Israel Radiological Association - איגוד הרדיולוגים בישראל
Hosting the מארח את
French Israel Association of Medical Imaging - AFIIM - SFR

17.25 CME CREDITS
In joint sponsorship with Albert Einstein College of Medicine of Yeshiva University, USA

Israel Radiological Association International Annual Meeting

Program & Abstracts

Dan Eilat Hotel (on the Red Sea), Israel
October 31 - November 2, 2012
ט"ו-י"ז בחשון תשע"ג, ימים רביעי - שישי

President of the conference:

Prof. Jacob Sosna, Chairman of ISRA

Organizing Committee:

Prof. M. Graif

M. Amitai MD, A.Blachar MD, N.Hiller MD, J.Luc Drape MD,

E.Konen MD,D. Shaham MD

Scientific Committee:

N.Hiller MD (Chairman), **L. Appelbaum MD, G. Bartal MD, A. Blachar MD,**

A. Engel MD, D. Goldsher MD, E. Konen MD, L. Kornreich MD,

N. Peled MD, T. Sella MD, D. Shaham MD, I.Shelef MD, R. Zissin MD

Faculty Committee:

Michael Zalis MD, Jan W. Casselman, MD, Marc Zins MD,

Nogah Haramati MD, Linda Haramati MD, Ronit Agid MD,

Jean Luc Drape – president AFIIM

CME Reviewer:

Nogah Haramati, MD

Professor of Clinical Radiology, Department of Radiology

(Musculoskeletal Radiology)

Professor of Clinical Orthopedic Surgery, Department of Orthopedic Surgery

Chief, Department of Radiology, Albert Einstein College of Medicine

Montefiore Medical Center, New York, USA

Quiz Committee:

J. Bar-Ziv MD, G. Bartal MD

Michal Meidan Award:

R. Katz MD (Chairperson), **I. Shelef MD, A. Nachtigal MD**

ISRA Website:

www.israel-radiology.org.il

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OFAKIM
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General Information

Conference Venue: The conference and exhibition will be held at the Dan Hotel, Eilat.
Conference Floor (-2).
- Hall A – Main lecture Hall
- Hall B – Parallel Sessions

Registration Desk: Conference registration and information desk will be occupied on Wednesday, starting 10 a.m. at the Lobby floor. On Thursday and Friday, the desk will be situated at the conference floor, throughout the conference hours.

Name Badges: All participants are kindly requested to wear their name badges at all times.

Meals and Social Events: Light lunch will be served at the exhibition area on Wednesday and Friday.
On Thursday lunch will be served at the Dining Room.
Cocktail Reception will be held at the "Midbar" (Restaurant Floor).
Gala Dinner will be held at the Pool Area.
Vouchers included at the regisration Kit, will be requested at the entrace of each social event.

Posters Exhibition and Quiz: Posters and quiz will be displayed on screens during the conference at the exhibition area.

Main Exhibition: Registered participants are invited to visit the exhibition and receive information about the products and innovations of the participating companies.

Thanks:

To **"SIEMENS Israel"** for sponsoring the Gala Dinner
To **"Philips Healthcare"** for sponsoring the Cocktail reception
To **"SIEMENS Israel"** for sponsoring the "Michal Meidan award" ceremony
To **"Machon Mor"** for their support of the annual conference
To **"Bayer Schering Pharma"** – for sposoring the Quiz
To all exhibiting companies who participate the conference

מידע כללי

מיקום הכנס: הכנס והתערוכה המקצועית יתקיימו בקומת הכנסים שבמלון (קומה 2-).
אולמות הכינוס הינם:
- אולם A - למושבים במליאה ובפיצול
- אולם B - למושבים בפיצול

תערוכה מסחרית - בשטח המקיף את האולמות

דלפקי ההרשמה: דלפקי ההרשמה יהיו פתוחים ביום רביעי, החל מהשעה 10:00 בבוקר בקומת הלובי ובמהלך ימים חמישי-שישי בקומת הכנסים.

תג זיהוי: המשתתפים מתבקשים לענוד את תג השם שלהכנס במהלך כל ימי הכנס. הכניסה לשטחי הכנס ולאירועים תותר לנושאי תג בלבד.

ארוחות וארועים חברתיים: ארוחות הצהרים הקלות יוגשו בשטח התערוכה בימים רביעי ושישי.
ביום חמישי ארוחת הצהרים תוגש בחדר האוכל של המלון.
הקוקטייל יתקיים ב"מדבר" הנמצא בקומת חדר האוכל.
ערב הגאלה יתקיים מסביב לבריכה.
הכניסה לאירועים ולארוחות הצהריים עם הצגת שובר מתאים.

תצוגת הפוסטרים והקוויז: תצוגת הפוסטרים והקוויז יתבצעו **על גבי מסכי פלזמה**, אשר ימצאו בשטח התערוכה במהלך כל הכנס. הקוויז מציג מקרים מדעיים למתמחים בלבד ובין הפותרים יוגרלו ספרי רפואה יקרי ערך.

תערוכה מסחרית: במקביל לכנס מתקיימת תערוכה, בה יוצגו החידושים והעדכונים של החברות המסחריות העוסקות בתחום.

תודות:

לחברת **"SIEMENS Israel"** על מתן חסות לערב גאלה
לחברת **"Philips Healthcare"** על מתן חסות לקוקטייל
לחברת **"SIEMENS Israel"** על מתן חסות לעבודת הפרס ע"ש מיכל מידן
ל**"מכון מור"** על תמיכתו בכינוס השנתי
ל"Bayer Schering Pharma", על תמיכתה בקוויז
ולכל החברות המציגות המשתתפות בתערוכה

EXHIBITORS:

Ardon Medical Ltd

Bayer Schering Pharma

Covidien

Dexcel pharma

Dinco

DMS – Carestream Health

Eldan Electronic instruments

HARAKIA HAREVEI Ltd

PHILIPS HEALTHCARE

SIEMENS Healthcare

Inframed Medical Technologies

Scholarship in Memory of Michal Meidan MD

מלגה לזכרה של ד"ר מיכל מידן-אברהמי ז"ל

י"ב באדר תשנ"ז - כ"ב בניסן תשכ"ה

21.3.1997 - 22.6.1965

ד"ר מיכל מידן נולדה בגבעתיים, למדה בבית הספר היסודי "בורוכוב" בגבעתיים.

חניכה ופעילה בתנועת הנוער "הנוער העובד והלומד" בקן גבעתיים.

למדה וסיימה תואר דוקטור לרפואה באוניברסיטת תל-אביב, התמחתה ברדיולוגיה בבית החולים וולפסון. מיכל הייתה רופאה מצטיינת, לקראת תום ההתמחות, כאשר נהרגה בפיגוע טרור בקפה אפרופו בתל-אביב ב-21 במרץ 1997. מיכל היתה בת 32 במותה ובחודש הרביעי להריונה.

משפחתה של מיכל מעניקה חסותה זו השנה ה-13 למלגת הצטיינות לרופא/ה מתמחה ברדיולוגיה, על שמה, ונועדה לממן ביקור בכנס ה-RSNA שייערך בשנת 2013 בארה"ב.

המלגה מוענקת על סמך עבודת מחקר שתוצג בכנס השנתי של איגוד הרדיולוגים, המתקיים השנה.

העבודה המצטיינת תבחר על-ידי חבר שופטים בראשותה של ד"ר רמה כץ.

את הפרס יעניק שי אברהמי - נציג המשפחה.

Dr. Michal Meidan was born in Givataim, and studied at Borochov Primary School in the town. She was a member of the youth movement of The Federation of Working and Studying Youth, at the Givataim branch. She graduated in Medicine at Tel Aviv University, specializing in Radiology at the Edith Wolfson Medical Center.

Michal was a brilliant resident ending her specialization term, when she was murdered at the Apropo Caffe terror attack in Tel Aviv, on March 21, 1997. Michal was 32 years old and was on her 4th month of pregnancy.

Michal's family will deliver for the 13th consecutive year – an excellence scholarship in her name, to a resident in Radiology. The award is intended to sponsor the attendance of its recipient at the RSNA Annual Congress, to be held in Chicago, USA, in 2013.

The scholarship is awarded based on a research work, which will be presented at Israel Radiological Association Conference this year.

A committee headed by Dr. Rama Katz will choose the best work.

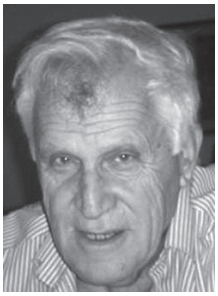
Mr. Shay Abrahami, the representative of the family will deliver the prize.

הזוכה במילגה ע"ש ד"ר מיכל מידן לשנת 2011 הוא
ד"ר ראדו רוזנברג ממרכז רפואי רמב"ם, חיפה

The prize is sponsored by SIEMENS Israel

Guest of Honor 2012 אורח הכבוד לשנת

Prof. Yacov Itzchak



Prof. Yacov Itzchak was born in Bagdad, Iraq in 1939 and immigrated to Israel in 1950. He attended the Medical School at the Hebrew University in Jerusalem and graduated in 1965. During the years 1968 - 1972, he specialized in Diagnostic Radiology. In 1977, he received a Ph.D. degree from the Weitzman Institute of Sciences in Rehovot. He served as Major in the Israeli army, supervising the Radiology and Radiation service.

Since 1982 he is a full Professor of Diagnostic Radiology at the Tel Aviv University.

Between 1975-1977 he was a visiting assistant professor of radiology at the Department of Diagnostic Radiology at Yale University, focusing on diagnostic ultrasound. Upon his return to Israel, he established the Ultrasound diagnostic unit at Sheba Medical Center and founded the Israeli Society for Ultrasound in Medicine, which he chaired for 10 years.

Prof. Itzchak he was the Head of the Diagnostic Imaging Department at the Chaim Sheba Medical Center between the years 1987-2010. For many years he was also chairman of Diagnostic Imaging Faculty at Tel Aviv University. During this period, the first clinical MRI scanner in Israel (Elscint) was installed in Sheba. At the mid-90's he collaborated with IBM Israel on the development of the first PACS system in Israel.

His main research interests are early cancer detection, breast imaging, tumors thermal ablation, PACS (Picture Archive Computerized systems), Functional Magnetic Resonance and teaching and management in radiology.

He is the author of more than 160 scientific papers, participated in multiple international conferences and is an active member in nine Radiological Societies, both local and abroad. Since his retirement he volunteers in the Department of Imaging in Sheba Medical Center, being active in both clinical, and research work. Prof. Itzchak is married and has three children and two granddaughters.

Professor Yaacov Itzhak, our guest of honor for the year 2012, a pioneer in Imaging and man of vision.

פרופ' יעקב יצחק

נולד בבגדד ב-1939, עלה לארץ ב- 1950 בגיל 11 עם הוריו, שהיו בין מקימי כפר חדש ליד גדרה.
לאחר סיום בית ספר תיכון התקבל ללימודי רפואה באוניברסיטה העברית במסגרת העתודה האקדמית, וסיים את לימודיו ב-1965. במהלך שירותו הגיע לדרגת רב סרן והיה אחראי על הרדיולוגיה ונושא הקרינה בצה"ל.

בשנים 1968-1972 ביצע התמחות במכון הרנטגן בבי"ח אסף הרופא. ב-1973 סיים תואר שני באוניברסיטת תל אביב וב-1977 קיבל תואר PhD. ממכון ויצמן ברחובות.

בין השנים 1975 ו-1977 היה פרופסור אורח במכון הרדיולוגי ב-Yale, ארה"ב, וביצע התמחות בתחום חדש שהיה אז עדיין בחיתוליו - אולטראסאונד. עם חזרתו לארץ היה מחלוצי השימוש באולטראסאונד בארץ. הוא התקבל למכון הדימות בבי"ח בתל השומר והקים את יחידת האולטראסאונד. אחרי שנתיים מונה כמנהלה.

בין השנים 1987-2006 שירת פרופ' יצחק כמנהל אגף הדימות במרכז הרפואי ע"ש שיבא. בתקופת כהונתו הותקן סורק ה-MRI הראשון בישראל, של חברת אלסינט. באמצע שנות ה-90 הוביל פרופ' יצחק מיזם משותף של המרכז הרפואי ע"ש שיבא יחד עם IBM ישראל בפיתוח מערכת ה-PACS הראשונה בארץ. בזכות זאת, ה-PACS הנוכחי ב"שיבא" כולל עד היום את כל בדיקות הנבדקים במכון הדימות מאז 1997.

בשנת 1979 קיבל מינוי פרופסור חבר בחוג לרדיולוגיה באוניברסיטת תל אביב, והחל מ-1982 הינו פרופסור מלא. תחומי ההתעניינות העיקריים במחקרו ועבודתו הקלינית של פרופ' יצחק במשך הקריירה הארוכה והעמוסה שלו כוללים מחקרים באנגיוגרפיה, מחקר חלוצי בתחום פיתוח מכשיר האולטראסאונד, גילוי מוקדם של סרטן, אבלציה טרמלית, PACS, f-MRI, חינוך וארגון מערכות ברדיולוגיה. פרופ' יצחק הינו מחברם של יותר מ- 160 מאמרים, השתתף והרצה במפגשים רדיולוגים בינלאומיים רבים, וגם היום הינו חבר ב-9 חברות רדיולוגיות בארץ ובחו"ל.

מאז פרישתו פרופ' יצחק ממשיך לעבוד ולתרום הן בתחום הקליני והן בתחום המחקרי במכון הדימות במרכז הרפואי ע"ש שיבא. הוא נשוי ואב לשלושה ילדים ושתי נכדות. אנו מאחלים לו עוד שנים רבות של בריאות ועשיה פוריה.

האיגוד הרדיולוגי הישראלי מתכבד לבחור כאורח הכבוד לשנת 2012 את פרופ' יצחק, איש חזון וחלוץ בתחום הדימות.

Program at a Glance

Wednesday October 31, 2012		Thursday November 1, 2012			Friday November 2, 2012		
	Hall A		Hall A	Hall B		Hall A	Hall B
		08:00-09:00	Registration		08:35-09:00	Guest Lecturer: M. Zalis MD, (USA)	
		09:00-09:15	Opening Remarks: J. Sosna **MD** Chairman of ISRA				
		09:15-09:45	Guest Lecturer: M. Zins MD, (France)		09:00-10:30	Session 9 Musculoskeletal Imaging	Session 10 Interventional Radiology
		09:45-10:15	Guest Lecturer: M. Zalis MD, (USA)				
10:00-12:00	Registration	10:15-11:00	Session 1 Abdominal Imaging Part 1	Session 2 Pediatric Imaging Part 1	10:30-11:00	*Coffee Break*	
12:00-13:00	Refresher and Educational Course: Pratical imaging From Head to Toe	11:00-11:30	*Coffee Break*		11:00-11:20	Guest Lecturer: J. L. Drape MD, (France)	
		11:30-13:00	Session 3 Abdominal Imaging Part 2	Session 4 Pediatric Imaging Part 2	11:20-12:40	Session 11 General Imaging & Informatics	Session 12 Breast Imaging
13:00-13:30	**Light Lunch Break**	13:00-14:00	*Lunch Break*		12:45-13:30	Quiz Solutions Michael Meidan Award Closing Remarks	
13:30-15:00	Refresher and Educational Course: Pratical imaging From Head to Toe	14:00-14:30	Guest Lecturer: J. W. Casselman MD, (Belgium)		13:30-14:00	*Light Lunch*	
		14:30-15:35	Session 5 Chest Imaging	Session 6 Neuroradiology Part 1			
15:00-15:30	**Coffee Break**	15:35-16:00	*Coffee Break*				
15:30-17:00	Refresher and Educational Course: Pratical imaging From Head to Toe	16:00-17:30	Session 7 Cardiovascular Imaging	Session 8 Neuroradiology Part 2			
17:00-19:00	AFIIM Workshop						
19:30	*Welcome Cocktail Reception*	20:00	*Gala Dinner*				

ISRA International Annual Meeting 2012
Conference Program

Refresher and Educational Course: Practical Imaging from Head to Toe — Hall A

Moderators: M. Amitai, A. Nachtigal, C. Hoffman

Wednesday, October 31, 2012

11:00-12:00	**Registration and light refreshments**
12:00-12:30	Cerebral aneurysms - Pitfalls of non-invasive imaging (CTA) **Ronit Agid MD**, Canada
12:30-13:00	Larynx imaging: Anatomy and pathology **Jan Walter Casselman MD**, Belgium
13:00-13:30	***Light Lunch Break***
13:30-14:00	CT of pulmonary embolism - Evidence for overdiagnosis **Linda B. Haramati MD**, USA
14:00-14:30	Breast imaging – update **Miri Sklair-Levy MD**, Israel
14:30-15:00	Cirrhosis, from regenerative nodule to HCC - Practical approach **Ofer Binyaminov MD**, Israel
15:00-15:30	***Coffee Break***
15:30-16:00	Cystic lesions of bone - A practical approach **Nogah Haramati MD**, USA
16:00-16:30	Endovascular treatment for peripheral vascular disease - All you need to know **Eli Atar MD**, Israel
16:30-17:00	Differential diagnosis of lesions of the distal phalanx **Jean-Luc Drape MD**, France
17:00-19:00	**Forth AFIIM Workshop** — **Pre-Registration required** US of digestives arteries: Normal and pathologic findings **Prof. Jean Michel Correas (hospital Necker, Paris**, France)
19:30-22:00	***Welcome Cocktail Reception***

Thursday November 1, 2012

08:00-09:00 ***Registration***

09:00-09:15 **Opening Remarks - J. Sosna**, Chairman of ISRA — **Hall A**

09:15-09:45 Abdominal MR imaging at 3T: is it really better?
Guest Lecturer: M. Zins MD, France

09:45-10:15 Advanced search of the electronic health record to improve operations in radiology: Data driving optimal practice
Guest Lecturer: M. Zalis MD, USA

10:15-11:00 *Parallel Session* — **Session 1: Abdominal Imaging-Part 1** — **Hall A**
Chairmen: A. Blank, A. R. Zina

10:15 -10:24 Managing challenges and pitfalls in MRI evaluation of suspected appendicitis in pregnancy
M. Amitai, L. Guranda, S. Apter, O. Portnoy, Y. Eshet
Sheba Medical Center, Tel-Hashomer, Israel

10:24-10:33 CT pelvimetry and neonate head circumference parameters are highly correlated with the risk for instrumental delivery and cesarean section due to cephalo-pelvic disproportion
A. Koval, L. Linov, A. Anteby
Barzilai Medical Center, Israel

10:33-10;42 Accuracy of ultrasonographic diagnosis of acute appendicitis in pregnant women
N. Kokhanovsky, A.R. Zeina, N. Reindorp, A. Levit-Kantor, Y. Glick, A. Nachtigal
Hillel Yaffe Medical Center, Hadera, Israel

10:42-10:51 Post-hysterectomy ovarian vein thrombosis-CT detection and clinical significance
A. Osadchy, R. Zissin
Meir Medical Center, Kfar Saba, Israel

10:51-11:00 CT appearance of uterine cesarean scar: Correlation with clinical outcome and complications
Y. N. Turner, R. Nabulsi, S. Grisaro, N.R. Bogot
Shaare Zedek Medical Center, Jerusalm, Israel

10:15-11:00 *Parallel Session* — **Session 2: Pediatric Imaging** — **Hall B**
Chairmen: M. Soudack, K. Rozovsky

10:15-10:24 Ultrasound guided core biopsy as the primary tool for tissue diagnosis in pediatric oncology
M. Abugazala, A. Ilivitzki, M. Arkovitz, A. Benbarak, S. Postovsky, N. Arad-Cohen, M. Ben-Arush, D. Gaitini, A. Engel
Rambam Health Care Campus, Haifa, Israel

10:24-10:33 Reconsidering appendix testis torsion: A distinct cluster of ultrasonographic features
M. Lev, J. Ramon, Y. Mor, J.M. Jacobson and M. Soudack
Sheba Medical Center,Tel-Hashomer, Israel

10:33-10:42 Sonographic features differentiating small bowel from ileocolic intussusceptions in children
N. Lioubashevsky, N.Simanovsky, N. Hiller
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

10:42-10:51 Image gently: Image quality and dose assessment in portable chest radiographs in the NICU and PICU before and after implementation of a high-KVP technique
B.Z. Koplewitz, A. Yahav-Dovrat, K. Rozovsky, J. Sosna and I. El-Bakri
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

10:51-11:00 Correlation between post-mortem computed tomography and magnetic resonance imaging and autopsy findings in children
N. Berkovitz, M. Vasserman, P. Gottlieb, S. Tal
Assaf Harofeh Medical Center, Zerifin, Israel

11:00-11:30 ***Coffee Break***

11:30-13:00 **Session 3: Abdominal Imaging - Part 2** **Hall A**
Parallel Session *Chairmen: O. Benjaminov, D. Gaitini*

11:30-11:45 Pancreatic mass: Tumor or inflammation? What imaging diagnostic strategy?
Guest Lecturer: M. Zins MD, France

11:45-11:54 Acute graft versus host disease of the gastrointestinal tract: CT in the clinical and prognostic evaluation
S. Apter, U.Rimon, M. Hertz , R. Yerushalmi, M. Amitai, O. Portnoy, L. Guranda, A. Nagler, A. Shimoni
Sheba Medical Center, Tel-Hashomer, Israel

11:54-12:03 Computed Tomography study of the effect of orlistat on visceral adipose tissue volume in obese subjects
G. Bachar, Y. Inbar, D. Dicker, P. Herskovitz, M. Katz, E. Atar
Rabin Medical Center, Petah Tikva , Israel

12:03-12:12 CT urography - A single institution review
N. Loberant, A. Kolesnikov, O. Yakir
Western Galilee Hospital, Nahariya, Israel

12:12-12:21 Imaging of drug smuggling and various body packing techniques, preliminary results
O. Mozes, Y. Eshet, O. Goitein, E. Konen, L. Guranda
Sheba Medical Center, Tel-Hashomer, Israel

12:21-12:30 Volumetric CT measurement of liver metastases: Our experience with a new software technique
S. P. Raskin, M. Amitai
Sheba Medical Center, Tel-Hashomer, Israel

12:30-12:39 Detection of net liver metastases with (GA-68-DOTATOC) PET-(GD-EOB DTPA) MRI fusion
N. F. Schreiter, R. Roettgen, U. F. Pape, B. Hamm, W. Brenner, M. Nogami
Charité - Universitätsmedizin Berlin, Campus Virchow, Berlin, Germany

12:39-12:48 Real time sonoelastography in the differential diagnosis of focal hepatic lesions
R. Schor Bardach, N. Simanovsky, N. Hiller, N. Lioubashevsky
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

12:48-12:57 Renal tumors: Radiologic pathologic correlation work in progress
E. Abramovici, I. Cohen, N. Loberant
Western Galilee Hospital, Nahariya, Israel

11:30-13:00 **Session 4: Pediatric Imaging – Part 2** **Hall B**
Parallel Session *Chairmen: O. Konen, B. Kopelewitz*

11:30 -11:45 Imaging of vascular malformations in children
Guest Lecturer: L. Korienrich MD, O. Konen MD, M. Schwarz MD, Israel

11:45-11:54 MR imaging in septo-optic dysplasia: A spectrum of associated congenital malformations
A. Ben Ely, H. Branson, S. Ahsan, C. A. Raybaud
Hospital for Sick Children, Toronto, ON, Canada

11:54-12:03 ADC values of the developing normal fetal brain
C. Hoffmann, D. Bergman
Sheba Medical Center, Tel-Hashomer, Israel

12:03-12:12 MRI white matter lesions in pediatric migraine
O. Konen, T. Eidlitz-Markus, A. Zeharia
Schneider Children's Medical Center, Petach Tikva, Israel

12:12-12:21 Otogenic sinus vein thrombosas in children: Does it still occur? Are we sure of diagnosis?
L. Kornreich, O. Konen, M. Schwarz, O. Ulanovski, J. Yacobovich, N. Buller, E. Raveh
Schneider Children's Medical Center, Petach Tikva, Israel

12:21-12:30 Fast-brain MRI in children: Quick, without sedation, and radiation-free, but beware of pitfalls
K. Rozovsky, E. Ventureyra, E. Miller
Hadassah Hebrew University Medical Center, Jerusalem, Israel

12:30-12:39 Safety and efficacy of liver biopsies in children using 18G and 20G coaxial core-needles
Y. Rapson, R. Shapiro, Y. Mozer-Glassberg, A. Belenky, M. Knizhnik, S. Litvin, E. Atar
Rabin Medical Center, Petach-Tikva, Israel

12:39-12:57 Discussion

13:00-14:00 ***Lunch Break***

14:00 -14:30 MRI of the head and neck, basic technical requirements: Coils-sequences techniques
Guest Lecturer: J. W. Casselman MD, Belgium

14:30-15:35 **Session 5: Chest Imaging** **Hall A**
Parallel Session *Chairmen: G. Aviram, E. Marom*

14:30-14:39 Automated computerized software for diameter and volume measurements of pulmonary metastatic disease: Preliminary evaluation
E. Lotan, D. Aharoni, S. Raskin, I. Eshed, B. Boursi, R. Berger, E. Konen
Sheba Medical Center, Tel-Hashomer, Israel

14:39-14:48 Immediate post-mortem Computed Tomography evaluation of trauma victims support lines malpositioning
E. Lotan, D. Simon, E. Konen, L. Guranda
Sheba Medical Center, Tel Hashomer, Israel

14:48-14:57 Normal CT characteristics of the thymus in adults
K. Rozovsky, N. Hiller, N. Loubashevsky, N. Simanovsky
Hadassah Hebrew University Medical Center, Jerusalem, Israel

14:57-15:06 CT-guided pericardiocentesis like a new possibility in patients with various causes pericardial effusion
A. Smolikov , D. Klyuchareva, S. Li , I. Shelef
Soroka University Medical Center, Beer-Sheva, Israel

15:06-15:15 Opposite side aspiration in resistant pneumothorax after CT-guided lung biopsy-complementary role after simple needle aspiration
D. Yaffe, D. Shitrit, M. Gottfried, G. Bartal, J. Sosna
Meir Medical Centre, Kfar Saba, Israel

15:15-15:25 Should pulmonary embolism be suspected in patients with acute exacerbation of chronic obstructive pulmonary disease?
A. R. Zeina, M. Beckerman, U. Soimu, A. Nachtigal
Hillel Yaffe Medical Center, Hadera, Israel

15:25-15:34 Retained fibrin sheaths: A common CT finding after long-term indwelling central venous catheter removal
G. Rosen, D. Krausz, J. Fisher, L.B. Haramati, W.B. Burton, A. Godelman, V.R. Jain, J. M. Levsky, B. Taragin, J. Cynamon, G. Aviram
Souraski Medical center, Tel Aviv , Israel

14:30-15:30 **Session 6: Neuroradiology - Part 1** **Hall B**
Parallel Session *Chairmen: Y. Amsalem, T. Jonach-Kimchi*

14:30-14:45 Intracranial arterial wall imaging
Guest Lecturer: R. Agid MD, Canada

14:45-14:54 Application of CT perfusion as an ancillary test in brain death diagnosis
R. Anconina, R. Novoa, E. Benkovich, I. Shelef
Soroka University Medical Center, Beer-Sheva, Israel

14:54-15:03 Quantification of CT perfusion parameters and penumbra based on aspects
A. Eran, B. Gilboa, G. Telman, Y. Amsalem
Rambam Health Care Campus, Haifa, Israel

15:03-15:12 A new algorithm for estimating blood-brain barrier permeability in magnetic resonance imaging studies
I. Shelef, V. Lublinsky, A. Friedman, Y. Chassidim
Soroka University Medical Center Beer-Sheva, Israel

15:12-15:21 Imaging of post mortem brain in situ by diffusion tensor imaging in forensic radiology
N. Berkovitz, O. Berman, P. Gottlieb, S. Tal
Assaf Harofeh Medical Center, Zerifin, Israel

15:21-15:30 Directional diffusivity changes describing micro-structural damage in normal appearing and lesioned cervical cord white matter in multiple sclerosis
N. Berkovitz, P. Gottlieb, S. Tal
Assaf Harofeh Medical Center, Zerifin, Israel

15:30-16:00 ***Coffee Break***

16:00-17:30 **Session 7: Cardiovascular Imaging** **Hall A**
Parallel Session *Chairmen: E. Konen, T. Gaspar*

16:00-16:15 Imaging of adult congenital heart disease - simple shunts
Guest Lecturer: L. B. Haramati MD, USA

16:15-16:24 Validation of aortic pulse wave velocity analysis assessed with velocity encoded MRI using parallel imaging with high reduction factor
N. Baram, I. Shelef, P. Rosen, G. Karp, A. Wolak
Soroka University Medical Center, Beer-Sheva, Israel

16:24-16:33 Aortic dimensions on MDCT versus echocardiography: Some are more equal than others...
A. R. Zeina, D. S. Blondheim, Y. Glick, L. Vassilenko, A. Shotan, A. Nachtigal
Hillel Yaffe Medical Center, Hadera, Israel

16:33-16:42 Trends in clinical Cardiovascular Magnetic Resonance (CMR) utilization
O. Goitein, A. Hamdan, Y. Eshet, S. Matezky, H. Hod, O. Agranat, Y. Salem, E. Di Segni, E. Konen
Sheba Medical Center, Tel- Hashomer, Israel

16:42-16:51 Microvascular obstruction assessed by cardiac MRI in patients with ST segment elevation MI (STMI) undergoing primary Percutaneous Coronary Interventions (PCI)
O. Goitein, A. Grupper, R. Beigel, A. Hamdan, Y. Eshet, H. Hod, E. Di Segni, E. Konen, S. Matetzky
Sheba Medical Center, Tel- Hashomer, Israel

16:51-17:00 The additive value of CT prior to Transcatheter Aortic Valve Replacement (TAVR) procedure
O. Goitein, E. Di segni, E. Konen, Y. Eshet, V. Guetta, A. Segev, A. Hamdan
Sheba Medical Center, Tel- Hashomer, Israel

17:00-17:09 Role of dobutamine stress MRI for preoperative cardiac risk assessment before major vascular surgery
A. Hamdan, O. Goitein, E. Di Segni, E. Konen
Sheba Medical Center, Tel-Hashomer, Israel

17:09-17:18 Epicardial adipose tissue as a predictor of coronary artery disease in asymptomatic subjects
G. N. Bachar, V. Hasminsky, D. Dicker, R. Kornowski, E. Atar
Rabin Medical Center, Petah Tikva, Israel

17:18-17:27 Vascular ring imaging - Ten years experience
Y. Salem, O. Goitein, J. Jacobson, D. Mishali, J. Danieli , U. Katz, D. Almelech, J. Hegesh, E. Di Segni, E. Konen
Sheba Medical Center, Tel-Hashomer, Israel

16:00-17:30 **Session 8: Neuroradiology - Part 2** **Hall B**
Parallel Session *Chairmen: D. Goldsher, O. Eizenshtein*

16:00-16:15 Hyperostosis Frontalis interna: Between two centuries
Guest Lecturer: H. May MD, Israel

16:15-16:24 Stent-assisted angioplasty in the management of extracranial carotid and vertebral arteries dissection after trauma
J. M. Gomori, S. Moscovici, E. Itshayek, F. Ramirez de Noriega, J. E. Cohen
Hadassah Hebrew University Medical Center, Jerusalem, Israel

16:24-16:33 Stent-based thrombectomy in the management of major ischemic stroke of the anterior circulation
J. M. Gomori, S. Moscovici, E. Itshayek, F. Ramirez de Noriega, J. E. Cohen
Hadassah Hebrew University Medical Center, Jerusalem, Israel

16:33-16:42 Endovascular stenting of extracranial carotid artery stenosis: Can zero postoperative stroke rates be achieved?
S. Mahgerefteh, S. Moscovici, O. Karaaslan, J. M. Gomori, J. E. Cohen
Hadassah Hebrew University Medical Center, Jerusalem, Israel

16:42-16:51 Potential consequences of late wilson's disease diagnosis
D. Kozic, I. Petrovic, M. Svetel, N. Boskov, V. Kostic
University of Novi Sad School of Medicine, Sremska Kamenica; Serbia

16:51-17:00 MR Neurography: Assaf Harofeh Medical Center preliminary results
S. Tal, Y. Cohen-Sivan, Y. Anekstein, Y. Mirovski
Assaf Harofeh Medical Center, Zerifin, Israel

17:00-17:09 Early MR findings in organophosphate-induced brain damage- potential biomarkers for short term prognosis
S. Shrot, D. Anaby , A. Krivoy, I. Makarovsky, Y. Rosman, E. Bloch-Shilderman, S. Lazar, A. Bar-shir, Y. Cohen
Sheba Medical Center, Tel-Hashomer, Israel

17:09-17:18 Advanced MR characteristics of peritumoral regions can discriminates between glioblastoma multiforme and cerebral metastases
S. Shrot, C. Hoffmann
Sheba Medical Center, Tel-Hashomer, Israel

17:18-17:27 Cerebral Fat Embolism (CEF): Imaging features -Experience of one medical center
R. Shreter, R. Shreiber, Y. Bar Lavie, D. Goldsher
Rambam Health Care Campus, Haifa, Israel

20:00 ***Gala Dinner***

Friday November 1, 2012

08:30-09:00 Laxative-free CT Colonography with advanced electronic cleansing and CAD: Technical and experience
Guest Lecturer: M. Zalis MD, USA — Hall A

09:00 -10:30 *Parallel Session* — **Session 9: Musculoskeletal Imaging** — Hall A
Chairmen: N. Shabshin, G. Flusser

09:00-09:15 Hip sport injuries
Guest Lecturer: E. Glaser MD and J. Levy MD, Israel

09:15-09:24 Bilateral hip replacement: Comparison of MRI signal intensity of periprosthetic pseudotumor collection between metal on metal and other hip replacement devices
D. Aharoni, E. Slomianski, T. Kushnir, A. Kadar, A. Menahem, A. Grundshtein, S. Dekel, I. Eshed
Sheba Medical Center, Tel-Hashomer, Israel

09:24-09:33 Metal-on-metal hip replacement: Correlation between blood metal ions levels and MRI signal intensity of different body tissues
E. Slonimsky, T. Kushnir, A. Kadar, S. Dekel, A. Grundshtein, A. Menahem, I. Eshed
Sheba Medical Center, Tel-Hashomer, Israel

09:33-09:42 Patients with atypical femoral fractures - Radiological parameters and medication exposure
L. TriptoShkolnik, A. Nachtigal, D. Militianu, R.Bachrach, A. Jaffe
Hillel Yaffe Medical Center, Hadera, Israel

09:42-09:51 The natural course of computed tomography progression in diffuse idiopathic skeletal hyperostosis - Preliminary results
G. Yaniv, S. Bader, N. Shazar, D. Aharoni, I. Eshed
Sheba Medical Center, Tel-Hashomer, Israel

09:51-10:00 Indices of paraspinal muscles degeneration: Reliability and association with facet joint osteoarthritis: Feasibility study
R. Tseitlin, L. Kalichman, A. Klindukhov, L. Ling, L. Linov
Ben Gurion University of the Negev, Beer Sheva, Israel

10:00-10:09 Early computed tomography findings of spinal infection
V. Perkhulov, P. Ben-Galim, M. Adi, P. Herskovitz and M. Katz
Kaplan Medical Center, Rehovot, Israel

10:09-10:18 Degenerative lumbar spinal stenosis and lumbar spine configuration
J. Abbas, K. Hamoud, N. Peled, H. May, D. Stein and I. Hershkovitz
Sackler faculty of medicine Tel-Aviv, Israel

10:18-10:27 MRI of the sacroiliac joints: Alternative diagnosis to inflammatory sacroiliitis
I. Eshed, D. Aharoni
Sheba Medical Center, Tel-Hashomer, Israel

10:27-10:36 Is contrast material needed for detecting enthesitis on MRI? A systematic comparison between stir and T1-W post-contrast images
E. Klang, U. Rimon, A. Dvora, A. Herman, N. Shazar, H. Kay-Geert, I. Eshed
Sheba Medical Center, Tel-Hashomer, Israel

09:00-10:30 **Session 10: Interventional Radiology** **Hall B**
Parallel Session *Chairmen: L. Appelbaum, J. Cynamon, G. Rozen*

09:00-09:09 Adjuvant catheter-directed intra-arterial steroid therapy for patients with high grade steroid-resistant Graft Versus Host Disease (GVHD)
S. Mahgerefteh , A. Klimov, M.Y.Shapira, D. Nahman, N. Sharon, R. Or, I. B. Resnick, A. Verstandig, A. I. Bloom
Hadassah Hebrew University Medical Center, Jerusalem, Israel

09:09-09:18 Diagnosis and treatment of popliteal artery entrapment syndrome: A single center experience using modern imaging techniques
A. Mahrer, A. Klimov, J. Sosna, Y. Leichter, I. Elbakri, H. Anner and A. I. Bloom.
Hadassah Hebrew University Medical Center, Jerusalem, Israel

09:18-09:27 Combined IR and OB approach to the management of abnormal placental penetration
J. Singer-Jordan, S. Papura, O. Ofir, Y. Bornshtein
Western Galilee Hospital, Nahariya, Israel

09:27-09:36 Long term outcome for angioplasty with stent graft versus bare stent for cephalic arch stenosis in hemodialysis access
I. Zaghal, D. Shemesh, I. Goldin, S. Shmailovitz, A. Verstandig, D. Berelowitz and O. Olsha
Shaare Zedek Medical Center, Jerusalem, Israel

09:36-09:42 Elective selective calicealureteronephrostomy insertion in minimaly or non-hydronephrotic kidneys as a preparation for PCNL
A. Belsky, H. Neyman, E. Belenky Bleich, D. Lifshitz, R.Holland, A. Belenky, S. Litvin, M. Kniezhnik, E. Atar
Hasharon Hospital, Rabin Medical Center, Petach-Tikva, Israel

09:42-09:57 IRE (Irreversible Electroporation) treatment effect susceptibility to local tissue properties
E. Ben David, M. Faroja, L. Appelbaum, J. Sosna, I. Nissenbaum, S.N. Goldberg
Hadassah Hwbrew University Medical Center, Jerusalem, Israel

09:57-10:06 Computed-tomography-guided high-dose-rate brachytherapy (CT-HDRBT ablation of metastases adjacent to the liver hilum
F. Collettini, A. Singh, D. Schnapauff, M. J. Powerski, T. Denecke, P. Wust, B. Hamm, B. Gebauer
Campus Virchow-Klinikum, Berlin, Germany

10:06-10:15 Comparing outcome of magnetic resonance-guided focused ultrasound surgery and uterine artery embolization for uterine fibroids - short-term and mid-term results
V. Froeling, K. Meckelburg, C. Scheurig-Muenkler, N. F. Schreiter, J. Kamp, H. Maurer, B. Hamm, A. Beck, T. J. Kroencke
Campus Virchow-Klinikum, Berlin, Germany

10:15-10:24 Optical guidance in percutaneous CT guided procedures
N. Greenbaum, L. Appelbaum, A. Hirschenbein, Y. Applbaum, Y. Libson, J. Sosna
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

10:24-10:33 Optimizing cluster electrode radiofrequency ablation
A. Wandel, A. Feifer, M. Faroja, S. Gourovitch, S. N. Goldberg
Wolfson Medical Center, Holon, Israel

10:35-11:00 ***Coffee Break***

11:00-11:20 Comprehensive approach and treatment of Modic 1 discopathies
Guest Lecturer: J. L. Drape MD, France

11:20-12:45 **Session 11: General Imaging & Informatics** **Hall A**
Parallel Session *Chairmen: G. Blinder, N. Peled*

11:20-11:35 Request for radiological results as an unbeatable way to attack medical systems
Guest Lecturer: D. Amitai, Israel

11:35-11:44 Frequency of risk factors for contrast-induced nephropathy in a busy academic CT unit: The importance of kidney protection measures
S. Fraifeld, A. Slobodnik, S. Mahgerefteh, O. Karaaslan, J. Sosna
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

11:44-11:53 Initial evaluation of language independent speech recognition system for radiology reporting
G. Bartal, M. Werner, E. Kots, A. Osadchy, A. Makori
Meir Medical Center, Kfar-Saba, Israel

11:53-12:02 Successive integrated PACS and RIS implementation improves communication and collaboration between radiologists and referring physicians
G. Bartal, M. Ayal, L. Haj, Z. Rosenbaum, A. Makori
Meir Medical Center, Kfar-Saba, Israel

12:02-12:11 Analysis of calcium, iron and iodine concentrations by material decomposition maps derived from dual-layer dual-energy CT
M. Gabbai, Leichter, R. Zimam, J. Sosna
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

12:11-12:20 Screening for Abdominal Aortic Aneurysm
I. Subotsky, I. Greenberg-Wolff, Y. Klainbaum
Maccabi Health Service, Israel

11:20-12:40 **Session 12: Breast Imaging** **Hall B**
Parallel Session *Chairmen: Z. Galamidi, T. Arazi-Kleinman*

11:20-11:29 Detection of suspicious calcifications on single view (MLO) mammography
Y. Adler-Levy, G. Zeltzer, T. Sella
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

11:29-11:38 Conventional ultrasound, nipple ultrasound and sonoelastography in breast papillary lesions: Diagnostic challenges and usefulness
A. R. Chiorean, M. M. Duma, M. A. Chiorean, S. A. Sfrangeu
"Iuliu Hatieganu", Faculty of Medicine, Cluj Napoca, Romania

11:38-12:47 Imaging aspects in non-neoplastic breast inflammatory diseases
M. M. Duma, A. R. Chiorean, A. Lebovici, M. A. Chiorean, S. A. Sfrangeu
University of Medicine and Pharmacy, Cluj Napoca, Romania

12:47-11:56 Sonographic detection of microcalcifications- Potential of new method
M. Grigoryev, T. Fischer, F. Diekmann, U. Bick, T. Slowinski, A. Thomas
Charité - Universitätsmedizin, Berlin, Germany

11:56-12:05 Early and late fluorescence near-infrared mammography for detection and differentiation of breast cancer
A. Poellinger, A. Hagen, D. Grosenick
Charité Campus Virchow Klinikum, Berlin, Germany

12:05-12:14 Shear-wave elastography of sonographic breast masses undergoing core needle biopsy - Histopathologic correlation
T. Sella, G. Zeltzer, T. Kleinman, E. Chernovsky, B. Maly
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

12:14-12:23 Dual-energy contrast-enhanced digital mammography vs mammography alone: Initial clinical results
M. Sklair-Levy, A. Rundestein, A. Shalmon, Y. Servadio, E. Konen
Sheba Medical Center, Tel-Hashomer, Israel

12:23-12:32 Evaluation of residual breast tissue post mastectomy using breast MRI
V. Tsehmaister Abitbol, A. Rundstein, A. Shalmon, E. Konen, M. Sklair-Levy
Sheba Medical Center, Tel-Hashomer, Israel

12:32-12:40 Paget's nipple disease: Radiological/pathological correlation
N. Weisenberg, I. Sharshevsky, M. Shapiro
Meir Medical Center, Kefar Saba, Israel

12:45-13:30 **Michal Meidan Award Ceremony, Quiz Solutions and awards, Closing Remarks**

13:30-14:00 ***Light Lunch***

ABSTRACTS

MANAGING CHALLENGES AND PITFALLS IN MRI EVALUATION OF SUSPECTED APPENDICITIS IN PREGNANCY

M. Amitai, L. Guranda, S. Apter, O. Portnoy, Y. Eshet
Department of Diagnostic Imaging, Sheba Medical, Tel Hashomer,
Sackler Faculty of Medicine, Tel Aviv University

BACKGROUND

An early diagnosis of appendicitis in pregnant women presenting with abdominal pain is critical for better fetal outcome. Readily available imaging modalities such as CT and US have limitations: CT is associated with a large dose of ionizing radiation, while abdominal ultrasound is less sensitive especially in advanced pregnancies. Abdominal MRI has no identifiable adverse effect on the pregnancies or neonatal outcomes; however its availability is relatively low, its cost is high and the number of trained radiologists able to give an initial report around the clock is sparse. Our institution recently decided to make MRI more available to pregnant women presenting with acute abdominal pain.
To present the work flow chart for management of pregnant women suspected of appendicitis using abdominal MRI and to describe the pitfalls and challenges incurred.

MATERIALS AND METHODS

Consecutive MRI studies of pregnant women presenting with acute abdominal pain during a 4 year period were surveyed. Initial reports were correlated with next day final report and with operative and follow up outcomes. Our protocol adapted to pregnancy included axial coronal and sagittal non-contrast scans single-shot fast spin echo (SSFSE) FIESTA acquisition which is relatively motion insensitive to reduce artifact from a mobile fetus, Fast SE T2, FSPGR 2D T1 + fat sat LAVA 3D T1 + fat sat to delineate anatomic structures, and time-of-flight acquisition to differentiate the appendix from dilated venous collaterals of the right gonadal vein. Most of the studies were performed after ingestion of Mannitol 5% administered one hour prior to scanning for better identification of the cecum and the illeo-cecal valve area.

RESULTS

32 patients were referred to MRI to rule out appendicitis. Technician and on-call staff radiologist were trained to conduct the modified protocol and to detect appendiceal inflammation. A good correlation (31/32) between the initial interpretation and the following day final report was found. Follow-up was available for 20/32 patients. Out of 32 women only 2 had an initial report diagnosing appendicitis which was later confirmed surgically. One patient was operated although the MRI was negative for appendicitis, and no appendicitis was found. In 7 women the appendix was not identified, however, there were no other signs of inflammation. In 11 patients other pathologies were found that were possibly responsible for the symptoms.

CONCLUSIONS

MRI evaluation for suspected appendicitis is a viable option and the pitfalls and challenges of this modality can be overcome with training of technicians and radiologists.

CT PELVIMETRY AND NEONATE HEAD CIRCUMFERENCE PARAMETERS ARE HIGHLY CORRELATED WITH THE RISK FOR INSTRUMENTAL DELIVERY AND CESAREAN SECTION DUE TO CEPHALO-PELVIC DISPROPORTION

A. Koval, L. Linov, A. Anteby
Barzilai Medical Center, Israel

PURPOSE
To evaluate the risk for instrumental delivery (ID) and cesarean section (CS) due to cephalo-pelvic disproportion (CPD), according to maternal pelvic parameters in CT, and neonate weight and head circumference.

MATERIALS AND METHODS
The picture archiving and communication system (PACS) was screened for abdominal CT in the last 3 years of all patients who also had had delivery in the same university medical center. Pelvimetry was performed retrospectively to measure the anterior-posterior (AP) and lateral diameters of the pelvic inlet, mid and outlet. All the deliveries were at term, with singleton fetus in vertex presentation. The cases were divided into three groups according to the mode of delivery: normal vaginal delivery (NVD), instrumental delivery (ID) and cesarean section that was performed during active labor (CS). Correlations between maternal pelvic parameters, neonate weight and head circumference (HC) and the mode of delivery were evaluated.

RESULTS
One hundred and eleven cases were enrolled to the study. Eighty four patients had had NVD, 20 – CS and 7 – ID. In the pelvic parameters, the transverse mid pelvis (the inter ischial spines diameter) was significantly smaller in ID and CS in comparison to NVD (9.5±1.1, 9.8±0.9 and 10.4±0.8 cm respectively, p=0.002). We expressed the composed AP and lateral parameters of the pelvic inlet, mid and outlet - with the "naive formula" of estimated ellipse circumference (EEC). The mid pelvic EEC was significantly smaller in ID and CS in comparison to NVD (32±2.6, 33.5±3.5 and 34.8±2.3 cm respectively, p=0.034). The neonates HC were significantly bigger in ID and CS in comparison to NVD (34.9±1.1, 34.9±2.5 and 33.8±1.7 cm respectively, p=0.03). There were no differences in neonatal weights between the different modes of delivery. We used the ratio between the pelvic EEC and HC to express the proportion score (PS) for CPD. The proportion scores were significantly smaller in ID and CS in comparison to NVD – in all pelvic levels - the inlet, mid and outlet (1.08±0.1 and 1.09±0.1 VS 1.15±0.08, p=0.006; 0.92±0.09 and 0.97±0.1 VS 1.03±0.08, p=0.0003; 0.77±0.04 and 0.81±0.07 VS 0.84±0.08 p=0.011 – respectively).

CONCLUTIONS
Low PS which expresses the relation between maternal pelvic parameters and neonate head circumference, is highly correlated with ID and CS due to CPD.
Clinical relevance:Using pelvimetry following CS suspected for CPD and calculating the PS – may be a tool to define the individual HC cutoff in which trial of labor after CS in the next pregnancy should be avoided.

ACCURACY OF ULTRASONOGRAPHIC DIAGNOSIS OF ACUTE APPENDICITIS IN PREGNANT WOMEN

N. Kokhanovsky, A.R. Zeina, N. Reindorp, A. Levit-Kantor, Y. Glick, A. Nachtigal

Department of Radiology, Hillel Yaffe Medical Center, Hadera, Affiliated with the Faculty of Medicine, Technion - Israel Institute of Technology, Haifa, Israel

PURPOSE

Acute appendicitis is the most frequently suspected acute abdominal disorder in the Emergency Department and the most common indication for emergency abdominal surgery. Clinical evaluation of acute appendicitis is difficult in pregnant patients. Ultrasonography remains the initial imaging study of choice in the evaluation of the pregnant woman with an acute abdomen. The purpose of our study was to assess the reliability and value of the sonographic examinations in the diagnosis of acute appendicitis in pregnant women.

MATERIALS AND METHODS

We obtained sonographic examinations performed on 68 pregnant women with suspected acute appendicitis retrospectively for 16 months (Sep. 2008 – Feb. 2010). Study subjects' average age was 27.3, with an average gestational age of 26 weeks. Sonography was the first imaging modality employed. Surgery or clinical follow-up was the gold standard for the evaluation of sonographic performance. All examinations were performed using gray-scale graded compression in the left lateral decubitus position for detecting an enlarged appendix. The sonographic criteria for acute appendicitis were detection of a noncompressible, blind-ended, tubular, multilayered structure measuring greater than 6 mm in maximal diameter. Additional relevant findings, such as the presence of enlarged regional lymphatic nodes, free fluid, cecal wall edema and highly echogenic mesenteric fat, were variably detected.

RESULTS

4 patients had positive sonographic findings of acute appendicitis (5.9%). Sonographic findings were correlated with surgical findings and clinical follow-up. The diagnosis was confirmed in all 4 patients (100%). In the 64 patients with negative sonographic findings of acute appendicitis, the result for 1 patient (1.6%) proved false-negative, whereas the remaining 63 (98.4%) improved on clinical follow-up. Accordingly, sensitivity was 80.0%, specificity was 100% and overall accuracy was 98.5%. Moreover, in 4 out of the 64 patients with negative sonographic findings for acute appendicitis, a different pathologic finding such as acute pyelonephritis was identified. We present the correlation of all the sonographic signs in the form of comparative charts.

CONCLUSIONS

Our experience suggests that gray-scale graded compression ultrasonography in the left lateral decubitus position, in addition to color Doppler imaging, is a highly accurate method for the diagnosis of acute appendicitis in pregnant women and should be performed as the first imaging test. We present the optimal study protocol, which allows not only to selectively examine the right lower quadrant of the abdomen, but to diagnose other common pathologic conditions in pregnant women as well.

POST-HYSTERECTOMY OVARIAN VEIN THROMBOSIS-CT DETECTION AND CLINICAL SIGNIFICANCE

A. Osadchy, R. Zissin
Department of Diagnostic Imaging, Meir Medical Center, Kfar Saba, affiliated to the Sackler Faculty of Medicine, Tel-Aviv University, Tel-Aviv, Israel

PURPOSE

Ovarian vein thrombosis (OVT) is a well known complication of puerperium and gynecological surgery for malignancy. Cases of OVT associated with benign hysterectomy are rare, but it may be more common than has been reported. The literature, does not present clear recommendations about whether OVT in association with hysterectomy should be treated. The purpose of the study is to report our experience in post-hysterectomy OVT.

MATERIALS AND METHODS

Seven women, aged 32-67 years, diagnosed with OVT after hysterectomy on CT, during a 3 years period, were retrospectively reviewed. Five of them underwent operation for malignant disease and two for benign conditions, 10 days – 5 months before the CT.

RESULTS

CT was done as a follow up study in 5 patients and for early postoperative abdominal pain in two patients with benign background. The OVT was right-sided in 3 cases and left-sided in 4. In one case the thrombus extended into the left renal vein. OVT was diagnosed as a low density filling defect in a non dilated ovarian vein in a Contras enhanced CT.
In three patients a pulmonary embolism (PE) was found: right-sided in 2 and bilateral in one, all of them without any respiratory symptoms. In one of them the diagnosis of PE was initially missed. Only the two patients with diagnosed PE were treated with anticoagulants. The other five had uneventful follow up.

CONCLUSIONS

CT may be the first imaging modality to discover unsuspected post-hysterectomy OVT and associated complication of clinically unsuspected PE. Radiologists must be aware of these uncommon insults and should carefully look for them. Further investigation is needed to evaluate the clinical significance of these pathological findings.

CT APPEARANCE OF UTERINE CESAREAN SCAR: CORRELATION WITH CLINICAL OUTCOME AND COMPLICATIONS

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PURPOSE

To correlate the postoperative appearance of the uterine scar in the early post operative period with infectious complication,and obstetric outcome.

MATERIAL AND METHODS

IRB waiver was obtained. From 2/2006-1/2011, fifty one patients (age 33.2±5.9) underwent 59 abdominal CT (45 patients had one exam, 4 had two and 2 had three exams). The exams were performed 1-14 days (mean 5.4) after cesarean section (CS). Clinical indications for study were as follows: fever (32 (62.7%)), abdominal pain (4(7.8%)) suspected collection (3 (5.9%)) other (e.g. Appendicitis) (12 (23.5%)). 8 studies were performed w/o injection, 51 following IV injection (in arterial, venous or both phases). Images were viewed on the sagittal plane by two radiologists on a PACS workstation. Scar thickness was measured and presence of internal gas bubbles was recorded. Scar visibility was scored on subjective scale from 1 to 4 (1= best visibility, 4=poor visibility), for each imaging phase. Results were correlated to the clinical outcome such as present of infection (fever and positive culture) duration of hospitalization and the rate of relaparotomy.

RESULTS

Scar was visible in 45 (88.2%) exams. On unenhanced scans the scar was usually not visible. The mean scar thickness was 6.6±4.5 mm. Gas in the scar was seen in 13(25.5%) exams. The mean scar visibility (MSV) was 2.81±0.93. The MSV on the arterial phase was 3.03±0.62 and on the venous phase 2.08±0.33. Scar thickness had no significant correlation with type of CS, number past CS, CT indication and timing of scan. Strong linear correlation was revealed between the scar thickness and internal gas and the POD ($p<0.0001$. Scar thickness and gas had no correlation to CT indication, CS urgency, febrile morbidity, positive cultures, and hospital stay.

CONCLUSIONS

Uterine scar was seen in 88.2 % of CT exams, best visualized on the venous phase. The scar thickness and presence of gas are not indicative of uterine pathology; thus these should not lead to unnecessary immediate intervention.

ULTRASOUND GUIDED CORE BIOPSY AS THE PRIMARY TOOL FOR TISSUE DIAGNOSIS IN PEDIATRIC ONCOLOGY

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PURPOSE

Traditionally in pediatric oncology biopsies for tissue diagnosis were incisional. For more than a decade we have an alternative of percutaneous imaging guided biopsies. In our department, Ultrasound guided fine needle biopsy (US guided FNB) is the first choice whenever there is a need for tissue diagnosis in the pediatric population. We retrospectively reviewed our experience in the procedure in the pediatric population and assessed the accuracy rate, safety and availability of the procedure.

MATERIALS AND METHODS

US guided biopsies on pediatric population done in our hospital between 11.2003 and 11.2011 were studied. Data collection included demographics, clinical and procedural data and follow up.

RESULTS

Altogether we had 213 biopsies performed on 191 patients: 40 on known oncologic patients and 173 to establish diagnosis. 17 biopsies were excluded, as malignancy was not suspected. 65% of the patients had a biopsy within a day. In 138 biopsies there was tumor at biopsy site, 4 were missed by initial biopsy (134 TP and 4 FN). In 58 biopsies no malignancy was found, and follow up was negative, read as TN. We had no FP. The sensitivity of our US guided FNB is 97.1%, e specificity 100% and accuracy 97.9%. We had no complication related to sedation, and 2 procedural complications: bleeding from the biopsy site, and seeding of tumor cells.

CONCLUSIONS

We find US guided FNB for suspected malignancy in the pediatric population to be highly available, safe and very accurate; having a potential to become the procedure of choice.

RECONSIDERING APPENDIX TESTIS TORSION: A DISTINCT CLUSTER OF ULTRASONOGRAPHIC FEATURES

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PURPOSE

Torsion of the appendix testis is the most common underlying cause of an acute scrotum in the pediatric population. Ultrasound is the imaging modality of choice to diagnose this disorder and differentiate it from other etiologies such as testicular torsion or epididymitis.

To describe a distinct set of sonographic features of appendigeal torsion

MATERIALS AND METHODS

We report 19 children with torsion of appendix testis identified by ultrasound. All presented with acute scrotum and were evaluated by ultrasound and color Doppler.

RESULTS

Ultrasound and color Doppler showed a typical pattern consisting of a round or oval avascular lesion with a microcystic echotexture, posterior enhancement and hyperemia of the surrounding structures.

CONCLUSIONS

Ultrasound and color Doppler can be used to accurately diagnose torsion of appendix testis and safely rule out other disorders.

SONOGRAPHIC FEATURES DIFFERENTIATING SMALL BOWEL FROM IIEO-COLIC INTUSSUSCEPTIONS IN CHILDREN

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PURPOSE

Differentiation of small bowel intussusception (SBI) and ileocolic intussusception (ICI) in children is imperative for the decisions between conservative treatment or pneumatic reduction. Our aim therefore was to evaluate sonographic characteristics that may enable differentiation between SBI and ICI.

MATERIALS AND METHODS

We retrospectively reviewed clinical and imaging findings for patients with SBI and ICI. Lesion location, diameter, outer rim thickness, fatty center diameter, and ratio of fatty core diameter-to-outer rim thickness were compared. Visualization of mesenteric lymph nodes in the abdomen and within the lesion, and of fluid inside the lesion and abdominal cavity were also investigated. The diagnosis on ultrasound was confirmed by clinical outcome. T-test was used for evaluation of quantitative parameters, while Chi-square or Fishers' exact test were used for the categorical parameters.

RESULTS

There were 56 patients with SBI (M: F=7:3; age 3-85 months, mean 25) and 147 with ICI (M: F=7:3; age 0-60 months, mean 25). The head of intussusceptions was in the central abdomen in 23 SBI patients (42%), right abdomen in 21 (37%), and left abdomen in 12 (21%), vs the right abdomen in 84 ICI patients (57%), central abdomen in 47 (32%) and left abdomen in 16 (11%) ($P<0.030$). SBI lesion diameter was 0.8-3.1 cm (mean 1.4) vs 1.4-4.0 cm (mean 2.6) diameter in ICI ($P<0.0001$). SBI fatty core diameter was 0-0.5 cm (mean 0.2) vs 0.1-2.2 cm (mean 1.3) in ICI ($P<0.0001$). The fatty core diameter-to-outer rim thickness ratio was >1 in 5.8% of SBI patients vs 96% of those with ICI ($P<0.0001$). This parameter has 96% sensitivity and 94% specificity rates. Mesenteric lymph nodes were seen in 80% of SBI and 67% of ICI ($P<0.092$) and contained in the lesion in 15% and 91% respectively ($P<0.0001$). Lesions contained fluid in 2% of SBI vs 5% of ICI patients ($P<0.448$). Ascites was present in 30% of ICI and 11% of SBI ($P<0.007$)

CONCLUSIONS

When compared with SBI, ICI appeared predominantly in the right abdomen, contains lymph nodes, had a larger diameter (>1.5 cm), a thicker outer rim and fatty core, and fatty core-to-outer rim ratio >1 in our patient population. The fatty core diameter-to-outer rim thickness ratio has 96% sensitivity and 94% specificity rates.

IMAGE GENTLY: IMAGE QUALITY AND DOSE ASSESSMENT IN PORTABLE CHEST RADIOGRAPHS IN THE NICU AND PICU BEFORE AND AFTER IMPLEMENTATION OF A HIGH-KVP TECHNIQUE

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PURPOSE

A quality control survey in our institution revealed that exposure techniques for portable chest radiographs (CXRs) of patients between 0-3 months old in the NICU and PICU vary widely. Different technologists select different tube potentials (kVp) and currents-time products (mAs) based on their experience and training. Although CR has been introduced for several years, low kVp settings are still used (50-56). As a result, patient doses vary widely and are higher on average than doses reported in the literature. The purpose of this project was to assess image quality at different settings, implement a standard technique that will enable dose reduction, and verify that image quality is not compromised.

MATERIALS AND METHODS

A weight based high-kVp technique chart was introduced into the practice of portable radiography in the NICU and PICU. The radiographs are acquired using a GE AMX4 portable x-ray system and Fuji CR imaging plates. The suggested tube potentials varied from 60 to 70, depending on the patient weight, and the suggested tube current was fixed at 0.5 mAs.

Effective dose calculations and image quality assessments were performed for 2 groups: prior to the introduction of the high-kVp technique (174 CXRs), and after the introduction of the high-kVp technique (50 CXRs). The effective dose for each radiograph was computed using the Monte Carlo software PCXMC 2.0, based on the patient weight and specific exposure conditions. Image quality assessment was performed by two fellowship-trained pediatric radiologists with 5-12 years of experience, using 4-point scale for criteria based on the CEC image quality standards. An image quality score was determined for each image as the average of the score for all the applicable criteria. The readers were also requested to state whether the image was diagnostic or not.

RESULTS

With the previous low-kVp technique, the average dose per radiograph was 19.5±7.8 uSv. The average image quality score was 3.06±0.4. The average kVp was 52.4 and the average mAs 2.5. With the new high-kVp technique, the average dose per radiograph was 9.3±3.2 uSv. The average image quality score was 3.4±0.3%. The average kVp was 65.8 and the average mAs was 0.53. In both groups, all images were diagnostic.

CONCLUSIONS

Our preliminary results show that implementation of a standard high-kVp imaging technique for portable chest radiographs of patients between 0-3 months old in the NICU and PICU resulted in ~50% of radiation dose reduction with no decrease in image quality.

CORRELATION BETWEEN POST-MORTEM COMPUTED TOMOGRAPHY AND MAGNETIC RESONANCE IMAGING AND AUTOPSY FINDINGS IN CHILDREN

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PURPOSE

To examine the feasibility of minimizing pediatric autopsies in forensic medicine by utilizing MRI and CT imaging in concert with focused local autopsy, due to public and religious opposition to conventional autopsies in Israel.

MATERIALS AND METHODS

During 2011-2012, we performed imaging studies of 11 children aged 2 months to 9 years. 8 of these cases were followed by complete autopsies, in 1 case a partial autopsy, and in 2 cases only external examination was performed. Total body CT was done in all cases. In all but one case MRI of the head and neck was performed. Three of the deaths were due to trauma, and 8 were due to sudden death.

RESULTS

In cases of trauma a good correlation between radiographic and autopsy findings was found. CT was helpful in identifying skeletal injuries, which could have been missed in autopsy, such as posterior upper rib fractures, and was invaluable in reconstructing mechanisms of injury. MRI was superior to autopsy in detecting spinal cord and brain injury. In 5 of the sudden death cases, pulmonary consolidations were demonstrated in both modalities, suggesting pneumonia, which was confirmed by autopsy. In two cases, myocarditis and encephalitis were found in autopsy, but not radiographically. In 1 case, a diagnosis of hyperthermia was based on circumstances, though both imaging and autopsy findings were non-specific. In 2 cases in which no autopsy had been performed, pneumonia was suspected based on imaging alone.

CONCLUSIONS

Post-mortem imaging studies should be an inseparable and complementary part of the conventional autopsy in all infant/child death investigations. In sudden death, when traumatic or criminal involvement has been excluded, invasive autopsy can be limited to areas of positive findings on CT/MRI, or sometimes even abandoned.

ACUTE GRAFT VERSUS HOST DISEASE OF THE GASTROINTESTINAL TRACT: CT IN THE CLINICAL AND PROGNOSTIC EVALUATION

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PURPOSE

To determine the role of abdominal CT in assessment of severity and prognosis of patients with acute gastrointestinal (GI) graft-versus-host disease (GVHD)

MATERIALS AND METHODS

During 2000-2004, 41 patients with clinical diagnosis of acute GI-GVHD were evaluated. CTs were examined for intestinal and extra-intestinal abnormalities, and correlated with clinical staging and outcome.

RESULTS

20 patients had GVHD clinical stage I-II and 21 had stage III-IV. 39 (95%) had abnormal CT appearances. The most consistent finding was bowel wall thickening: small (n=14, 34%) or large (n=5, 12%) bowel or both (n=20, 49%). Other manifestations included bowel dilatation (n=7, 17%), mucosal enhancement (n=6, 15%) and gastric wall thickening (n=9, 38%). Extra-intestinal findings included mesenteric stranding (n=25, 61%), ascites (n=17, 41%), biliary abnormalities (n=12, 29%) and urinary excretion of orally administered gastrografin (n=12, 44%). Diffuse small bowel thickening and any involvement of the large bowel were associated with severe clinical presentation. Diffuse small bowel disease correlated with poor prognosis. 8 of 21 patients responded to therapy, compared with 15 of 20 patients with other patterns (p=0.02) and cumulative incidence of GVHD-related death was 62% and 24%, respectively (p=0.01). Overall survival was not significantly different between patients with diffuse small bowel disease and patients with other patterns (p=0.31). Colonic disease correlated with severity of GVHD (p=0.04), but not with response to therapy or prognosis (p=0.45).

CONCLUSIONS

GVHD often presented with abdominal CT abnormalities. Diffuse small bowel disease was associated with poor therapeutic response. CT may play a role in supporting clinical diagnosis of GI GVHD and determining prognosis.

COMPUTED TOMOGRAPHY STUDY OF THE EFFECT OF ORLISTAT ON VISCERAL ADIPOSE TISSUE VOLUME IN OBESE SUBJECTS

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PURPOSE
To examine the effect of orlistat in promoting weight loss and its specific effect on the visceral adipose tissue and subcutaneous adipose tissue as evaluated by computed tomography.

MATERIALS AND METHODS
A prospective case series study of 10 obese subjects was conducted. The 6 women and 4 men, age 50–67 years (mean 59 ± 8 years), had a mean body mass index of 34.1± 3.2 kg/m2. All subjects were prescribed a mildly hypocaloric diet (600 kcal/day deficit). In addition, all subjects were treated with orlistat 120 mg 3 times a day for 20.1±7 weeks.

RESULTS
The subjects had lost approximately 8.2 kg each, or 8.4% of their initial body weight. Mean body weight decreased from 98±13 to 89.8±13.6 kg at the last follow-up visit (P = 0.0001); mean BMI1 decreased from 34.1±3.2 to 30.3±3.9 kg/m^2 (P = 0.0001), and mean waist circumference from 113.8±11.4 to 107.6± 10 cm (P = 0.0006). Mean total abdominal adipose tissue volume, evaluated by computed tomography, decreased from 426±104.3 to 369.8±99.6 mm^3 (P = 0.0001). Mean abdominal SAT2 volume decreased from 251.1±78.8 to 224±81.1 mm^3 (P = 0.006), and mean abdominal VAT3 volume decreased from 176±76.7 to 141.6 ± 67 mm^3 (P = 0.0001). Thus, the total abdominal adipose tissue volume for the whole group decreased by 15.4%, and most of this decrease was attributable to the reduction in VAT (24.8%) as opposed to SAT (only 12% reduction) (P = 0.03, The weight reduction that occurred during the study was accompanied by a statistically significant reduction in levels of total cholesterol, low density lipoprotein-cholesterol, triglycerides, and fasting blood glucose.

CONCLUSIONS
Our study provides evidence on the effect of orlistat on reducing human visceral adipose tissue as evaluated by CT. The benefit of the treatment is further supported by the statistically significant reduction in cardiovascular risk factors.

CT UROGRAPHY- A SINGLE INSTITUTION REVIEW

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PURPOSE

To review indications and accuracy of CTU.

MATERIALS AND METHODS

Retrospective study of 134 patients who underwent CTU because of hematuria. Age range: 13-88, mean 54 years; 72% males, 28% females.Clinical and laboratory data were recorded for patients. CTU images were reviewed and compared to final diagnosis. The presence of cysts and incidental findings was recorded.

RESULTS

In 12.7% a definitive diagnosis was provided by the non-contrast scan. 16/17 showed ureteral stone with signs of obstruction; 1/17 periappendiceal abscess. In this group mean age was 46 years, 35 %<40 years of age, 88% were male. 71% complained of acute pain.

In the remaining 117 patients, mean age was 54 years, 23 %< 40 years of age, 69% were male. Only 39% complained of acute pain. In these 117 patients, 80 (68 %) had negative CTU. In the remaining 37 patients, the examinations showed abnormalities which were either diagnostic or suspicious: ureteral tumor (1), renal tumor (6), bladder tumor (27) (including a number of indeterminate studies with bladder wall abnormalities), both bladder/renal tumor (1), pyelonephritis (2). In patients < 40 years of age no CTU was suspicious for tumor. Women were more likely to have negative CTU.

1-2 year follow up was available for 112/134 patients. There were 12 bladder tumors, 4 renal tumors, and 1 ureteral tumor.

Our sensitivity was 100%, specificity 94%, PPV 74%, NPV 100%.

CONCLUSIONS

Our results were generally in accordance with the literature.

The presence of thickened and trabeculated bladder wall is a cause of diagnostic uncertainty. Although CTU is an accurate test, exposure to contrast agents and radiation demands proper indication, especially in younger patients. Ideally, the non-contrast scan should be reviewed before proceeding with CTU completion.

IMAGING OF DRUG SMUGGLING AND VARIOUS BODY PACKING TECHNIQUES, PRELIMINARY RESULTS

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PURPOSE

Body packing is a distinct method of drug smuggling. Radiologists are confronted with body packers on a daily basis with recently introduced new smuggling methods such as liquid cocaine. The objective of this study is to describe the radiological features of the new packing techniques.

MATERIALS AND METHODS

Series of suspected passengers were detained and escorted to our medical center from Ben-Gurion airport by the police. Each suspect underwent standard supine position for a plain abdominal X-ray. When indicated, an abdominal CT scan (Phillips Brilliance 64 slices) was obtained. No IV contrast or oral contrast media were given. The CT images were interpreted by the on-call radiologist and in case of a positive result, the suspect was hospitalized in an internal medicine department, under police supervision, until two consecutive drugs free feces samples were obtained, as recommended by the attending toxicologist.

RESULTS

During 2011-2012, 17 sequential suspects were imaged with plain abdominal film for bodypacking. Three of them also underwent a CT scan. The average CT exam was 492.4 mGy X cm of Dose-length-product. Five out of 17 (29%) had the typical radiological features of "Double condom" sign. Ten out of 17 (59%) were found to smuggle liquid cocaine that have specific radiological features of linear radiolucencies which will be presented. Of the suspects who had a positive imaging exam, all were hospitalized and were found to have illegal drug packages in their feces.

CONCLUSIONS

Plain abdominal film and CT scan serve as an important tool in identifying intracorporeal drug smuggling. With improved wrapping techniques that help the bodypackers to evade detection, better detection methods must be devised. Our preliminary experience suggests an important role for CT scan as a reliable modality for detection of those new packing techniques. Radiologists should be acquainted with the typical radiologic features of those new packing methods, thus helping the law enforcing agencies nip drug trafficking in the bud.

VOLUMETRIC CT MEASUREMENT OF LIVER METASTASES: OUR EXPERIENCE WITH A NEW SOFTWARE TECHNIQUE

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PURPOSE

Volumetric analysis of the liver and of metastatic lesions is a promising alternative to linear measurement, but it can be difficult and tedious. Our purpose is to present our experience with a new software technique for estimating liver volume and the volumes of liver metastatic lesions parenchyma and vessels.

MATERIALS AND METHODS

We evaluated consecutive oncological patients over a six month period, and selected those known to have liver metastases. Each patient had a contrast-enhanced CT scan, consisting of contiguous 2.5mm sections of the chest, abdomen, and pelvis. From this group, a set of patients with multiple discrete, non-confluent lesions was selected. Radiologists experienced in liver CT analyzed each scan employing a new algorithm (Intellispace liver analysis, Philips Corporation), for volumetric analysis. Analysis included determination of total liver volume, lesion volume, and operational time.

RESULTS

We found 14 consecutive patients enrolled in oncologic clinical trials whose prior RECIST analysis showed 2-9 liver metastases. The average number of sections was 244. Fully automatic total liver volumetry, was successful in 11/14 scans. Average time to calculate liver volume was 15 sec; hepatic and portal venous structures and volumes appear within an additional 10 seconds. We evaluated 55 lesions. Each lesion was marked manually for automatic analysis by the software; the average time to mark and analyze each lesion was 10 seconds/ lesion and <90 seconds per scan.

CONCLUSIONS

Volumetric CT analysis for evaluating total liver volumes and the volumes of metastatic disease, performed with this dedicated software is quick, simple, and easy to master.

DETECTION OF NET LIVER METASTASES WITH (GA-68-DOTATOC)PET-(GD-EOB DTPA)MRI FUSION

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PURPOSE
To assess the impact of PET-MRI fusion on the detection of liver metastases of neuroendocrine tumors (NET) in comparison to NET-specific Ga-68-DOTATOC PET/CT and liver-specific Gd-EOB-DTPA MRI

MATERIALS AND METHODS
22 consecutive patients with suspicious liver metastases from histopathologically proven NET were examined with Gd-EOB-DTPA MRI and multiphase contrast-enhanced Ga-68-DOTATOC PET/CT within a maximum time of 6 days between investigations. PET and MRI images were retrospectively fused with e.soft4.0m (Siemens). PET/CT, MRI and PET-MRI fusion images were evaluated by 2 physicians experienced in nuclear medicine and radiology with a time interval of 6 weeks between the reading of each modality. A 5-point and 3-point visual scoring system were used to assess confidence level and dignity of liver lesions, respectively. The reference standard of each lesion was histopathology and/or follow-up examinations of at least six months. To determine the diagnostic performance, ROC analysis was performed for each method on a lesion-basis. To compare the diagnostic value regarding sensitivity and specificity of each method, the McNemer's test was performed.

RESULTS
181 lesions in 22 patients were detected by PET/CT, MRI and/or fused PET-MRI, and all the lesions were rated according to the reference standard. PET-MRI had a sensitivity of 91.2% (significantly superior to PET/CT; $p<0.05$) and a specificity of 95.6% (significantly superior to MRI; $p<0.05$). PET/CT had a sensitivity of 73.5% and a specificity of 88.2%. MRI had a sensitivity of 87.6% and a specificity of 86.8%. The area under the curve was 0.98 for PET-MRI, 0.96 for MRI and 0.89 for PET/CT.

CONCLUSIONS
Retrospectively fused PET-MRI is superior to multiphase PET/CT and MRI for the detection of NET liver metastases. It is more sensitive in comparison to PET/CT and more specific in comparison to MRI. Fused PET-MRI therefore seems best suited for surgical and interventional planning and evaluation of radioreceptor-therapy.

REAL TIME SONOELASTOGRAPHY IN THE DIFFERENTIAL DIAGNOSIS OF FOCAL HEPATIC LESIONS

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PURPOSE
The purpose of this study was to determine the potential usefulness of real-time sonoelastography in the differential diagnosis of focal hepatic lesions.

MATERIALS AND METHODS
Twenty patients with 30 known focal hepatic lesions were examined with Acustic Radiation Force Impulse Elastography (ARFI). A 4 point elastographic score (adapted from breast elastography) was used to classify each lesion (1=mass with similar elasticity to background parenchyma, 2=mass is predominantly softer, 3=mass is predominantly stiffer, 4= mass is entirely stiffer) and the size of the lesions was measured. The ARFI findings (elasticity score and size) were correlated to conventional B-mode ultrasonography, CT of the liver and MRI or histopathology when available. The difference in elastographic score between benign and malignant masses was evaluated.

RESULTS
Of all hepatic lesions 21 were benign (hemangiomas or cysts) and 9 were malignant (primary or metastatic). All malignant lesions were classified as elastography score of at least 3 (predominantly or entirely stiffer than liver). 81% of benign lesions were classified with a score not higher than 2 (softer or of equal elasticity of liver) .Of the benign lesions: all liver cysts were entirely soft, 75% of hemangiomas were equal to liver or softer. All malignant lesions looked larger on the ARFI imagccxzde than on B-mode US. Of the benign lesions: all cyst and hemangiomas looked smaller or equal in size on ARFI images and on B mode US.

CONCLUSIONS
Sonoelastography provides complementary information regarding focal hepatic lesions tissue stiffness, which may be potentially useful in non invasive characterization of their nature, and in the differential diagnosis of focal hepatic lesions.

RENAL TUMORS: RADIOLOGIC PATHOLOGIC CORRELATION WORK IN PROGRESS

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PURPOSE

To correlate demographic, radiologic and pathologic findings in patients who underwent nephrectomy partial nephrectomy or renal biopsy from 2005-2011 in the WGH and who underwent CECT imaging prior to surgery.

MATERIALS AND METHODS

63 patients fit the above criteria. There were 41 males and 22 females. Average age was 64 (range 35-84). 39 patients underwent nephrectomy, 20 partial nephrectomy and 6 biopsy.
CT scans were reviewed and the following information documented: involvement of right or left kidney; tumor size; homogeneity and attenuation; borders; calcification; central scar; enhancement characteristics; perirenal fat involvement; retroperitoneal lymphadenopathy; vascular involvement; metastases.

RESULTS

61% of pathologic specimens showed renal cell carcinoma, 22% showed urothelial carcinoma, and 17% showed either benign tumor or inflammation. 80% of renal cell carcinomas were clear cell type, 10% chromophobe, and 10% papillary. RCC's were evenly divided between right and left kidneys. Nearly all tumors were heterogeneous in appearance, and enhanced after contrast administration. Mean tumor size for clear cell and chromophobe RCC's and oncocytomas was between 5 and 6 cm, whereas for papillary RCC it was 3.4 cm. Median size for oncocytoma, and for papillary and chromophobe RCC was 3.2-3.6 cm, and for clear cell RCC median size was 5 cm. Nearly all oncocytomas and papillary and chromophobe RCC's were well-defined, whereas only 66% of clear cell RCC's were well-defined. Six clear cell RCC's showed calcification; no other tumor type showed calcification. One chromophobe (25%) and 5 clear cell (16%) RCC's demonstrated metastatic lesions. One chromophobe (25%) and 3 clear cell (9%) RCC's showed vascular involvement. Lymphadenopathy was uncommon, seen in 2 clear cell and 1 chromophobe RCC.
Two patients were less than 40 years of age: one with oncocytoma, one with leiomyoma.

CONCLUSIONS

Renal masses are relatively common findings on CT, and represent a wide spectrum of pathology, including inflammatory lesions, benign tumors and various types of malignant tumors. Because of major differences in treatment and prognosis among these entities, imaging predictors of diagnosis are important to the clinician. Imaging characteristics including tumor size and appearance, contrast enhancement, collecting system involvement, perinephric space involvement, vascular invasion and more distant findings are critical in characterizing renal masses.

MR IMAGING IN SEPTO-OPTIC DYSPASIA: A SPECTRUM OF ASSOCIATED CONGENITAL MALFORMATIONS

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PURPOSE
Septo-Optic Dysplasia (SOD), as described by de Morsier in 1956, consists of two major imaging findings: aplasia/dysplasia of the septum pellucidum and hypoplasia/dysplasia of anterior optic pathway. The purposes of this study were to isolate coherent subtypes of SOD and to relate these to possible morphogenetic processes based on the known embryology of the midline structures.

MATERIALS AND METHODS
We undertook a retrospective review of the medical records and MRI studies of the brain of 75 patients (31 F, 44 M) with radiographically diagnosed absence of the septum pellucidum available in our archives between January 1, 2000 to December 31, 2011. We used the radiology database ISYS with the terms Septo-Optic dysplais and MRI. Exclusion criteria were: patients with single ventricle and incomplete division of the cerebral hemispheres (e.g. lobar holoprosencephaly) and patients with evidence that the loss of the septum pellucidum may be acquired secondary to a shunt for hydrocephalus. MRI analysis included: presence and appearance of the septum pellucidum, fornices and commissures, appearance of the anterior optic pathways, associated abnormalities of the hypothalamus, pituitary gland, brainstem and cerebellum, abnormalities of the meningeal structures, associated malformations of cortical development. Clinical information that was collected included the results of visual examinations, presence of developmental delay or seizures/endocrine dysfunction.

RESULTS
The septum pellucidum was absent in all 75 patients. Optic nerves could not be assessed in 4 patients due to technical scan issues, were bilaterally small in 44 (61.97%) patients, unilaterally small in 7 (9.86%) patients, normal in 20 (28.16%). The optic chiasm could not be assessed in 1 patient, was small in 54 (72.97%) patients and normal in 20 (27%). The ventricular system was not dilated in 45 patients (60%), was mildly dilated in 13 (17.3%) patients, moderately in 10 (13.3%) patients and there was severe ventriculomegaly in 7 (9.3%) patients. The anterior pituitary gland could not be assessed in 1 patient, was normal in 53 (71.6%) patients and was small in 21 (28.4%) patients. Posterior pituitary bright spot couldn't be assessed in 2 patients, was absent in 10 (13.7%) patients, ectopic in 4 (5.5%) patients and normal in 59 patients (80.8%). Malformations of cortical development were found in 17 (22.7%) patients. Olphactory bulbs were absent in 7 (9.3%) patients and hypoplastic in 6 (8%) patients. Regarding the posterior fossa structures: the ponto-medullary junction was straightened in 7 (9.3 %) patients, asymmetry of the brainstem was noted in 1(1.3%) patient, a low position of the cerebellar tonsils was seen in 9 (1.2%) patients and two of these patients had also a short clivus, some degree of fullness of the posterior fossa was noted in 2 (2.7%) patients. We divided all patient into groups according to presence of associated congenital anomalies of the pituitary gland, malformations of cortical development, posterior fossa anomalies and olfactory bulbs agenesis/hypoplasia. We found out that only 29 patients (38.67%) had a pure SOD with malformation of white matter tracts only.

CONCLUSIONS
Our review allows us to identify a group of pure SOD with malformation of white matter tracts only, and a heterogeneous group of complex CNS malformations in which the SOD is associated with a variable constellation of other lesions of the forebrain, midbrain and hindbrain. Our study might cast light on the morphogenetic processes leading to SOD, which remain unknown.

ADC VALUES OF THE DEVELOPING NORMAL FETAL BRAIN

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PURPOSE

The ADC value of the brain tissue changes during the maturation process of the brain. The level of the ADC is high in fetal life due to the high content of water before the process of myelination is taking place. It is important to establish the normal values for each gestational week in order to distinguish the abnormal values from the normal ones.

We aim to measure the ADC value and to establish the normal value in fetal brain. The normal value is needed for the understanding of the abnormal cases, especially in twin pregnancies with TTTS and abnormal vasculature of the placenta.

MATERIALS AND METHODS

48 women underwent MRI in the third trimester (26-33 weeks GA). The indication was siblings with metabolic diseases in previous pregnancies and normal US, and cases in which an anatomical abnormality was suspected, but the MRI excluded the condition. The ADC value was measured in 9 locations on both hemispheres and in the posterior fossa. The value is measured in mm^2 /second. The value ranges between 0.00126 mm^2/sec in the basal ganglia to 0.00232 mm^2/sec in the white matter.

RESULTS

The ADC value declines during the third trimester in all the locations, excluding the frontal lobe. The difference is not significant between each consecutive week. The ADC value is lower in the grey matter and in the brain stem than in the white matter. For example the ADC in the basal ganglia is between 0.00150 to 0.001155 mm^2/sec and in the frontal white matter is 0.00232 to 0.00152 mm^2/sec. In the brain stem the value is 0.00210 to 0.000987 mm^2/sec.

CONCLUSIONS

The ADC value in the white matter is higher than in the grey matter. During the pregnancy while the process of myelination progress the ADC value has a tendency to be lower.

MRI WHITE MATTER LESIONS IN PEDIATRIC MIGRAINE

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PURPOSE

Several studies have reported an association between migraine and white matter hyperintensities on brain magnetic resonance imaging (MRI) in adult patients, and a fourfold risk of white matter lesions in adult patient with migraine compared to healthy controls. The aim of the present study was evaluate brain MRI findings in pediatric patients with migraine

MATERIALS AND METHODS

The database of the Pediatric Headache Clinic, was reviewed for children who were diagnosed with migraine versus other diagnosis and underwent MRI evaluation.The scans were reassessed by a single pediatric radiologist who was blinded to the patients' clinical parameters and diagnosis. Indications for an MRI examination at our center are based on Practice Committee of the Child Neurology Society. Patients found to have white matter lesions undergo further testing to rule out systemic disease (multiple sclerosis, diabetes mellitus, hypertension, collagen disease, valvular heart disease, hyperlipidemia and polycythemia, syphilis, HIV, Lupuserythematosoushypercougelability metabolic screening.

RESULTS

One hundred ninety-four children met the study criteria: 84 boys (43.3%) and 110 girls (56.7%) of mean age10.92±3.5 years (range 2.5-18 years). One hundred thirty one patients had migraine without aura, 48 had migraine with aura and 83 without aura. Sixty three had other diagnoses: tension headache (n=34), new-onset headache (n=10), nonspecific headache (n=6), trigeminal neuralgia (SUNCT or cluster headache) (n-9), or PTSD (n=4). The mean time elapsed from headache onset to MRI imaging, 19.52±21.139 months (range 0-96 months). All patients had normal findings on neurologic examination and normal development, with no signs of neurodegenerative disease.or other background disease. Comparison of the imaging parameters between the two groups (migraine versus other diagnosis) yielded no significant differences, except for white matter lesions, which were highly significantly more prevalent in the patients with migraine (10.6% vs 0, p=0.006)). In twelve of the 14 patients with white matter abnormalities, the lesions were focal in 12; in only one patient were there confluent periventricular hyperintensities. All focal lesions were less than 3 mm in diameter. The distribution of the lesions was variable;. Six patients had periventricular lesions, 6 had subcortical lesions,3 had watershed zone lesions, and one had a thalamic lesion.

CONCLUSIONS

MRI white matter lesions may be found in pediatric migraine patients. Other background disease should be excluded.

OTOGENIC SINUS VEIN THROMBOSIS IN CHILDREN: DOES IT STILL OCCUR? ARE WE SURE OF THE DIAGNOSIS?

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PURPOSE

Sinus vein thrombosis (SVT) is rare complication of acute otitis media and mastoiditis. The treatment is controversial both regarding the type of surgery and the role of anticoagulants administration . In many cases the imaging diagnosis of SVT is not straightforward, but it is crucial for the management of these patients.

To review our experience with otogenic SVT, and to assess the accuracy of the diagnosis of SVT.

MATERIALS AND METHODS

Retrospective study of children hospitalized with otogenic SVT at Schneider Children's Medical Center from 2000 to 2012. The imaging examinations (CT) were reviewed by 2 pediatric radiologists for the presence of SVT. Diagnosis was reached by joint agreement. Visualization of subperiosteal and epidural abscesses was also noted. The diagnosis in the original report of the examination was compared to the findings in the review.

RESULTS

According to the written reports, SVT was diagnosed in 39 children ,aged 1month to 13 years (median 26 months). Acute otitis media with mastoiditis was the causing factor in 37 children and cholesteatoma in the other two. Sigmoid sinus thrombosis was seen in 38 patients. The thrombus extended into the transverse sinus in 11 patients and into the jugular vein in 8. One patient had cavernous sinus thrombosis. Subperiosteal abscess was demonstrated in 35 patients. Epidural abscess was visualized in 14 children. Thirty six CT examinations were available for review, in 14 no thrombus was evident. The hypodense focus in the region of the sinus, considered a thrombus in the original report, was attributed either to the presence of an epidural abscess (4 patients) or to perisinus phlegmon (9 patients). Non visualization of the sigmoid sinus in one patient was due to congenital hypoplasia.

CONCLUSIONS

Despite widespread antibiotic treatment, SVT secondary to ear infections still occurs. In most of the cases the thrombus is limited to the sigmoid sinus. Dedicated review of the findings refuted the diagnosis in 14 (40%) of patients. Confounding findings were the presence of perisinus phlegmon and epidural abscess. Awareness of these pitfalls, combined with meticulous technique and careful evaluation, may help to avoid overcalls.

FAST-BRAIN MRI IN CHILDREN: QUICK, WITHOUT SEDATION, AND RADIATION-FREE, BUT BEWARE OF PITFALLS

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PURPOSE

Fast brain MRI is a promising technique for young children that require anesthesia for conventional MRI, however poor contrast resolution and the use of only one type of pulse sequence carry limitations. We aimed to review and document pitfalls of fast brain MRI in non-sedated children.

MATERIALS AND METHODS

50 fast brain MR studies (FIESTA protocol; 1.5T Signa Excite HD, GE HealthCare, Milwaukee WI) performed January 2008-August 2010 in 30 non-sedated patients aged 1 day-5 years (mean 18 months) were retrospectively reviewed and compared to the most recent MRI or CT. Indications were VP shunt insertion/revision/follow-up (20/50, 40%), postoperative follow-up (9/50, 18%), macrocephaly/ventriculomegaly/congenital malformation (15/50, 30%), complications of prematurity (6/50, 12%).

RESULTS

VP Shunt position and size of fluid-filled structures were satisfactorily assessed in all cases. Undetected findings in 7/50 studies (14%) included sinus vein thrombosis[1], subdural hematoma[3], failure to differentiate blood products[2], and limited evaluation of extraaxial collections[1].

CONCLUSIONS

FIESTA fast-brain MRI provides satisfactory assessment of shunt position and the size of fluid-filled structures, but radiologists should be aware of limitations for depiction of sinus vein thrombosis, and bleeding. Modification of fast brain protocols appears to be indicated.

SAFETY AND EFFICACY OF LIVER BIOPSIES IN CHILDREN USING 18G AND 20G COAXIAL CORE-NEEDLES

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PURPOSE

Evaluation of hepatic histopathology is essential for the proper diagnosis and management of benign and malignant pediatric liver diseases. Ultrasound-guided percutaneous liver biopsy (PLB) has become an indispensable tool in obtaining tissue for histopathologic evaluation. The success of the procedure is defined not only by the ability to obtain adequate tissue for diagnosis, but equally, if not more importantly, by its safety profile. Early series describe the safety and efficacy with the use of various needles (manual and semi-automated, coaxial and non-coaxial) with and without ultrasound guidance. There is little information in the literature about fine needle (smaller than 20G) core biopsies.

Our objective was to evaluate the safety and efficacy of ultrasound guided percutaneous general liver biopsies in children, using semi-automated 18G and 20G coaxial core needles. And to verify, that the use of finer needles is safer without compromising the diagnostic accuracy.

MATERIALS AND METHODS

We retrospectively evaluated pediatric patients, who underwent PLBs at Schneider medical center and Beilinson hospital, Petah Tikvah, Israel, between January 1st 2006 and April 30th 2012.

Data was collected from the angiography log books and the patients' medical records regarding the indications, technical biopsy details, the pathology results, complications and the influence that the biopsy result had on the patients' management.

A biopsy was considered technically sufficient when there was a full pathology report, more than 6 portal tracts were included in the biopsy tissue, there was no need to repeat the biopsy for technical reasons and/or the pathologic results effected the patient's management.

RESULTS

260 children had 320 biopsies. 44.6% were girls. The patients' age ranged from 18 days to 18 years and 11 months (mean of 7.4 years). There was a wide range of indications for biopsy, 28.7% of the cases were post liver transplant, 22.4% were for the diagnosis of an unknown liver disorder. All biopsies were performed with 18G or 20G coaxial semi-automated core needles - 90(28%) of the biopsies were with a 20G needle, 148(46%) were with a 18G needle and the rest were not reported.

All biopsy results were technically sufficient. The complication rate was 18(5.6%) of the 320 biopsies, 6(1.9%) of these were major complications, requiring operation, pediatric intensive care unit (PICU) admittance and treatment with transfusion of blood products. We didn't find a statistically significant difference in the complication rate between the use of 18G needles or 20G.

CONCLUSIONS

The use of 20G coaxial core needles for percutaneous ultrasound guided general liver biopsies, is as safe and as efficient as the use of larger needles.

AUTOMATED COMPUTERIZED SOFTWARE FOR DIAMETER AND VOLUME MEASUREMENTS OF PULMONARY METASTATIC DISEASE: PRELIMINARY EVALUATION

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PURPOSE

RECIST and other paradigms rely on geometric measurements derived from CT scans. This process may be tedious and time consuming. We evaluated the performance of a novel automated computerized software for diameter and volume measurements of metastatic lung nodules.

MATERIALS AND METHODS

Measurements of long and short-axis of 50 lung metastatic lesions in 8 sequential patients with metastatic renal cell carcinomawere manually obtained twice by 3 radiologists. Those measurements were compared with automated software measurements (Lesion Management Application [LMA], Carestream Health, Rochester NY). In addition, the software automatically identified the lesions' contours and volumes; the readers could accept the automated measurement or correct it manually.

Intraobserver correlation was assessed by intraclass correlation coefficient (ICC) using random mixed effect ANOVA, and interobserver reliability (between two different radiologists or between a radiologist and a software) by the concordance correlation coefficient (CCC) and Bland-Altman limits of agreement. The mean relative software vsradiologists'measurements was calculated as a geometric mean of the ratios between software and expert measurementsfor each lung lesion.

RESULTS

The intraobserver agreements (ICC) for long/short axis and volume werein range of 0.878-0.943/0.905–0.948 and 0.984-0.995, respectively. The interobserver agreement (CCC) between radiologists' and software measurements for the long axis ranged from 0.836-0.947 vs0.820-0.989 between different radiologists, for the short axis 0.923-0.974 vs0.839 -0.955, and for volume 0.911–0.941 vs0.968-0.991. The mean relative difference of software vsradiologists' measurements corresponds to 2.5% overestimated volume (95%CI=98.4%,106.8%) of the software compared to radiologists' evaluation.

CONCLUSIONS

Our preliminary experience suggests that automated computerized software might have an important and reliable role in current RECIST evaluations, as well as providing potential additional benefit of automated volume determination for other future response criteria.

IMMEDIATE POST-MORTEM COMPUTED TOMOGRAPHY EVALUATION OF TRAUMA VICTIMS SUPPORT LINES MALPOSITIONING

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PURPOSE

Recent studies stress the value of postmortem computed tomography (PMCT) as an important adjunct to autopsy in trauma victims in detecting PM pathologies and cause of death. These studies have delayed PMCT at least 3 hours after time of death, after the removal of support lines. In our institution PMCT are performed immediately after death while support lines are still in place. Thus, in addition to assessing cause of death, we are able to evaluate the effectiveness of the resuscitation efforts in order to improve future treatment in the trauma setting.

MATERIALS AND METHODS

PMCT was performed within 1 hour of declaration of death in our tertiary medical center in 21 subjects between august, 2008, and may, 2012. Two radiologists retrospectively assessed the placement of support lines in consensus. The correct placement of the following support lines was evaluated: endotracheal tubes (ETTs), chest drains, central venous catheters and nasogastric tubes (NGTs). Pre-hospital resuscitation efforts were started in all of the cases. The mean Injury Severity Score was 41 (range 25-54). The trauma mechanism was blunt in 20 patients (13 Motor Vehicle Accident, 7 fall from height) and penetrating (Gun Shot Wound) in one. Death was declared immediately on arrival for a few (n=3), while for others death was declared following failure of in-hospital resuscitation efforts.

RESULTS

Overall, 14 subjects (67%) had a misplaced support line. ETT was inserted into 18 trauma victims; 3 were misplaced in the right main bronchus (17%) and 5 (28%) were distally misplaced. NGTs were inserted in 5 trauma victims; in one case it was folded in the mouth. Central venous catheters were inserted into 8 subjects (7 femoral and 1 brachiocephalic); one of the femoral central catheter (13%) was malpositioned in the soft tissues of the pelvis. Chest drains were inserted into 13 subjects; 10 were malpositioned (77%). Five instances (23%) of multiple support lines misplacements were observed.

CONCLUSIONS

This study shows the important role of PMCT as a tool for Quality Improvement of pre-hospital and shock-trauma room resuscitation of trauma victims. Proper positioning of support lines is cardinal for the success of trauma resuscitation. Physicians and paramedics involved in trauma-resuscitation should be familiar with the identification and verification of correct placement of support lines in order to improve the outcome of resuscitation efforts.

NORMAL CT CHARACTERISTICS OF THE THYMUS IN ADULTS

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PURPOSE
The thymus changes with age. Its shape and the proportion of solid tissue and fat vary between individuals, yet there is no comprehensive work describing the size and morphology of the normal thymus on CT. As a result, many adults with some preserved soft tissue in the thymus may undergo extensive work-up to exclude mediastinal tumor. Our aim was to quantify CT characteristics of the normal thymus in an adult population.

MATERIALS AND METHODS
CT chest scans of 194 trauma patients aged 14-78 years (mean 52.6 years), were retrospectively reviewed. The density, volume, shape and predominant side of the thymus were recorded for 56 patients in whom some solid tissue was preserved. Statistical analysis of these characteristics according to the patient age and gender was performed.

RESULTS
Thymic density and volume decreased progressively with age. No solid tissue component was seen in the thymus in patients older than 54 years. In the majority of patients, the thymus had an arrowhead shape, with middle position. However, great variability in thymic shape and border were noted. There was a highly significant relationship between density and patient age ($p<0.0001$).

CONCLUSIONS
We hope that our work will help in the definition of normal thymic CT parameters in adults, help to prevent unnecessary and expensive imaging procedures, and reduce patient exposure to ionizing radiation.

CT-GUIDED PERICARDIOCENTESIS LIKE A NEW POSSIBILITY IN PATIENTS WITH VARIOUS CAUSES PERICARDIAL EFFUSION

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PURPOSE

CT-guided pericardiocentesis is a challenging procedure in cases of pericardial effusion management. In spite of its obvious advantages over open surgery, it is relatively rarely performed. In order to evaluate the effectiveness and clinical outcomes of this procedure, we investigated cases of various etiologies of pericardial effusion managed by CT-guided pericardiocentesis carried out by a single radiologist (A.S.) at the Diagnostic Imaging Department in Soroka University Medical Center.

MATERIALS AND METHODS

Over a 2-year period, 14 patients with symptomatic pericardial effusion were treated with CT-guided percutaneous placement of an indwelling pericardial catheter. All patients underwent an echocardiograph prior to the procedure. The mean age of the patients was 59 years (minimum 14 years, maximum 86 years). There were 9 male and 6 female patients. For the pericardium puncture and drainage we used pericardiocentesis and thoracentesis sets (8.3 Fr/ 40 cm).

RESULTS

In all procedures the catheter was successfully placed under CT-guidance, followed by drainage of pericardial fluid and tamponade relieving. The following complications were noted: pneumothorax in 2 cases and temporary hypotension in 1 case. The volume of aspirated fluid ranged from 50 cc to 1500 cc. Hemorrhagic fluid was drained in 4 cases and transuded in the other 10 cases. Left side approach was performed in most cases. All complications were minor and did not required special measures, except for monitoring and appropriate follow-up. None of the cases required repeated CT-guided pericardiocentesis.

CONCLUSIONS

CT-guided pericardiocentesis is a safe and effective alternative to surgical drainage in the care of patients with clinically significant pericardial effusion. In addition, this procedure avoids general anesthesia and saves substantial cost.

OPPOSITE SIDE ASPIRATION IN RESISTANT PNEUMOTHORAX AFTER CT-GUIDED LUNG BIOPSY- COMPLEMENTARY ROLE AFTER SIMPLE NEEDLE ASPIRATION

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PURPOSE

To evaluate the efficacy of simple aspiration of air from biopsy- induced pneumothorax immediately after biopsy and to present a new method to overcome intractable pneumothorax, by the "Opposite Side Aspiration."

MATERIALS AND METHODS

Between 1.1.10 and 3.4.11, 73 CT guided consecutive percutaneous needle biopsies of lung nodules were performed in 71 patients (45 men, 26 women; mean age 67.8 years; age range, 26-88 years). Two patients underwent repeated biopsies. The mean lesion diameter was 38 mm (range: 8 – 110 mm). Both core biopsy and FNA were performed in 68 procedures, 3 FNA were performed alone. Coaxial method was used for both FNA and for true cut biopsy. We performed simple aspiration on both asymptomatic patients with pneumothorax as well as patients with small pneumothorax. The "Opposite Side Aspiration" was performed consecutively to unsuccessful simple aspiration.

RESULTS

Among 73 CT-guided biopsy procedures, pneumothorax was detected in 39(53%) procedures by CT. Thirty-four (49%) were detected immediately after the biopsies. Delayed pneumothorax occurred in 3 (4%) patients. Manual aspiration to treat pneumothorax was performed in 16(22%) of 71 procedures or 16 (43%) of 37 of pneumothoraces.(One patient had delayed pneumothorax) Simple aspiration was successful in 10 out of 16 (62.5%) cases. In the other 6 cases (38%) Opposite Side Aspiration was successfully used after simple aspiration failed .

CONCLUSIONS

Immediate percutaneous aspiration of iatrogenic pneumothorax is successful in 62.5% of patients needing treatment. Our proposed new method of "Opposite Side Aspiration" offers a solution for those patients who remain with intractable pneumothorax after being treated with simple aspiration.

SHOULD PULMONARY EMBOLISM BE SUSPECTED IN PATIENTS WITH ACUTE EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE?

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PURPOSE
The clinical diagnosis of acute pulmonary embolism (PE) in patients with acute exacerbation of chronic obstructive pulmonary disease (COPD) is often difficult because the presenting symptoms of both conditions are indistinguishable.
To determine the prevalence of PE in patients with acute exacerbation of COPD.

MATERIALS AND METHODS
49 consecutive patients admitted to our medical center for acute exacerbation of COPD were included. PE was investigated in all patients (whether or not clinically suspected) following a standardized algorithm based on d-dimer testing, and computed tomography pulmonary angiography (CTPA).

RESULTS
PE was ruled out by a d-dimer value <500 µg/l in 20 (41%) patients and a by negative CTPA in 40 (82%). PE was confirmed in 9 patients. The prevalence of PE was 18%. One patient with normal D-dimer had PE. Presenting symptoms and signs were similar between patients who did and did not have PE.

CONCLUSIONS
One of five COPD patients who require hospitalization for an acute exacerbation may have PE. CTPA should be considered in patients with exacerbation severe enough to warrant hospitalization, particularly in those with an intermediate-to-high pretest probability of PE.

RETAINED FIBRIN SHEATHS: A COMMON CT FINDING AFTER LONG-TERM INDWELLING CENTRAL VENOUS CATHETER REMOVAL

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PURPOSE

Fibrin sheath development around long-term indwelling central venous catheters (CVC) occurs frequently; sheath remnants may remain in place after CVC removal. The purpose of this study was to evaluate the prevalence of retained fibrin sheaths after removal of long-term indwelling CVCs and their association with indications for CVC placement, patient characteristics and CVC-associated complications.

MATERIALS AND METHODS

We retrospectively reviewed the CT scans of 147 patients (77 men, mean age 58 years) who had undergone CVC removal. The prevalence of fibrin sheath remnants was calculated. Bivariate and multivariate analyses were performed to assess for an association between sheath remnants and the underlying diagnoses leading to CVC placement; patients' age and sex; venous stenosis, occlusion and collaterals; CVC infection and pulmonary embolism.

RESULTS

Retained fibrin sheaths were present in 13.6% (20/147); 45% (9/20) were calcified. Bivariate analysis revealed sheath remnants to be more common in women [80% (16/20), p=0.0018]. Venous occlusion and collaterals were more prevalent in patients with retained fibrin sheaths [30%, (6/20) vs. 5% (6/127), p=0.0001, and 30% (6/20) vs. 6% (7/127), p=0.0003, respectively] compared to those without. There was no significant association between sheath remnants and patients' age, infection, pulmonary embolism orindication for CVC placement. Multivariate analysis confirmed a significant relationship between fibrin sheaths and both female sex (p=0.005) and venous occlusion (p=0.01).

CONCLUSIONS

Retained fibrin sheaths are present on CT in a substantial minority of patients following CVC removal; nearly half are calcified. They are more common in women and are associated with venous occlusion.

APPLICATION OF CT PERFUSION AS AN ANCILLARY TEST IN BRAIN DEATH DIAGNOSIS

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PURPOSE

The concept of brain death emerged in the 1960s, as the ability to resuscitate individuals and mechanically keep the heart and lungs functioning became prevalent.
Brain death is a legal definition of death that refers to the irreversible end of all brain activity) including involuntary activity necessary to sustain life) due to total necrosis of the cerebral neurons following loss of blood flow and oxygenation.
Since June 2009 the low of respiratory brain death come in to force in Israel.
According to the low the diagnosis of brain death is based on clinical criteria with the combination of an ancillary test.
CT angiography (CTA) became one of the most useful test to establish the diagnosis of brain death because of its availability and simplicity of performing, but is subject to reader subjective decision regarding brain blood supply.
To create an objective parameters regarding blood supply in cases of diagnosing brain death using CT perfusion.

MATERIALS AND METHODS

15 patients that were referred for CTA to confirm the diagnosis of brain death during the years 2009-2012 had also CT perfusion.
A region of interest (ROI) was placed over the course of the major intracranial vessels, in order to detect if their is change or not in density during the perfusion scan – no change means there is no blood flow in the vessel.

RESULTS

We were able to measure the density in the intracranial vessels in 14 of 15 cases.
We compare our results in the CT perfusion to the results of the CTA- in 13 of the remaining 14 cases we found correlation between the two tests.
In one of the test the result did not match- the conclusion from the CTA was there is no intracerebral blood flow while in the CT perfusion we were able to identify changes in the density fitting with blood flow.

CONCLUSIONS

With the advance in technology and the new and faster CT machines CTA become an important ancillary test in the diagnosis of brain death, but its interpretation is subjective and depends on the observer impression.
We propose to use CT perfusion in an unconventional and new way, without measuring the cerebral blood volume and flow, but instead use it to asses intracranial blood supply more objectively by putting ROI and calculate the change in density of the vessel during the perfusion scan and eliminating or minimizing the interobserver difference.

QUANTIFICATION OF CT PERFUSION PARAMETERS AND PENUMBRA BASED ON ASPECTS

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PURPOSE

Evaluation of brain perfusion prior to angiographic interventions has been suggested as a possible selection criterion for treatment. ASPECTS (Alberta Stroke Program Early CT Score), is a quantitative method that has been developed to measure stroke in MCA territory. We hypothesized that the ASPECTS can be applied to CT Perfusion (CTP) maps to quantify core and penumbra.

MATERIALS AND METHODS

411 patients underwent CTP due to clinical suspicion of acute stroke between April 2007 and August 2011. We identified 88 patients that had acute stroke in the MCA territory as shown by CTP and follow-up CT. We scored MTT (Mean Transit Time), CBF (Cerebral Blood Flow) and CBV (Cerebral Blood Volume) in the ischemic region using ASPECTS. Additionally, volumetric quantification of the infracted region was also obtained using vendor software. Penumbra percent was calculated by the equation - (MTT size minus CBV size X 100)/MTT size. Pearson correlation was used to correlate the measurements based on ASPECTS and the volumetric measurements.

RESULTS

Significant correlation ($p<0.01$) was found between volumetric measurements of perfusion parameters and ASPECTS. Pearson's correlation coefficients were -0.89, -0.75, -0.75 and 0.64 for CBV, MTT, CBF and penumbra percent respectively. We further investigated the correlation by dividing the patients into 3 groups based on penumbra percent (0-50%, 50-85% and 85-100%) and found similar correlation in all groups.

CONCLUSIONS

ASPECTS may be used as a quantification tool of perfusion parameters and penumbra percent in clinical practice and research.

A NEW ALGORITHM FOR ESTIMATING BLOOD-BRAIN BARRIER PERMEABILITY IN MAGNETIC RESONANCE IMAGING STUDIES

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PURPOSE

Recent experimental evidence indicate that pathology of the blood-brain barrier (BBB) underlies brain dysfunction and damage, highlighting the importance of measuring BBB permeability in human patients. In this study we present a new algorithm for detection and quantification of BBB dysfunction and permeability increase in patients with traumatic brain injury. The assessment of BBB permeability was performed using MRI scanning by measuring of gadolinium leakage through a dysfunctional BBB. The algorithm was implemented and a graphical user interface (GUI) was created using MATLAB.

MATERIALS AND METHODS

Images from nine patients following traumatic brain injury (all had repeated scans) and 4 control subjects (healthy volunteers) were analyzed for this study. T1-weighted sequences were taken before and five minutes after injection of gadolinium All the images were normalized into a standard space defined by template t1-weighted image supplied with SPM which approximate the space described in the atlas of Talairach and Tournoux. Normalized matrix size was 571x642x30 with pixel resolution of 0.449mm and slice gap of 6mm.

RESULTS

Significant changes in image intensity were defined by performing slice-wise unpaired t-test with FDR correction. Each pixel with its 8 connected neighbors in the pre injection image were compared to the equal set of connected pixels at the same location in the post injection image. Each center pixel was reassigned with a P-value. P-value of $<.05$ was considered statistically significant. Then intensity percent difference values between the pre and post injection images were computed at correspondingly located pixels.

To obtain the information content of the 3D image, BBB permeability was quantified by a discrete function of the density distribution. First, coordinates of the lesion geometrical center of mass (COM) were manually defined. Then, each pixel in the image was reassigned with a Euclidian distance value to the lesion COM. The range of distances was quantized into equal unit intervals equal to the slice gap. The Permeability discrete density function was then defined at each unit interval as a ratio of the amount pixels with abnormal enhancement to a number of all of the pixels in the interval.

CONCLUSIONS

The automated algorithm was developed to provide an in-vivo detection of abnormal enhancement and thus BBB dysfunction. The accuracy of the algorithm was determined by visual pattern comparison and by correlation assessment of the BBB breakdown density function for the repeated scans.

IMAGING OF POST MORTEM BRAIN IN SITU BY DIFFUSION TENSOR IMAGING IN FORENSIC RADIOLOGY

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PURPOSE

A prospective study aimed to evaluate potential changes in DTI parameters (λ1, λ2, λ3, FA and ADC) in gray and white matter of deceased subjects in comparison with living subjects. We aim to evaluate Eigenvalue data as a means of assessing the main cell changes post-death as longitudinal diffusivity (λ1) has been associated with axonal loss while transverse diffusivity (λ2, λ3) with demyelination.

MATERIALS AND METHODS

DTI parameters (λ1, λ2, λ3, FA and ADC) of the brain were performed in situ in 10 deceased subjects and compared to 10 live subjects with normal MRI and DTI studies. DTI parameters were evaluated in different ROIs in the gray and white matter within different brain regions.

RESULTS

Post-mortem ADC values of the brain were decreased compared to normal DTI subjects by an average of 70%. Mean FA values in the white matter did not significantly change between live and post-mortem subjects, while grey matter FA values showed a significant decrease in the post-mortem subjects. Post-mortem ADC and FA values were highly correlated with λ2 and λ3 parameters and less correlated with λ1. No laterality differences between left and right hemispheres were observed.

CONCLUSIONS

Transverse diffusivity (λ2, λ3) has a higher effect than longitudinal diffusivity (λ1) on the decreased ADC and FA in post-mortem subjects. A possible explanation for this is the higher degree of cell membrane structural loss as compared to axonal degeneration in recently deceased in-vivo brains.

DIRECTIONAL DIFFUSIVITY CHANGES DESCRIBING MICRO-STRUCTURAL DAMAGE IN NORMAL APPEARING AND LESIONED CERVICAL CORD WHITE MATTER IN MULTIPLE SCLEROSIS

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PURPOSE

To evaluate the DTI parameters (λ1, λ2, λ3, FA and ADC) of relapsing- remitting multiple sclerosis (RRMS) patients in the normal appearing cervical spinal cord (NASC) and in MS lesions. Particular focus will be Eigenvalue data as longitudinal diffusivity (λ1) has been associated with axonal loss and Wallerian degeneration while transverse diffusivity (λ2, λ3) with demyelination.

MATERIALS AND METHODS

DTI of the cervical spine was performed. The DTI parameters were measured bilaterally at the level of C2-3 in anterior, lateral and posterior spinal cord Regions of Interest (ROIs). The values were compared between white matter in MS (NASC) patients and white matter (NWM) in non MS patients. When existing, a cervical MS Lesion was measured (ROI), one per patient. Values were compared to clinical parameters of Expanded Disability Status Scale (EDSS) and Disease Duration (DD) for correlation.

RESULTS

There were 10 RRMS (mean age 44, 7F, 3M) and 7 control (Mean age 41 4F, 3M) patients. 8 Lesions were measured. Anterior ROIs for all patients showed a significantly lower FA and considered to contain grey matter elements. NASC had significant higher mean λ1, λ2 and ADC values than NWM. Decreased FA was not significant. Lesions had significantly higher λ2, λ3 and lower FA values than NASC. Lesions were higher in λ1, λ2 and ADC with a lower FA than NWN, statistically significant without the anterior ROIs. FA changes between NASC and Lesions significantly correlated with λ2 and λ3. FA in NASC and NWM show correlations with λ1, λ2 and λ3. DTI values did not correlate with the clinical parameters examined.

CONCLUTIONS

NASC shows an increased longitudinal and transverse diffusivity compared to NWM. In Lesions, the transverse diffusivity is increased,

VALIDATION OF AORTIC PULSE WAVE VELOCITY ANALYSIS ASSESSED WITH VELOCITY-ENCODED MRI USING PARALLEL IMAGING WITH HIGH REDUCTION FACTOR

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PURPOSE

Phase contrast MRI with multidirectional velocity encoding requires multiple acquisitions of the same k-space lines to encode the underlying velocities, which can considerably lengthen the total scan time. To reduce scan time, parallel imaging is often applied. Limitations of parallel imaging include reduced signal-to-noise ratio and reconstruction artifacts. The promising clinical parameter of pulse wave velocity (PWV) can be derived from aortic flow curves acquired by MRI. Therefore, the purpose of this study was to evaluate the impact of different reduction factors on the accuracy and reproducibility of phase contrast imaging for calculation of pulse wave velocity (PWV).

MATERIALS AND METHODS

A total of 32 female volunteers (age 43 ± 14 years, 18 healthy, 5 RA and 9 SLE patients) were enrolled in this study. CMRI was performed using a 1.5T scanner and included phase contrast images of the ascending and descending aorta with a reduction factor of 2 and a reduction factor of 4. A dedicated cardiovascular analysis software was used to measure the flow at the level of the ascending and the descending aorta. The time that takes the flow wave to propagate between the two point was analyzed from the flow curves. The distance between these two levels was also obtained, and PWV was calculated accordingly. Artifacts were noted for each group. A cutoff of 6.5 considered to be normal. The results are expressed as mean± SD, Pearson's correlation coefficient (PCC), intraclass correlation (ICC) and Bland Altman's analysis (BAA) were used to assess agreement. McNemar test was used to assess a difference between proportions.

RESULTS

There was no difference between PWV-SF2 to PWV-SF4, 6.16 ±2.66 m/s vs. 5.95±2.4 m/s, respectively, p=NS. The PCC was 0.74, $p<0.01$. The ICC was 0.78 for single measures and 0.87 for average measures, $p<0.01$ for both. The BAA showed a bias of -0.22 and the 95% limits of agreement were 3.6-3.1 m/s. There were no artifacts using the PWV-SF2 acquisition and 14 (43%) were noted using the PWV-SF4 acquisition. The rate of normal/abnormal values was 18/14 and 20/12 in the PWV-SF2 vs. PWV-SF4 groups, respectively, p=NS.

CONCLUSIONS

In a mixed population of normal and collagen disease female patients, PWV calculation at SF2 shows strong agreement with PWV calculation at SF4, in spite of higher rate of artifacts in the PWV-SF4 acquisition.

AORTIC DIMENSIONS ON MDCT VERSUS ECHOCARDIOGRAPHY: SOME ARE MORE EQUAL THAN OTHERS…

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PURPOSE

During long-term follow-up for a dilated aorta, it is common to perform measurements alternately on CT and echocardiography in order to prevent excessive exposure to radiation. However, the guidelines for the two modalities differ on the locations and methods for measurement.
To determine the relationship between measurements on CT and echocardiography at various locations, using several methods.

MATERIALS AND METHODS

We studied 14 patients who had both a CECT scan of the chest and echocardiography. Measurements of the aorta were performed at 6 locations: aortic annulus, sinuses of Valsalva, sinotubular junction, 3cm above the sinotubular junction, the widest area of the ascending aorta and at the aortic arch. At each location, measurements were repeated using 3 techniques: Internal to internal edge (INT), internal to external edge (MIX) and external to external edge (EXT). A radiologist performed the measurements on cross-section CT images and a cardiologist on standard echocardiographic images. Each reader was blinded to the other's results and to the images from the other modality.

RESULTS

Significant differences between the modalities were found for the EXT method (mean 32.7±4.3mm on echocardiography vs. 30.4±4.0mm on CT, $p<0.0001$). Annular measurements were smaller on echocardiography ($p<0.02$) and variability (by standard deviation) was greatest (4.7mm). Excluding the annulus, average differences between echocardiography and CT using the INT, MIX and EXT methods were: 0.2±2.8mm, -1.0±2.7mm and -2.4±3.0mm, respectively ($p<0.001$ for all combinations), but their correlations were similar (0.56, 0.63 and 0.60, respectively).

CONCLUSIONS

There is considerable variability between the two modalities. Measuring with the EXT method is not advised due to significant differences between modalities. Variability is considerable within each modality for measurements of the annulus and sinuses. The smallest difference between modalities was achieved using the INT method.

TRENDS IN CLINICAL CARDIOVASCULAR MAGNETIC RESONANCE (CMR) UTILIZATION

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PURPOSE

Cardiovascular magnetic resonance (CMR provides accurate tissue characterization especially for ischemic and non-ischemic cardiomyopathies.

Purpose: To record CMR use over a period of 9 years and characterize trends in CMR utilization.

MATERIALS AND METHODS

Retrospective analysis of a prospectively maintained database was performed. Data regarding patients scanned between January 2003 and December 2011 was queried for patient demographics and scan indications.

RESULTS

A total of 3731 patients (61% males) were scanned. Scans performed increased significantly over the 8 year period in the following manner: 11 scans (2003), 177 scans (2004), 309 scans (2005), 428 scans (2006) 435 scans (2007) 500 scans (2008), 611 scans (2009), 646 scans (2010), 659scans (2011). The main indications and their percent change from 2004 and 2011 were as follows: tumor evaluation (from 9% in 2004 to 6% in 2011), RVD (from 1% to 10%), myocarditis (from 2% to 12%), cardiomyopathy (from 3% to 20%), STEMI (from 0% to 7%), Stress CMR (from 0% to 2%), T2*for cardiac iron overload (from 0% to 7%), MR angiography (from 70% to 21%).

CONCLUSIONS

A substantial increase in CMR scans performed for all indications occurred during the 9 year period. Analyzing the trends in CMR utilization demonstrates a significant increase in the percent of CMR studies performed for cardiomyopathy, myocarditis and STEMI evaluation. This trend affirms the increasing acceptability of CMR as an imaging modality in the cardiology arsenal.

MICROVASCULAR OBSTRUCTION ASSESSED BY CARDIAC MRI IN PATIENTS WITH ST SEGMENT ELEVATION MI (STEMI) UNDERGOING PRIMARY PERCUTANEOUS CORONARY INTERVENTIONS (PCI)

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PURPOSE

Microvascular obstruction (MVO) occurring following percutaneous coronary interventions (PCI) may lead to myocardial injury, and is an independent predictor of adverse outcome in patients presenting with ST segment elevation MI (STEMI). Cardiac magnetic resonance (CMR) became the gold standard for assessment of microvascular obstruction (MVO). Recently CMR is being performed as part of the routine evaluation of STEMI patients undergoing angiographically successful (TIMI III) primary PCI (PPCI) in Sheba Medical Center. CMR was evaluated for the amount of delayed enhancement (DE) and MVO.

MATERIALS AND METHODS

The study cohort included 31 consecutive patients who underwent primary angioplasty for first STEMI (26 males, mean age 58± years). CMR studies were performed within an average of 5.4 days from admission. CMR scans were performed using a 1.5T scanner with the following sequences : steady state free precession, T2, perfusion and myocardial delayed enhancement (MDE). Evaluation included LVEF and RVEF calculation; quantification in grams of: MDE and microvascular obstruction (MVO).

RESULTS

Fifteen patients had MVO > 2% (mean 6±3%) of LV mass (MVO group) and sixteen patients had no or MVO extent < 2% (mean 0.56±0.66%) of LV mass (no MVO group). Patients in the MVO vs. no MVO group were more likely to be non-smokers (90% vs. 56%, P=0.074) and were two times more likely to be diabetic (30% vs. 12.5%, P=0.29).

MVO was associated with larger myocardial damaged as assessed by CMR DE (24±7 vs. 11±6% of LV, P<0.005), peak CPK (4165±2242 vs. 1202±1010 IU/l, P=0.0001), peak troponin I (133±108 vs. 39±33, P=0.003) and left ventricular ejection fraction (38±8 vs. 49±10%, P=0.01). Thrombus in the left ventricle was found in 4 patient in the MVO group and none in the no MVO group (P=0.02).

CONCLUSIONS

Routine early CMR, in patients undergoing PPCI for STEMI, can detect MVO, predicting larger myocardial damage and lower LVEF.

THE ADDITIVE VALUE OF CT PRIOR TO TRANSCATHETER AORTIC VALVE REPLACEMENT (TAVR) PROCEDURE

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PURPOSE

Transcatheter aortic valve implantation (TAVR) has been recently introduced as an alternative to conventional open heartsurgery for selected patients with symptomatic severe aorticstenosis.

To evaluate the additive value of CT performed prior to TAVR procedure.

MATERIALS AND METHODS

The study cohort included 67 consecutive patients which underwent gated chest and abdomen CT (58/41) or gated chest CT (9/67) prior to tranfemoral and transapical aortic valve implantation, respectivly. All scans were performed using a 256 slice multi-detector CT scanner and evaluated for aortic annulus measurement, vascular and non cardiac findings.

RESULTS

Procedure cancellation occured due to large annulus (>29 mm) (1/67), small annulus (<23 mm) 4/67, tortuous ulcerated aortic aneurysm 3/67, calcified finding near the aortic valve 1/67, patient operated 1/67 and lack of data 4/67.

Change from trans-femoral to trans-apical approach was necessary in 9/67 patients because of significant vascular disease,avoiding vascular access, including aortic dissection (1/67).

Major non cardiac finding included (a) thoracic : pulmonary findings in 52%(35/67) out of which 2/67 were suspected for malignancy and a case of chronic PE 1/67 mediastinaladenopathy in 20% (14/67), (b) abdominal : adrenal, renal, gastrointestinal and hepatic pathology in 10% (7/67), 38% (26/67), 46%(31/67), 14% (10/67), respectively; 13/67 (19%) required further investigation or treatment. Skeletal findings were demonstrated in 19/67 (28%), five suspected for metastatic spread.

CONCLUSIONS

Pre TAVR gated CT can improve pre procedure patient selection. Gated CT allows better per patient tailoring prior to the procedure, including accurate vascular and procedure access demonstration. Non vascular findings in this patient population are frequent, however these should not be underestimated since major findings changing or cancelling the procedure can occur.

Incidental findings prevalence is high the older patients undergoing TAVR. These can alter procedure management. Therefore, all studies should be carefully scrutinized for them.

ROLE OF DOBUTAMINE STRESS MRI FOR PREOPERATIVE CARDIAC RISK ASSESSMENT BEFORE MAJOR VASCULAR SURGERY

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PURPOSE

Over the past years, dobutamine stress magnetic resonance (DSMR) has proven its efficacy as an integrated part of the diagnostic armamentarium in cardiology; however, the use of DSMR for preoperative cardiac risk assessment before major vascular cardiac surgery has not evaluated.

MATERIALS AND METHODS

Twelve consecutive patients (65.6 ± 14.3, range 37 - 85) were referred for DSMR to assess preoperative cardiac risk. Vascular surgical procedures included arterial bypass in the lower extremities (n = 9), abdominal aortic aneurysm repair (n = 2), and carotid endarterectomy (n = 1). Cine images were acquired in 3 short- and 3 long-axis views. Patients were examined at rest and during a standard dobutamine-atropine protocol. The examination was terminated if new or worsening inducible wall-motion abnormalities (IWMA) or chest pain occurred or when > 85% of age-predicted maximum heart rate was reached. Image quality and wall-motion at rest and maximum stress level were evaluated using a four-point scale for the visibility of the endocardial border (score: 1 = barely or not visible; 2 = moderately or partly visible; 3 = well visible; and 4 = excellently visible).

RESULTS

In 11 patients DSMR was successfully performed and completed in an average of 54 ± 5 minutes. One patient could not be examined because of claustrophobia. No serious side effects were observed during DSMR and the target heart rate had been reached in all patients. Two patients had positive DSMR results but were clinically asymptomatic and had only mild ischaemia (IWMA in only one segment) and therefore did not undergo coronary angiography. All 11 patients did not experience any cardiac event (death, myocardial infarction, or congestive heart failure) during surgery or in their postoperative course.

The segmental intra-observer agreement for wall motion assessment was nearly perfect ($\kappa = 0.80$; $p < 0.0001$) and the average image quality was excellent without difference of the rest versus maximal stress cine images (3.8 ± 0.38 vs. 3.7 ± 0.40, $p = 0.125$; respectively).

CONCLUSIONS

Our initial clinical experience demonstrated the clinical applications and safety of DSMR for predicting cardiac event during or after major vascular surgery.

EPICARDIAL ADIPOSE TISSUE AS A PREDICTOR OF CORONARY ARTERY DISEASE IN ASYMPTOMATIC SUBJECTS

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PURPOSE
This study sought to elucidate the relationship between epicardial adipose tissue (EAT) thickness measured by multidetector computed tomography (MDCT) and the presence and burden of coronary artery atherosclerosis.
Recent studies suggest that fat disposition in visceral organs and epicardial tissue could serve as a predictor of coronary artery disease (CAD).

MATERIALS AND METHODS
The sample included 190 asymptomatic subjects with one or more cardiovascular risk factors who were referred for cardiac CT angiography (CCTA). Body mass index, blood pressure, fasting glucose level, and lipid profile were measured. MDCT results were analyzed for atherosclerosis burden, calcium Agatston score, and EAT thickness.

RESULTS
Mean EAT values were 3.54±1.59 mm in patients with atherosclerosis and 1.85±1.28 mm in patients without atherosclerosis ($p<0.001$). On receiver operating characteristic analysis, an EAT value of 2.4 mm or more predicted the presence of significant (>50% diameter) coronary artery stenosis. There was a significant difference in EAT values between patients with and without metabolic syndrome (2.58±1.63 mm vs 2.04±1.46 mm, $p<0.05$), and between patients with a calcium score of more or less than 400 (3.38±1.58 mm vs 2.02±1.42 mm, $p<0.0001$).

CONCLUSIONS
Asymptomatic patients with CAD have significantly more EAT than patients without CAD. An EAT thickness of 2.4 mm is the optimal cutoff for prediction of the presence of significant coronary artery stenosis.

VASCULAR RING IMAGING - TEN YEARS EXPERIENCE

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PURPOSE

Airways obstruction and stridor are common in children, a portion of these are caused by abnormalities in the embryologic development of the aorta and pulmonary arteries, known as vascular rings and slings. In most centers Computerized Tomographic Angiography (CTA) is used to evaluate these abnormalities. Recently we have begun performing MRI/A instead of CTA in order to avoid ionizing radiation exposure and iodinated contrast administration.

The purpose of this work is to summarize our experience in imaging of vascular rings both by CT and MRI.

MATERIALS AND METHODS

A retrospective analysis of imaging data from January 2002 to March 2012 was performed. The study group included 29 patients with suspected aortic arch abnormalities by either physical examination and/or echocardiography, including fetal echocardiography (age range: 2 days-41 years, mean age: 63 months; weight range 3.1 kg-57). Seventeen patients were scanned using CTA and twelve patients using MRI/A.

All the studies were supervised and interpreted by a dedicated team of a cardiologist and a radiologist for detecting cardiovascular and extravascular abnormalities.

RESULTS

Among the CTA (N=17), 10/17 patients had a vascular ring associated with double aortic arch, 5/17 had right aortic arch with aberrant Lt subclavian artery. One patient had vascular sling and one patient had aortic arch abnormalities without vascular ring.

Among the MRI/A (N=12); 7/12 patients had vascular ring associated with double aortic arch. 3/12 patients had vascular ring associated with right aortic arch and aberrant lt subclavian. One patient had aortic arch abnormalities without vascular ring.

Both CTA and MRI/A findings were confirmed by the operative findings. No difference was found in the accuracy of pre-operative diagnosis between CTA or MRI/A findings.

CONCLUSIONS

Cardiac MRI/A and CTA are comparable modalities for evaluating vascular rings and slings. In our experience MRI/A, is a non inferior imaging modality compared to CTA, not exposing the patients to the inherent risks of ionizing radiation and iodinated administration.

HYPEROSTOSIS FRONTALIS INTERNA: BETWEEN TWO CENTURIES

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One of the major challenges of the 21st century medical research is to reveal the consequences of the rapid changes in our environment, lifestyle, reproductive behavior and nutrition, on our health. A pathology like hyperostosis frontalis interna (HFI) whose diagnosis and definition is unaffected by medical progress, i.e, diagnostic techniques and disease definition, may allow us follow these changes. In addition, HFI is rare in historic populations, albeit occasional cases with very high prevalence had been reported.

The aim of this study was to examine whether the prevalence and severity of HFI have significantly changed during the past 100 years.
Two female populations, 100 years apart, were studied; 992 historic and 568 present day females. Detection of HFI was carried out via direct observation or CT images (Philips Medical Systems, Cleveland, Ohio, USA). HFI degree was identified according to Hershkovitz et al.'s (1999) 4-scale definition and according to May et al.'s (2010) 3-scale definition.

Following correction for age, present day females manifested a significantly higher HFI prevalence compared with historic females ($p<0.05$). The risk of developing HFI was found to be approximately 2.5 times greater in present day females compared with females living 100 years ago ($p<0.05$). In the young age cohort, present day females manifested a significantly higher prevalence of HFI type B ($p<0.05$), whereas in the old age cohort, a significant difference in the prevalence of HFI types C and D was noted between the two groups ($p<0.05$). HFI tended to appear at a younger age in the present population.

The last two decades has witnessed an increase in HFI prevalence, especially among young individuals. This may possibly indicate the impact of the profound change in human fertility patterns, together with the introduction of various hormonal treatments and new dietary habits.

STENT-ASSISTED ANGIOPLASTY IN THE MANAGEMENT OF EXTRACRANIAL CAROTID ANDVERTEBRAL ARTERIES DISSECTION AFTER TRAUMA

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PURPOSE

Extracranial carotid and vertebral arteries dissection is an uncommon but well-recognized entity that may occur as a complication of trauma. These injuries can result in brain ischemic changes with devastating neurological consequences. Anticoagulant therapy is commonly prescribed but is frequently contraindicated in this setting. Thus, endovascular stenting has been proposed as a valuable alternative.

MATERIALS AND METHODS

We reviewed 23 patients admitted to our institution between 2003 and 2010 with traumatic extracranial internal carotid and vertebral arteries dissection treated by means of stent-assisted angioplasty. Medical history, physical examination, neurological findings, radiological studies, endovascular reports, and follow-ups were drawn from the patients' charts.

RESULTS

There were nineteen male and four female patients, the mean age was 42.6 (median 43, range 16-66), fourteen patients presented after multiple trauma, including four after fall from height, seven after minor cranial-cervical injuries and two with penetrating cervical injuries. Ischemic events were the most common clinicגדשal presentation. Contraindication for coagulation was the most common indication for angioplasty. In eleven patients multiple stent were implanted, immediate stenosis reduction from a mean 62% (range 100-10%) to 5% (range 0-20%). No patient presented clinical or neurological complications in relation to the endovascular procedure.

CONCLUSIONS

In selected cases of traumatic carotid and vertebral arteries dissection, failure or contraindication of anticoagulation therapy or when there are clinical or neuroradiological signs of impending stroke, endovascular stenting may be considered a valuable therapeutic option. Endovascular reconstruction by means of stents appears to be a technically feasible, safe and effective method of arterial reconstruction even in acutely occluded arteries. This technique avoids the need of long-term anticoagulation.

STENT-BASED THROMBECTOMY IN THE MANAGEMENT OF MAJOR ISCHEMIC STROKE OF THE ANTERIOR CIRCULATION

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PURPOSE

Stent-based thrombectomy is a recently described technique that promises to revolutionize the endovascular management of major ischemic stroke. We present our experience using a self-expanding stents to achieve urgent arterial recanalization in acute stroke.

MATERIALS AND METHODS

Between February 2010 and February 2012 sixty four consecutive patients (mean age 57, range 22-92) sustained stent-based thrombectomy for anterior circulation major ischemic stroke secondary to large vessel occlusion. Occlusion sites were: MCA trunk (36), MCA branch (7), T-L ICA occlusion (11) and tandem ICA-T/MCA (10). Patients had mean NIHSS of 18 (10-28) and mean ASPECT of 8 (5-10). Demographic and technical data, neurological evolution and neuroradiological findings especially hemorrhagic complications were recorded and evaluated.

RESULTS

Mean time to therapy was 4 hours (range 1-11). After a mean of 1.8 passes (range 1-5), the mean time to recanalization was 47 minutes (range 35-136). TIMI and TICI 2-3 were achieved in 95% and 84% of the patients, respectively. Hemorrhagic transformation was detected in 11% of the patients, most of them considered asymptomatic. Two stents were permanently implanted. 77% of the patients with MCA occlusion reached mRS 0-2 at 3 months.

CONCLUSIONS

Stent-based thrombectomy allows unprecedented rates of recanalization of major vessels in major stroke of the anterior circulation and in our experience proved to be more rapid and effective in comparison to other available thrombectomy options with an acceptable risk profile. In the majority of cases, the presented approach allowed three desired effects: rapid endovascular revascularization, clot removal and no need of leaving a permanent implant.

ENDOVASCULAR STENTING OF EXTRACRANIAL CAROTID ARTERY STENOSIS: CAN ZERO POSTOPERATIVE STROKE RATE BE ACHIEVED?

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PURPOSE

In the treatment of carotid artery stenosis, it is generally felt that endarterectomy poses a slightly lower risk of procedural complications than does carotid artery stenting (CAS). We evaluate the procedural risks associated with CAS in a series of high-risk patients.

MATERIALS AND METHODS

We retrospectively reviewed consecutive cases of CAS in high-risk patients treated from 2006 to 2012. Patients were considered to be at high risk for complications if they had major morbidities, restenosis post carotid endarterectomy (CEA), restenosis post radiation, contralateral carotid occlusion, or tandem occlusions. Low-risk patients and those with dissections and acute stroke were excluded. Our data included age, gender, degree of carotid artery stenosis, symptoms related to the carotid lesion being treated, and any relevant medical or surgical background information. Percentage pre- and post-procedural stenosis as well as major and minor complications were noted.

RESULTS

We identified 90 cases of CAS in 82 high-risk patients (25 women, 65 men; ages 41-89 years, mean 67.5). Twenty-six treated lesions (29%) were symptomatic, and 12 occurred in carotid sections previously treated with endarterectomy. Stenosis was graded by NASCET criteria. Pre-procedure stenosis ranged from 60-95% (mean 86%); following CAS it improved to 0-40% (mean 4%). No procedure-related ischemic strokes or myocardial infarctions occurred. There were no major complications. There were three femoral hematomas and four urinary tract infections in six patients, which were managed conservatively.

CONCLUSIONS

In high-risk patients with extracranial carotid artery stenosis, carotid artery stenting is a very safe treatment option. Team experience and adequate technical planning may greatly reduce the risk of procedural stroke.
Clinical Relevance: Risk of procedural complications, notably stroke, may be negligible in carotid artery stenting, and should not influence the choice of treatment for carotid artery stenosis.

POTENTIAL CONSEQUENCES OF LATE WILSON'S DISEASE DIAGNOSIS

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PURPOSE

The purpose of the study was to evaluate the resolution of brain lesions in patients with Wilson’s disease (WD) during the long-term chelating therapy by magnetic resonance imaging (MRI) and a possible significance of the time latency from the initial symptoms of the disease to the introduction of such therapy.

MATERIALS AND METHODS

Fourteen patients with neurological presentation o WD divided in Group A (5 patients who initiated chelating therapy ≤18 months from the first symptoms) and Group B (9 patients whose therapy started ≥24 months after the initial symptoms) were MRI reexamined during the follow-up of 5.7±1.3 years.

RESULTS

Complete or partial resolution of the brain MRI lesions was observed in a substantial number of patients in the putamen (43%), caudate nuclei (43%) mesencephalon (75%) and pons (100%). Significant difference was observed in the distribution of patients with complete or partial resolution, as well as those without change of putaminal lesions, between Group A and B (p=0.024). There was a significant difference between groups A and B regarding complete resolution of brain stem lesions (p=0.005). The likelihood of complete resolution of brain stem and putaminal lesions in WD appears to be significantly higher if adequate treatment is initiated earlier in the course of the disease.

CONCLUSIONS

If the correct diagnosis and adequate treatment have not been established within 18 months from initial symptoms, permanent clinical impairment associated with irreversible lesions within the brain parenchyma could be expected.

MR NEUROGRAPHY: ASSAF HAROFEH MEDICAL CENTER PRELIMINARY RESULTS

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PURPOSE

High-resolution magnetic resonance (MR) Neurography is a novel imaging technique, which enables multiplanar imaging of peripheral nerves, as well as diagnosis and localization of entrapment and non-entrapment peripheral neuropathies related to etiologies, such as inflammation, tumor and trauma. Our purpose is to present the MRN appearance of various types of diffuse peripheral nerve lesions.

MATERIALS AND METHODS

At MRN imaging, neural disease is inferred from alterations in nerve signal intensity, size, morphology, and location. Nerve disease is presumed when there are secondary signs of neural injury, such as denervation of the supplied muscles in the case of motor nerves. At our institute we have performed more than 40 MRNs, with a gender variability of 50% male-to-female. The age range of our patients was 35-60. Using clinical and pathologically proven relevant examples we present the feasibility, required sequence types and the ability of MRN to depict various pathologies such as traumatic, inflammatory, infectious, hereditary, radiation-induced, neoplastic, and tumor variants.

RESULTS

Typically, MR Neurography techniques utilize a combination of MRI pulse sequences for the detection of the nerve signal, contour and size changes, as well as anatomical sequences for the assessment of the peripheral nerve anatomy. Approximately 50% of our MRNs were diagnosed as normal, with the remainder diagnosed as pathological: including 5 peripheral nerve neuropathies, 3 schawannomas, a single nerve root avulsion, and 3 traumatic nerve tears.

CONCLUSIONS

High-resolution MRN imaging of peripheral nerves is becoming more common and practical. There is a relative paucity of literature on MRN appearance of diffuse peripheral nerve lesions. At MRN imaging, neural disease is inferred from alterations in nerve signal intensity, size, morphology, and location. Using clinical and pathologically proven relevant examples we present the feasibility, required sequence types and the ability of MRN to depict various pathologies of diffuse peripheral nerve lesions.

EARLY MR FINDINGS IN ORGANOPHOSPHATE-INDUCED BRAIN DAMAGE– POTENTIAL BIOMARKERS FOR SHORT TERM PROGNOSIS

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PURPOSE

Organophosphates are highly toxic substances which cause severe brain damage. The hallmark of brain injury is major convulsions. The objective of the current study was to describe the spatial and temporal changes in the brain of organophosphate intoxicated animals using MR techniques.

MATERIALS AND METHODS

Male rats (n=14) were exposed to 1.4 LD50 paraoxon (450 mg/kg, IM). One minute after intoxication, all rats were treated with atropine (3 mg/kg, IM) and obidoxime (20 mg/kg, IM) to induce brain damage without significant immediate mortality. MR T2-weightd and 1H-spectroscopy were conducted prior to intoxication and 3 hours, 24 hours and 8 days post intoxication.

RESULTS

T2 prolongation mainly in the thalmi and cortex was evident as early as 3 hours after intoxication (4-6% increase in T2 values). On spectroscopy, NAA/Creatine and NAA/Choline levels significantly decreased 3 hours post intoxication (>20% decrease) and 3 hour lactate peak was evident in all intoxicated animals. On the 8th day, although no significant T2 changes were evident, NAA/Creatine and Choline/Creatine were significantly decreased (>15%). Animals who succumbed had extensive cortical edema, significant higher lactate levels and a significant decrease in NAA/Creatine and NAA/Choline levels compared to animals which survived the experiment.

CONCLUSIONS

Organophosphate induced brain damage is obvious on MRI already 3 hours post intoxication. In-vivo spectroscopic changes are more sensitive for assessing long term injury than T2 weighted imaging. Early spectroscopic findings might be used as biomarkers for the severity of the intoxication and might predict early survival.

ADVANCED MR CHARACTERISTICS OF PERITUMORAL REGIONS CAN DISCRIMINATES BETWEEN GLIOBLASTOMA MULTIFORME AND CEREBRAL METASTASES

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PURPOSE
Discriminating between glioblastoma multiforme (GBM) and metastases based on enhancement patterns on MR imaging may be impossible. Our hypothesis is that there are significant differences in MR characteristics of peritumoral region between GBM and metastases which can assist to differentiate between them.

MATERIALS AND METHODS
Thirty eight patients with a solitary brain tumor (21 GBM, 17 metastases) underwent conventional, diffusion tensor imaging (DTI), contrast–enhanced perfusion-weighted (PWI) and proton spectroscopic MR imaging (MRSI) before surgical resection or stereotactic biopsy. The peritumoral region was defined as the area in the white matter immediately adjacent to the enhancing portion of the tumor (hyperintense on T2-weighted images, but not enhancing on postcontrast T1-weighted images). PWI (rRBV), DTI (fractional anisotropy (FA), λmax, λmid, λmin) and MRSI (NAA, Choline and Creatine peaks) parameters were measured by placing region-of-interest (ROI) on the peritumoral area. Advanced DTI parameters were calculated (mean diffusivity, CL, CP, CS, p and q). Binary logistic regression analysis was employed to determine the best model for classification.

RESULTS
rRBV was significantly higher in peritumoral region of GBM compared to metastasis (1.02 compare to 0.51, respectively, p=0.008) and NAA to Choline ratio was significantly higher in metastases (1.72 compare to 1.02, p=0.006). The best logistic regression model for classification included five parameters (FA, NAA/Creatine, Choline/Creatine, NAA/Choline and rRBV) resulting in accurate prediction of 90% of the tumors (91% of the GBM and 88% of the metastasis) and area under the curve of 0.95 (in ROC analysis). Advanced DTI analysis did not improve the prediction ratios.

CONCLUSIONS
The combination of DTI metrics, PWI and spectroscopy analysis of the peritumoral area has a potential as a non-invasive measure to differentiate GBM from metastasis.

CEREBRAL FAT EMBOLISM (CFE): IMAGING FEATURES AN EXPERIENCE OF ONE MEDICAL CENTER

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PURPOSE

To report the imaging findings of CFE in the acute phase and changes over time in follow-up studies.

MATERIALS AND METHODS

Six patients were diagnosed with CFE at our institution between 2006 and 2012. Five patients had fractures of long bones and a 6th patient had Sickle cell anemia. All of the trauma patients had surgery from which 4/5 did not regain consciousness and the 5th patient presented with postoperative seizures. The 6th patient suffered acute respiratory distress and did not regain consciousness following intubation. All patients were studied initially with brain CT. Five patients had MRI study thereafter and a second MRI preformed 7-35 days later. Three had a repeat exam 5 to 35 months later. One patient died following the CT performed without having an MR study. Demographic and clinical data were collected from patient charts. Imaging features from all CT and MRI studies for each patient were reviewed. The study received an institutional ethics committee approval with exemption from informed consent.

RESULTS

CT studies were interpreted as normal in 3 patients and abnormal in the other three. Of the abnormal CT studies 2 had diffuse low attenuation regions in the white-matter and the 3rd had low attenuation lacunae demonstrated in the basal ganglia. One of the three died within several days. The second and the third patients remained in deep coma. MRI findings displayed 2 different patterns: 1. a milliary distribution pattern of multiple punctuate lesions of high intensity on T2WI and FLAIR with restricted diffusion (previously described as “starfield pattern”). This pattern was observed in 3 patients. 2. Scattered high intensity lesions on T2WI without clear restricted diffusion that appeared in 2 of our patients.

CONCLUSIONS

CFE may present with 2 different imaging patterns on T2WI and DWI. Fewer T2WI lesions correlate with a better clinical picture. Low attenuation of the white matter on CT might predict worse prognosis.

HIP SPORT INJURIES

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Conventional radiographs may demonstrate some causes of hip pain, such as stress fractures and degenerative joint disease. Magnetic resonance imaging (MRI) of the hip has proven valuable in the diagnosis of radiographically occult osseous abnormalities and periarticular soft-tissue disorders such as fractures, avulsion injuries,musculotendinous abnormalities, and bursitis.This article focuses on the use of MRI in recreational and professional athletes with painful hip areas. Where possible, MRI is compared with other diagnostic modalities such as Ultrasound and computed tomography.

We review many of the most common confounding causes of hip pain in our institution and from MRI Mor Mar Ltd in the 3 last year. We present cases of stress fractures, musculotendinous abnormalities, bursitis, and Labrum tears. (we need about 20 minutes (if is possible).

BILATERL HIP REPLACEMENT: COMPARISON OF MRI SIGNAL INTENSITY OF PERIPROSTfrHETIC PSEUDOTUMOR COLLECTION BETWEEN METAL ON METAL AND OTHER HIP REPLACEMENT DEVICES

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PURPOSE

Modern metal-on-metal (MoM) hip replacements have been marketed as having a long life expectancy, with minimal wear over their lifetime, compared to traditional implants. There is steadily growing body of evidence of periprosthetic soft tissue complications linked to shedding of metallic particulate debris. Periprosthetic fluid collection (PPC), also called "pseudotumor" is a commonly reported complication. We hypothesized that metallic shredding in MOM will affect signal intensity of the PPC compared to signal intensity in PPCs of other types of implants.
We aimed to compare signal intensity of PPC in patients after bilateral hip replacement in which at least one hip was replaced by metal on metal (MoM) hip prosthesis.

MATERIALS AND METHODS

30 MRI hip examinations in 22 patients (Male: female, 4:18, average age: 67.8 years) who underwent bilateral hip replacement were retrospectively evaluated. Eight patients underwent bilateral MoM hip replacement, 14 patients underwent unilateral MoM hip replacement and another type of hip replacement (non MoM) of the contralateral hip. All MR examinations were performed with metal reduction artifact protocol that included T1-weighted, T2-weighted and STIR sequences on the axial and coronal planes. Examinations were evaluated for the presence of a PPC on both hips. In the presence of a collection, its' signal intensity was measured on axial T2-weighted images by placing a region of interest (ROI) in the middle of the collection. ROI was also measured in the subcutaneous fat on the same image. In order to standardize ROI values, signal to Noise ratio (S/N) was defined as the collection's measured ROI divided by fat's ROI. Mean S/N ratio was compared between MoM and non MoM PPCs and between both sides of MoM PPCs.

RESULTS

PPC was seen in 17 (55%) MoM hip replacements and in 7 non MoM hip replacements (50%). Average S/N of the MoM PPC was lower than non MoM collection (1.17 vs. 1.63) almost reaching statistical significance (p=0.077). S/N of the different sides of MoM collection was similar (right=1.159, left=1.21, p=0.8).

CONCLUSIONS

Metal's paramagnetic effect is expressed as decreased MRI signal intensity in T2-weighted sequences. The lower signal intensity of periprosthetic collections of MoM hip replacements compared to non MoM hip replacements, suggests metal shedding into the PPC from the MOM but not in the non MOM implants.

METAL-ON-METAL HIP REPLACEMENT: CORRELATION BETWEEN BLOOD METAL IONS LEVELS AND MRI SIGNAL INTENSITY OF DIFFERENT BODY TISSUES

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PURPOSE

To evaluate possible accumulation of metal ions in different body tissues of patients after metal on metal (MoM) hip replacement by assessing correlation between blood metal ion levels (BMIL) and MRI signal intensity (SI) of different body tissues

MATERIALS AND METHODS

61 MRI hip examinations in 54 patients (Male:female, 18:36, average age: 65 years) who underwent either unilateral or bilateral MoM hip replacement (average time from surgery: 4.1 years, range: 1.9-6.1) were retrospectively evaluated independently by an experienced MSK radiologist and an intern. The mean SI in a region of interest (ROI) was measured for periprosthetic pseudotumor collection (PPC), when present, bladder, fat, muscle and air on axial FSE-T2-w, T1-w and STIR sequences on the same slice. SI was defined as signal to noise ratio, i.e. the measured ROI values of tissue, divided by standard deviation of air at the same slice. Reader's results were averaged. Blood levels of chromium and cobalt ions were retrieved from patients' files. Pearson's correlation coefficient was computed to assess the relationship between BMIL and tissue's SI.

RESULTS

PPC was seen in 32 patients (52%), average volume: 82.48 mm3. Average BMILs were: chromium 19.12 ug/L (range: 0.2-108) cobalt 49.46 ug/L,(range: 0.4-310). No correlation was seen between BMILs and the presence of PPC. In the presence of a PPC, positive correlation exists between BMILs and PPCs' volume (cobalt/chromium: r=0.4/0.6, p=0.05/0.001). Negative correlation was seen on STIR between BMILs and muscle's SI: (cobalt/chromium: r=0.4/0.4, p=0.05/0.04); bladder's SI (cobalt/chromium: r=0.5/0.4, p=0.01/0.04) and between cobalt levels and PPC's SI (r=0.4, p=0.05). Positive correlation was found on T1-w SIs. On T2-w, negative correlation was seen between cobalt (but not chromium) levels and fat (cobalt/chromium: r=0.4/0.3, p=0.04/0.2).

CONCLUSIONS

Increased MRI SI on T1-w and decreased SI on STIR were correlated with BMILs. This correlation suggests metal paramagnetic effect and thus metal deposition in the evaluated tissues.

PATIENTS WITH ATYPICAL FEMORAL FRACTURES – RADIOLOGICAL PARAMETERS AND MEDICATION EXPOSURE

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PURPOSE

Atypical femoral fractures have drawn much attention during the last several years, especially in light of their possible connection to prolonged bisphosphonate use. Reported cases have been reviewed, and position statements of ASBMR and Endocrine Society has been published with sets of clinical and radiological criteria for more precise case definition. These reports call for uniform documentation of atypical fractures by creating specific codes and continued epidemiological and clinical data collection in order to establish prevalence and risk factors. We aimed at reviewing the prevalence of atypical fractures and clinical and radiological parameters of patients at our institution.

MATERIALS AND METHODS

Computerized database of discharge diagnoses 2007- 2010 was reviewed. ICD-9 diagnoses compatible with fracture location below femoral neck were chosen (Shaft, Supracondylar, Subtrochanteric, etc). Patients younger than 50 years old and those with major trauma were excluded. Admission femoral X rays of patients with suitable fracture location were examined by two senior radiologists in two steps. The fractures were classified as Atypical or Not-Atypical according to the published criteria. Hospital files of the patients with atypical fractures were reviewed.

RESULTS

Eighty one patients answered the search criteria. Of note, most fractures coded as "subtrochanteric" were in fact inter or intratrochanteric, and thus excluded. Twenty two were classified by the first radiologist (AN) as having an atypical fracture. After a second radiological evaluation (AN and DM) fifteen were judged as not compatible with the existing criteria, mainly due to oblique configuration. The remaining seven patients were all women. The medium age was 80 (70-91). The average hospital stay was 8.3 days. Of all twenty two patients, eight were functionally independent prior to fracture, the rest were frail – bedridden, psychiatric ward inpatients, or ADL dependent. Five patients received bisphosphonates only, median length of treatment 5 years (2-10). One of these patients also received PPI's. For the remaining two patients there was no complete medication data.

CONCLUSIONS

Atypical femoral fractures are not uncommon. Lack of uniform code designation makes the case identification difficult. Miscoding makes the task even more challenging. Thus, conclusions drawn from trials based solely on coded diagnosis might lead to significant bias. In our institution seven patients presented with an atypical femoral fracture, five of whom received bisphosphonate treatment. For the other two no complete medication data was available.

THE NATURAL COURSE OF COMPUTED TOMOGRAPHY PROGRESSION IN DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS – PRELIMINARY RESULTS

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PURPOSE

To evaluate the dynamics of the radiographic course and natural progression of bridging osteophyte formation of diffuse idiopathic skeletal hyperostosis (DISH) by a newly proposed scoring system.

MATERIALS AND METHODS

149 patients diagnosed as having DISH according to Resnick's classification criteria were identified from a historical cohort and retrospectively evaluated for study inclusion. Fifteen DISH patients (male:female 12:3, mean age 57 years on first scan, 62 years on last scan) who had computed tomography (CT) examinations of the thoracic and/or lumbar spine obtained at ≥2 time points within a minimum of 3 years were analyzed to evaluate bridging osteophyte formation by two readers (MSK radiologist and a resident) in consensus. For each patient, sagittal reformats of the spine at all time points were evaluated at the same reading session and scored according to a new scoring system: 0 = no changes, 1 = ≥1 small osteophyte, 2 = ≥1 large osteophyte, 3 = anterior longitudinal ligament (ALL) calcification, 4 = ALL calcification and ≥1 osteophyte, 5 = bridging between calcified ALL and one osteophyte, 6a = bridging between calcified ALL and both osteophytes, and 6b = bridging between both osteophytes without ALL calcification

RESULTS

A total of 232 vertebral units (VUs) were evaluated for 64 time points (average time points per patient: 4, range: 2-7, average time between scans: 5.2 years, range: 3-10). The average DISH score per VU progressed from 2.1 (±1.6) to 4.3 (±1.6) over time. The DISH score of 40 VUs (17%) of 12 patients increased: 21 VUs in the thoracic spine and 19 VUs in the lumbar spine. Three patients' scores were unchanged. Two patterns of bridging osteophyte formation were observed: osteophyte growth occurring parallel to ALL calcification and eventually fusing to form a flowing osteophyte (seen in 86 VU, 73%) and osteophyte fusion without apparent ALL calcification (seen in 31 VU, 27%). Both patterns were observed concomitantly in 8 (53%) patients, with no predilection for spine location.

CONCLUSIONS

DISH is a progressive disease involving osteophyte growth and fusion with or without ALL calcification. Progression can be scored and monitored by CT.
A Clinical Relevance Statement: Analyzing the dynamics of bridging osteophyte formation in patients with DISH may advance our understanding of disease etiopathogenesis.

INDICES OF PARASPINAL MUSCLES DEGENERATION: RELIABILITY AND ASSOCIATION WITH FACET JOINT OSTEOARTHRITIS: FEASIBILITY STUDY

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PURPOSE

To introduce a scoring system for evaluating visible fat infiltration in paraspinal muscles; to evaluate inter- and intra-tester reliability of this system and its relationship with indices of muscle density; to evaluate the association between indices of paraspinal muscle degeneration and facet joint osteoarthritis (OA).

MATERIALS AND METHODS

150 consecutive CT scans of the lower back (N=75) or abdomen (N=75) were evaluated. Mean radiographic density (in Hounsfield units) and standard deviation (STD) of the density of multifidus and erector spinae were evaluated at the L4-5 spinal level. A new index of muscle degeneration, radiographic density ratio (RDR) = muscle density/STD of density, was calculated. To evaluate the visible fat infiltration in paraspinal muscles, we proposed a 3-graded scoring system. The prevalence of facet joint OA was also evaluated. Interclass correlations (ICC) and Kappa statistics were used to evaluate inter- and intra-rater reliability. Logistic regression examined the association between paraspinal muscle indices and facet joint OA.

RESULTS

Intra-rater reliability for fat infiltration score (kappa) ranged between 0.87-0.92; inter-rater reliability between 0.70-0.81. Intra-rater reliability (ICC) for mean density of paraspinal muscles ranged between 0.96-0.99, inter-rater reliability between 0.95-0.99; STD intra-rater reliability ranged between 0.82-0.91, inter-rater reliability between 0.80 -0.89. Significant associations ($p<0.01$) were found between facet joint OA, fat infiltration score and RDR.

CONCLUSIONS

Two suggested indices of paraspinal muscle degeneration showed excellent reliability and were significantly associated with facet joint OA. Additional studies are needed to evaluate the associations with other spinal degeneration features and low back pain.

EARLY COMPUTED TOMOGRAPHY FINDINGS OF SPINAL INFECTION

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PURPOSE

Spinal infection is an uncommon, but serious disease.
The diagnosis is frequently delayed due to the indolent nature of the disease and paucity of symptoms.
Early and specific diagnosis of spinal infection is essential for initiation of proper antibiotic or surgical treatment. Any delay in treatment can be associated with the risk of severe complications, particularly paraplegia and tetraplegia.
In many patients presenting with fever or back pain, the first diagnostic imaging examination is CT. Our aim was to identify early signs of spinal infection in CT.

MATERIALS AND METHODS

We reviewed several cases of patients diagnosed with spinal infections, including the imaging studies and medical files. We reviewed the earliest CT examination performed and compared it to the CT and MRI studies that were done later in the course of the disease.

RESULTS

Early CT findings in spinal infection in our study group included: paravertebral soft tissue stranding, swelling and hypodensity of paravertebral muscles, air bubbles in and around the inflamed region, venous thrombosis, alteration of the disk height and subtle bone changes.

CONCLUSIONS

A high clinical suspicion and awareness of early subtle CT findings may lead to the early diagnosis of spinal infections, which is the key to successful management and to prevention of complications.

DEGENERATIVE LUMBAR SPINAL STENOSIS AND LUMBAR SPINE CONFIGURATION

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PURPOSE

As life expectancy increases, degenerative lumbar spinal stenosis (DLSS) becomes a common health problem among the elderly, leading mainly to intermittent claudication, and radiculor pain. DLSS is usually caused by degenerative changes in bony and/or soft tissue elements, but with norm spinal canal bony diameters. Reviewing the literature we noticed that scanty studies have been carried out on pure degenerative stenosis without any attempt to differentiate it from other types of stenosis. Furthermore, data on vertebral body shape and size are missing.

To shed light on the association of vertebral body size and shape with DLSS.

MATERIALS AND METHODS

Two groups of population were utilized. The first group included 165 individuals with degenerative LSS (mean age 64.3 ± 9.9) and the second, 180 individuals (mean age 62.5 ± 12.6) without LSS related symptoms. Measurements were performed at L1 to S1 vertebrae using CT images (Philips Brilliance 64) and included: vertebral body dimensions (height, length, and width), AP diameter of the bony spinal canal, pedicle dimensions (width and height), spinous process inclination and facet joint orientation.

RESULTS

Vertebral body lengths and width were significantly greater in the DLSS group at all levels compared to the control group ($P<0.05$). Furthermore, pedicle width value was significantly higher in the stenosis group at all lumbar levels compared to the control group ($P<0.05$). Spinous process inclination was horizontally oriented (L3, L4 and L5) in the stenosis group compared to the control ($P<0.05$). Facet- joint orientation was significantly smaller in the stenosis group compared to the control ($P<0.05$). In the stenosis males, vertebral body was more beveled anteriorly at L1 to L3 and less beveled posteriorly at L4 to L5 compared to the control group ($P<0.05$).

CONCLUSIONS

Vertebral bodies size and shape and facet joint orientation in DLSS group deviate from the norm. We suggest that some of these deviations are related to the pathogenesis of DLSS.

MRI OF THE SACROILIAC JOINTS: ALTERNATIVE DIAGNOSIS TO INFLAMMATORY SACROILIITIS

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PURPOSE

Magnetic resonance imaging (MRI) is the most sensitive imaging modality for the detection of inflammation in the sacroiliac joints so that MRI is considered the imaging modality of choice for diagnosing inflammatory sacroiliitis in patients with spondyloarthropathy.
Thus increasing number of sacroiliac joints MRI examinations are performed for suspected inflammatory sacroiliitis. Diagnosing sacroiliitis on MRI is not always straightforward and can be challenging in some cases. Also, several alternative diagnoses can be suggested based on characteristic MRI appearance.
We aimed to evaluate the alternative diagnoses suggested by MRI and characterize the MR appearance of the most common ones.

MATERIALS AND METHODS

All MRI examinations for the sacroiliac joints performed between the years 2005-2012 were retrospectively evaluated by an experienced MSK radiologist. Diagnoses and suggested alternative findings were registered and MR appearance including location of bone marrow edema, sclerosis of the subchondral bone, etc, was noted. A total of 281 MR examinations were performed (116:165 M:F, average age 44, range: 9-81).
Sequences and orientation in all examinations included semicoronal T1-weighted, STIR, FSPGR before and after gadolinium injection for the sacroiliac joints as well as T1-weighted and T2-weighted with fat suppression in sagittal orientation of the lumbar spine.

RESULTS

71 patients (25%) were diagnosed with inflammatory sacroiliitis.149 patients (53%) were negative for inflammatory arthritis but no alternative diagnosis was suggested according to the MR findings. In the remaining cases, suggested alternative diagnosis was: hyperostosis triangularis ilii: 25 patients (9%), septic sacroiliitis or discitis: 17 patients (6%), degenerative changes: 16 patients (5.5%) and lymphoma, traumatic avulsion and stress reaction in 1 patient (0.3%) each.
The MR characteristics of inflammatory sacroiliitis and of the major alternative diagnoses will be presented.

CONCLUTIONS

Causes for sacroiliac pain other than inflammatory sacroiliitis are not infrequent. Radiologists should be familiar with the characteristics findings of these alternative diagnoses and to differentiate them from inflammatory sacroiliitis.

IS CONTRAST MATERIAL NEEDED FOR DETECTING ENTHESITIS ON MRI? A SYSTEMATIC COMPARISON BETWEEN STIR AND T1-W POST-CONTRAST IMAGES

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PURPOSE

To assess the contribution of contrast material in detecting and evaluating enthesitis of pelvic entheses by MRI.

MATERIALS AND METHODS

A total of 67 hip or pelvic MRI examinations (30:37 male:female, mean age: 53 years) were retrospectively evaluated for the presence of hamstring and gluteus medius (GM) enthesitis. The images were evaluated independently by two readers (an intern and an experienced MSK senior radiologist) who were unaware of patients' age and clinical details. Two learning sessions on 10 cases each were performed for standardizing and recognizing enthesitis findings on an MRI. The readers analyzed the axial and coronal STIR and the T1w-fat saturated post-contrast (T1+Gd) sequences in isolation on two separate occasions to determine the presence or absence of enthesitis. The minimum interval between each of the 4 readings was two weeks. The standard of reference for diagnosing enthesitis was established by consensus of two senior radiologists who evaluated both sequences together. Inter- and intra-observer reliability [Kappa (k)] as well as sensitivity and specificity for the detection of enthesitis of the STIR vs. T1+Gd sequences were calculated.

RESULTS

A total of 214 entheses were evaluated. Gold standard analysis diagnosed 80 (37%) enthesitis lesions. Intra-reader reliability for the senior radiologist was significantly (p=0.0001) higher in the T1+Gd images [hamstrings: k=0.84 (SD=0.05), GM: k=0.84 (SD=0.05)] compared to the STIR images [hamstrings: k=0.45 (SD 0.08), GM: k=0.47 (SD=0.08)]. Sensitivity of enthesitis detection increased from 0.67 to 0.89, and specificity increased from 0.8 to 0.9 in the STIR images and T1+Gd sequences, respectively. Intra-reader reliability for the intern was lower, with no significant difference between readings [STIR; hamstrings: k=0.32 (SD=0.08), GM: k=0.60 (SD=0.07), CM; hamstrings: k=0.28 (SD 0.08), GM: k=0.67 (SD=0.07)].

CONCLUSIONS

MRI evaluation of enthesitis is challenging and requires considerable training and experience. Contrast material improves the reliability, sensitivity and specificity of detecting enthesitis on an MRI, and its use is therefore recommended.

ADJUVANT CATHETER-DIRECTED INTRA-ARTERIAL STEROID THERAPY FOR PATIENTS WITH HIGH-GRADE STEROID-RESISTANT GRAFT VERSUS HOST DISEASE (GVHD)

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PURPOSE

To prospectively evaluate the safety and efficacy of adjuvant intra-arterial steroid (AIAS) injection for the treatment of steroid-resistant/dependant graft-versus-host-disease (GVHD)

MATERIALS AND METHODS

Following review board approval and informed patient consent, consecutive patients with steroid-resistant/dependent GVHD were treated with AIAS. Methylprednisolone (MP; maximal dose of 1000mg) was infused intra-arterially to the target organs. Lower gastrointestinal (GI) GVHD was treated with 40-60 mg MP per vessel into the superior and inferior mesenteric arteries, with 40mg MP to each internal iliac artery. Upper GI symptoms were treated via the gastro-duodenal artery with 40 mg MP. Hepatic GVHD was treated with 600 mg/m2 MP via the hepatic artery. Patients with concomitant GI and hepatic GVHD underwent treatment to both organ systems in the same session. Data were evaluated using non-parametric tests or confidence intervals. Cumulative incidence of time to specific cause of death (COD) was determined. Times to death or remission were estimated using Kaplan-Meier survival curves.

RESULTS

Fifty-five patients (median age 39.7, range 7.6–69 yrs) with steroid-resistant/dependent GVHD (11 liver, 27 GI, 17 combined) received AIAS within a median of 3 weeks from GVHD diagnosis. Partial response was seen for the liver and GI tract in 53.6% and 65.9%, respectively. One year survival was 36%. At one year, causes of death were GVHD (21 patients, 38%), infection (9), disease progression/relapse (3), cystitis(1), other(1). There was a significant association between remission in the treated organ and increased survival (liver and GI remission, $p<0.01$ and $p=0.03$, respectively). Conversely, there was a significant increase in one-year mortality in association with previous autologous transplant and total body irradiation ($p=0.036$ and 0.0007, respectively). Mortality did not appear to be affected by age, sex, primary diagnosis, number of organs treated, donor matching, number of transplants, or ablative vs. reduced intensity conditioning. Mild transient renal failure was seen in 8 patients (14.6%) following AIAS and was not associated with increased one year mortality.

CONCLUSIONS

This study suggests that AIAS may be safe and effective treatment for steroid-resistant/dependant GVHD. Routine combination of AIAS with standard GVHD treatment should be considered. Optimal dosing and administration protocols should be evaluated further.

DIAGNOSIS AND TREATMENT OF POPLITEAL ARTERY ENTRAPMENT SYNDROME: A SINGLE CENTER EXPERIENCE USING MODERN IMAGING TECHNIQUES

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PURPOSE

Popliteal artery entrapment syndrome (PAES) is a rare but important cause of intermittent claudication in young adults. Under diagnosis may result in severe complications.

To compare the utility of modern imaging techniques in the diagnosis of PAES and report a real life practice paradigm.

MATERIALS AND METHODS

A retrospective review between the years 2005-2012 at a single tertiary care university hospital identified twelve consecutive patients (19 limbs were studied) with a clinical diagnosis of PAES who underwent one or more imaging studies to confirm the diagnosis. These included color Doppler ultrasound (CDU), CTA or DSA. Recorded variables included imaging findings, study sensitivity, dose of iodinated contrast and radiation dose.

RESULTS

CDU was performed on 9 limbs (47%), eight were confirmed positive for PAES (sensitivity of 89%). CTA was performed on 6 patients (50%), PAES was diagnosed in 6/9 affected limbs (sensitivity 66%) with remaining limbs requiring additional diagnostic studies. DSA was performed on 14 limbs (70%) all of which were positive (sensitivity 100%). There were no procedure related complications. The average dose of contrast was 44ml per limb for DSA and 180ml for CTA (both limbs). The estimated calculated effective radiation dose for a dedicated lower limb study was approximately 1-2mSv for CTA and approximately 1mSv for DSA. Seven of twelve patients (58%) underwent surgery with confirmation of PAES.

CONCLUSIONS

CDU is a reliable first line imaging evaluation tool for PAES with sensitivity of 89%. CTA had 66% sensitivity, which was lower than DSA (100%). DSA uses less contrast with similar radiation dose as CTA.

COMBINED IR AND OB APPROACH TO THE MANAGEMENT OF ABNORMAL PLACENTAL PENETRATION

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PURPOSE

To evaluate the clinical effectiveness and safety of temporary arterial occlusion in the management of the delivery of patients with abnormal placental insertion (API), including immediate embolization where indicated. The subgroups of hybrid and non hybrid room utilization were compared.

MATERIALS AND METHODS

All women with an antenatal diagnosis of placenta accreta, increta or percreta from 2004 to the present were included; 2 patients with suspect API that at the time of caesarian section (CS) were negative were removed from the study group. Immediately prior to CS temporary occlusion balloons were placed in the internal or common iliac arteries. Balloons were inflated immediately following delivery of the infant and deflated following surgical hemostasis; in the event of continuing haemorrhage embolization was carried out. Clinical success was measured in terms of obviation of hysterectomy (one grand multipara who had an elective caesarian hysterectomy was not removed from the group), reduction in blood loss and requirement for transfused blood products, post operative hospital stay and complications.

RESULTS

32 women underwent the procedure, the first 13 using both the operating room and the angiographic suite and subsequent cases were managed entirely using the angiographic suite as a hybrid room. 6 of the first group required caesarian hysterectomy; in the hybrid room no emergency hysterectomy was required; the solitary case was elective as mentioned above.

CONCLUSIONS

The use of temporary occlusion balloons reduces transfusion of blood products and emergency hysterectomy. In the event of uncontrolled haemorrhage the presence of occlusion balloons permits safe immediate embolization. The use of a hybrid room allows a smooth and timely sequence of procedures including embolization if required without transporting the patient from room to room and table to table with the risks of break in asepsis, catheter dislodgment and delay in treatment; in the (so far hypothetical) case of catastrophic haemorrhage uncontrollable by embolization with inflated balloons in place, angiography to identify the source and embolization with appropriate materials may be carried out immediately.

LONG TERM OUTCOME FOR ANGIOPLASTY WITH STENT GRAFT VERSUS BARE STENT FOR CEPHALIC ARCH STENOSIS IN HEMODIALYSIS ACCESS

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PURPOSE

To report the long term results of stent graft placement for the treatment of cephalic arch stenosis ipsilateral to hemodialysis access fistula.

MATERIALS AND METHODS

Indications for stent graft insertion were recurrent cephalic arch stenosis >50% within three months of successful balloon angioplasty, poor immediate outcome after angioplasty alone (elastic recoil), occlusion at presentation, or extravasation during angioplasty. Restenosis was defined as >50% narrowing of the stent lumen or the adjacent vessel up to 0.5cm from the stent. Post intervention (primary) patency was time until first intervention for >50% stenosis. Post intervention secondary patency was time until occlusion of the access.

RESULTS

Fifty-seven patients were treated from 2001 to 2008, 16 with bare stents and 41 with stent grafts. Post intervention lesion patency (primary patency) for the bare stent group was 81% at three months and 14% at six months. For the stent graft group it was 79% and 55% respectively (P = .02) Post intervention secondary patency rate at 3,6,12 and 24 months was 100%, 87%, 87% and 44% respectively for bare stents and 100%, 95%, 95% and 95% respectively for stsent grafts (P = .009). Patients with bare stents required 2.5 interventions per patient year compared with 1.2 interventions per patient year in the stent graft group (P < .001). During follow up, sixteen (28%) patients died and only two patients had renal transplants.
group (P < .001).

CONCLUSIONS

The use of stent grafts in angioplasty for recurrent cephalic arch stenosis significantly improved short term restenosis rates and long term patency compared with bare stents.

ELECTIVE SELECTIVE CALICEALURETERONEPHROSTOMY INSERTION IN MINIMALY OR NON-HYDRONEPHROTIC KIDNEYS AS A PREPARATION FOR PCNL

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PURPOSE

To report our results in selective cannulation of desired minimally or non-dilated calyx by various imaging means.

MATERIALS AND METHODS

This is a retrospective study summarizing 3 years of collaboration with the Urology department at Hasharon hospital (2006-2009). 48 consecutive patients with kidney stones that were candidates for percutaneous stone elimination were referred for selective insertion of nephroureterostomies prior to PCNL. The selected calyx was determinate according to the stone location to obtain good treatment access. 64% had no hydronephrosis and 25% had radiolucent stones. The access to the desired calyx was determined according to the stone fluoroscopic or sonographic visibility alone or in combination. The stone was targeted and contrast media was injected to fill the collective systems followed by additional puncture of the desired calyx in the Seldinger technique followed by insertion of 8 to 10 F uretronephrostomy. If direct visualization was not possible, IVP was performed followed by needle puncture.

RESULTS

The overall technical success rate was 93.7% (45 patients). 8 patients (16.6%) had 9 early complications: 5 (10.4%) had post procedure hematuria, pneumothorax in one , and 3 had isolated extravasation of contrast media that was observed during the procedure without any late sequelae. Post-surgical complications were seen in 9 patients (20.8%), which included self-limited fever, urinary tract infection, sepsis successfully treated with antibiotics, urine leak, pleural effusion, pneumonia and mild hematuria.

CONCLUSIONS

Utilizing ultrasound, fluoroscopy and IV contrast media, alone or in combination, according to the stone morphology, enables relatively safe catheterization of selective non-dilated calyx with high success rates.

IRE (IRREVERSIBLE ELECTROPORATION) TREATMENT EFFECT SUSCEPTIBILITY TO LOCAL TISSUE PROPERTIES

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PURPOSE

The purpose of the study was to determine the extent of the effect of heterogeneous tissue properties on the shape and size of IRE ablation zones.

MATERIALS AND METHODS

IRE ablation (n = 66) was applied in-vivo in 3 porcine tissues; liver (n=12), kidney (n=24) and muscle (n=30) in 18 pigs. Two electrodes of 2cm tip exposure were used with varying IRE voltage (1,500-3,000V), pulse repetition (70-100) pulse length (70-100 μsec) and electrode spacing (1.5-2 cm). For muscle, the electrodes were placed either parallel or perpendicular to paraspinal muscle fibers (5 pairs of energy settings). For kidney, IRE was applied either in the peripheral cortex or adjacent to the renal medulla and collecting system (4 energy settings). Lastly, identical IRE parameters were applied to liver in the presence or absence of a metal plate placed underneath the liver within 2 cm of the electrodes.

RESULTS

Ovoid zones of ablation were achieved for some IRE parameters for all tissues. For muscle, cross-sectional area ranged from 3.7±0.2 x 2.9±0.2cm for 1,500V to 4.8±0.3 x 3.3±0.1cm for 2,250V when electrodes were placed parallel to muscle fibers. However, a perpendicular configuration resulted in a “cross-shaped” zone of treatment effect with increased ablation running parallel to the fibers. For kidney cortex, ovoid zones of 1.5±0.1 x 0.5±0.0cm to 2.5±0.1 x 1.3±0.1cm were seen for 2,000 and 3,000V, respectively. Yet, placement of the electrodes within 5 mm of the medullary pyramids resulted in a comma-shaped deformation of the treatment effect, preferentially extending into the collecting system. For liver, 3.0±0.5 x 1.9±0.4cm coagulation areas were obtained symmetrically around the electrode in the absence of metal. Yet, ablation was asymmetric and drawn at least 5mm (mean 7.8 ± 2.8mm) to the metal plate whenever present.

CONCLUSIONS

IRE ablation is extremely sensitive to local tissue properties, with some of this likely due to the effects of local variations in electrical conductivity influencing the IRE field. Regardless, location, orientation and heterogeneities in local environment must be taken into account when attempting to plan ablations using this modality.

COMPUTED-TOMOGRAPHY-GUIDED HIGH-DOSE-RATE BRACHYTHERAPY (CT-HDRBT) ABLATION OF METASTASES ADJACENT TO THE LIVER HILUM

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PURPOSE

To evaluate technical feasibility and clinical outcome of computed tomography-guided high-dose-rate-brachytherapy (CT-HDRBT) ablation of metastases adjacent to the liver hilum.

MATERIALS AND METHODS

Between November 2007 and May 2012, thirty-two consecutive patients with 34 metastases adjacent to the liver hilum (common bile duct or hepatic bifurcation ≤ 5 mm distance) were treated with CT-HDRBT. Treatment was performed by CT-guided applicator placement and high-dose-rate brachytherapy with an iridium-192 source. MRI follow-up was performed 6 weeks and every 3 months post intervention. The primary endpoint was local tumor control (LTC); secondary endpoints included time to progression (TTP) and overall survival (OS).

RESULTS

Patients were available for MRI evaluation for a mean follow-up time of 18.75 months (range: 3-56 months). Mean tumor diameter was 4 cm (range: 1.3-97 mm). One major complication was observed. Four (11.7 %) local recurrences were observed after a local tumor control of 5, 8, 9 and 10 months respectively. Eighteen patients (56.25%) experienced a systemic tumor progression during the follow up period. Mean TTP was 10.9 months (range: 2-56 months). Nine patients died during the follow-up period. Median OS was 20.24 months.

CONCLUSIONS

Minimally invasive CT-HDRBT is a safe and effective option also for unresectable liver metastases adjacent to the liver hilum that would have been untreatable by thermal ablation.

COMPARING OUTCOME OF MAGNETIC RESONANCE-GUIDED FOCUSED ULTRASOUND SURGERY AND UTERINE ARTERY EMBOLIZATION FOR UTERINE FIBROIDS - SHORT-TERM AND MID-TERM RESULTS

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PURPOSE
To compare the re-intervention rate, short- and mid-term alleviation in Symptom Severity and Health-Related Quality of Life after Uterine Artery Embolization (UAE) and Magnetic Resonance-guided Focused Ultrasound Surgery (MRgFUS) for uterine fibroids.

MATERIALS AND METHODS
Eighty women (mean age: 38.3; range: 27.7-55.3 years) with symptomatic fibroids who underwent MRgFUS or UAE between 2002-2009 at our department were subdivided into a short-term (n=72) and a mid-term (n=50) follow-up group. Re-intervention rates after therapy were determined and compared. Symptom Severity (SS) and Health-Related Quality of Life (HRQoL) score before treatment and at short-term (2.5-7.5 months; mean 5) and mid-term follow-up (7.6-24 months, mean: 15.6) were assessed by the Uterine Fibroid Symptom and Quality of Life (UFS-QoL) questionnaire and compared retrospectively.

RESULTS
The primary outcome was defined as re-intervention rate which was significantly lower after UAE than after MRgFUS (p=0.022) until 24 months after therapy.
Secondary outcome consists in differences in SS and HRQoL scores alleviation after UAE and MRgFUS which was significantly better for HRQoL score after UAE than after MRgFUS at short-term (P=0.040) and mid-term (P=0.045) follow-up.
Alleviation in SS score after UAE nearly reached significance in comparison to MRgFUS for short-term (P=0.058) and missed significance for mid-term follow-up (P=0. 436).

CONCLUSIONS
UAE for symptomatic uterine fibroids has a significantly lower re-intervention rate than MRgFUS and the HRQoL alleviation after UAE is significantly better than after MRgFUS until 24 months after treatment.

OPTICAL GUIDANCE IN PERCUTANEOUS CT GUIDED PROCEDURES

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PURPOSE

Diagnosis and destruction of tumors during biopsy and radiofrequency ablation are usually performed using percutaneous, CT-guided approach. From the viewpoint of the radiologist, the key factor for procedure success is accurate needle positioning in the lesion. For the radiology technician, the main goal is to minimize the patient's exposure to radiation, by reducing the number of scans during the procedure. This paper describes our experience with the ActiSight system which uses video and 3-dimensional software to guide the needle to the lesion, which may reduce radiation exposure and procedure time while providing more accurate biopsy access. A post marketing prospective study was performed in our department from June 2010 till January 2012 to assess advantages and disadvantages of the ActiSight system.

MATERIAL AND METHODS

All participating patients signed an informed consent form. Percutaneous biopsy and RF ablation was conducted on 40 patients including both soft tissue and hard tissue lesions. 13 procedures were RF ablations using CoolTip RF needles (Covidien) and 26 were biopsies/FNA and one sacroiliac injection. All procedures were performed using ActiSight needle guidance system. The miniature video camera of the system fitted all needles used for the procedures: 11G and 13G for bone procedures, 17G for RF ablation, and 18-20G for soft tissue biopsies. Procedure-related data, including accuracy, time to reach lesion, number of scans, and complication rates, were compiled.

ActiSight Needle Guidance System (ActiViews, Haifa, Israel) is an accessory for CT systems, designed to assist image guided interventions. It incorporates skin-attached, colored/radio-opaque reference markers and a miniature video camera mounted on the needle. The video image is registered with the CT image, allowing the system to show in real time the location of the needle in the 3D space of the CT images.

RESULTS

The radiologists succeeded reaching the lesion in all 40 cases (100% success) in two cases the radiologist continued by free hand because the sticker was bent. Lesion diameter ranged from 4 mm to 38 mm with a median size of 13 mm. Mean time for correct needle placement was 14 min. Total number of CT scans until beginning of actual procedure (biopsy and/or RF ablation) was 4.

CONCLUSIONS

Preliminary experience in our center shows that ActiSight assisted CT-guided procedures yield a fast procedure with less confirmation scans during needle placement. Accuracy of needle placement at the lesion was high, independent of the lesion size or difficulty to reach the specific location. There were no system related complications.

OPTIMIZING CLUSTER ELECTRODE RADIOFREQUENCY ABLATION

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PURPOSE

To determine the optimal parameters for maximizing the coagulation necrosis zone using a new high current radiofrequency (RF) generator and dynamic energy pulsing.

MATERIALS AND METHODSO;

Pulse technique radiofrequencyablation (RFA) was applied for 12 minutes to ex-vivo bovine livers (n= 120) using a cluster array of three internally cooled electrodes. Current was set at 2,500mA (500mA higher than commercially available generators) with a variable off-time(cooling period) of 20 – 30 seconds based upon changes in electrical impedance.Electrode tip exposures and electrode spacing were systematically varied and ranged from 2-4 cm and from 7 mm to 3.5 cm, respectively. The number of pulses, temperature, and size of ablation were all evaluated and compared. Optimal settings were repeated in in-vivo Porcine liver (n= 24).

RESULTS

Ablation diameter in bovine ex-vivo liver varied parabolicallywith changes to the distance (r2 = 0.69-1.0) between electrodes and electrode tip exposure (r2 = 0.49-0.95). Optimal results were obtained with electrode spacing set between 2.5 to 3.0 cm and tip exposure set at3.0 cm, yielding 7.5±0.6 cm. The findings also revealed that the obtained diameter correlated with the number of impedance rise pulses / cooling periods of no energy deposition(global r2= 0.39). In-vivo porcine liver ablations demonstrated that parameters including 2.5-3.0 cm exposure and 1.0 cm distance produced a 5.2±0.1cm ablation zone in this well perfused tissue. Larger spacing resulted in less uniform ablations.

CONCLUSIONS

Electrode spacing and exposure influence ablation outcome for RF cluster arrays. Thus, for a given maximum current, optimal results are obtained by balancing the current density of the application (i.e. controlled by the exposure) with matched electrode spacing that enables optimal thermal distribution. The reduction parameters and accompanying in size are attributed to the additional influence of perfusion on these factors.

REQUESTMENT OF RADIOLOGICAL RESULTS AS AN UNBEATABLE WAY TO ATTACK MEDICAL SYSTEMS

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PURPOSE

This lecture will show out why any patient can be a Trojan horse.
My study will effect any hospital or medical systems which uses computers as a legitimate tool for medicals process.
Taking a CD with an x-ray results will be a trigger to get virus and another computers disease.
I would like share my study, so the medical system doctors and any concerned party will start to cure the problems before future attack.

MATERIALS AND METHODS

In the lecture I will share technique of how simple is to get an X ray results, copy it to new CD,print the same visual information (the name, case number etc') on the fake CD, and add any auto-run virus that will attack the hospital systems.
The CD can be an X ray/CT/MRI or any other CD that it's normal to get from the patient as a legitimate medical act with no suspicion.

RESULTS

This kind of attack can cause the medical system to lose sensitive information from the archive, To changing blood test results including the blood type manipulate data on the time it's transfer or the even attacking X ray systems from long range (in the time of cyber attack

CONCLUSIONS

At the moment taking CD with a results from a patient it's an act that makes the life of many people on risk.
In the other hand there is no alternative way at the moment that doctors can do is job.
Having computers virus it's not new issue but knowing that you can kill people by taking an X ray results its something else.

FREQUENCY OF RISK FACTORS FOR CONTRAST-INDUCED NEPHROPATHY IN A BUSY ACADEMIC CT UNIT: THE IMPORTANCE OF KIDNEY PROTECTION MEASURES

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PURPOSE

The estimated incidence of contrast-induced nephropathy (CIN) in patients undergoing contrast CT examination is 4-21%. Although risk factors for CIN have been identified, compliance with kidney protection measures remains challenging. We aimed to evaluate the risk profile of patients undergoing contrast MDCT studies as a first step towards the introduction of kidney protection measures in our CT Unit.

MATERIALS AND METHODS

The senior physician administering iodinated contrast to patients undergoing MDCT examination completed a questionnaire with 435 individuals aged ≥18 years in February-June 2012. Personal or family history of kidney disease and other risk factors were noted. Digital patient files were retrospectively examined to obtain SCr levels within 6-weeks before and 6-weeks after MDCT. Grade 1 CIN was defined as ≥25% increase in SCr and <44mmol/l absolute increase; grade 2 CIN as an absolute SCr increase ≥44mmol/l. GFR was estimated (CKD-EPI Creatinine Equation) with eGFR ≥90 defined as normal, eGFR 60-89 as mild reduction, and eGFR <60 as severe reduction.

RESULTS

There were 211 males and 223 females, mean age 59.3 (range 18-99). 28.1% of patients were ≥70 years, 29.2% were 60-69, 42.8% were <60. Among 281 patients with data on pre-MDCT SCr levels, eGFR was normal in 55.9%, mildly reduced in 34.9%, and severely reduced in 9.3%. Pre- and post SCr levels were available in 90 patients (20.7%). Grade 1 CIN was seen in 6 (6.7%), grade 2 CIN in 4 (4.4%). Among those with CIN were 5 patients ≥70years; 3 on chemotherapy, 3 with heart disease who were on diuretics, 3 with no apparent risk factor, and 1 patient on dialysis. There was a personal history of kidney disease in 20 patients (4.6%) and 7 had a single kidney (1.6%); SCr levels pre- and/or post-MCDT were available in 3.

CONCLUSIONS

SCr levels were not routinely available in patients with a personal or family history of kidney disease or other risk factors. Changes in SCr compatible with CIN were seen in 11.1% of patients with available data. Increased surveillance of SCr levels and introduction of kidney protection measures in those at risk of CIN are warranted in patients undergoing MDCT.

INITIAL EVALUATION OF LANGUAGE INDEPENDENT SPEECH RECOGNITION SYSTEM FOR RADIOLOGY REPORTING

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PURPOSE

Radiologists' reporting of imaging studies using dictation or self typing is time consuming and might be distracting. Commercially available speech recognition systems are based on structured reporting with limited vocabulary tools and are speaker and language dependent. Presently only isolated words, or number of speakers constrain the way in which sentences may be formed making computerized speech recognition possible. Our aim was to evaluate the feasibility of "Medical Speech To Text" (MS2T) system for language independent transcription that can be used by radiologists from different nationalities at their native languages.

MATERIALS AND METHODS

The MS2T (Speech Modules Ltd and Harakya Harevei Ltd) system comprises language and acoustic models. Language model can be extended by adding additional words and word combinations to the lexicon. The software calculates distance between strings and character error rate, is speaker independent and supports several languages including Hebrew. While performing transcription in particular language, MS2T software can correctly recognize words and abbreviations in another language (i.e. English). No dedicated training is required. Three certified radiologists (G.B., E.K. and A.O.) repeatedly dictated various ultrasound studies using the MS2T system. Each radiologist dictated 4, 5 and 13 reports consisting of 388, 487, and 1204 words respectively.

RESULTS

Following verified speech recognition process of 487, 388 and 1204 words each, the MS2T software achieved accuracy of 98, 97 and 93% respectively (mean 96%). There was no need for retakes. Insertion of relevant English expressions in Hebrew text was seamless.

CONCLUSIONS

Speaker and language independent speech recognition for radiology reporting is feasible with high accuracy rates. Numerous languages can be readily transcript in the same report. Large scale evaluation for various imaging modalities is under way.

SUCCESSIVE INTEGRATED PACS AND RIS IMPLEMENTATION IMPROVES COMMUNICATION AND COLLABORATION BETWEEN RADIOLOGISTS AND REFERRING PHYSICIANS

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PURPOSE

Clalit Health Services (CHS) is the largest HMO in Israel (4 million members, 12 Hospitals and 1400 outpatient clinics). Initially 18 months ago state-of-the-art Web deployed PACS was implemented and used with legacy RIS at Meir Medical Center (MMC). For the past year the legacy RIS was replaced by a new integrated state-of-the-art RIS. Our aim was to assess the benefits delivered by the sequential deployment of integrated state of the art PACS and RIS. .

MATERIALS AND METHODS

Integrated RIS system (Carestream Health, Inc) was installed in MMC 18 months following PACS integration. Two-phase validated 1-5 Likert-scale anonymous questionnaires were distributed among radiologists and referring physicians. First at March 2011 on PACS with legacy RIS implementation 13/16 radiologists (10 attending and 3 residents) and 31/52 referring physicians responded. Second questionnaire on PACS and RIS implementation was issued to the same 13/16 radiologists and 39/61 referring physicians at March 2012.

RESULTS

Following the RIS implementation we observed an increase in radiologists interaction with referring physicians (3.5 to 4, $P<.05$), mostly at the level of detailed clinical information (2.5 to 3, $P<.01$), which clearly shown that meticulous message on clinical issues directly affects the radiologists' satisfaction. We also found an increase in relevancy of information to radiologists (4 to 4.5, $P<.01$); significant decrease in number of rejected requests for imaging (3 to 1.5, $P<.01$) and clear confirmation by the radiologist's perception of these trends (3.5 to 4, $P<.01$; 2.5 to 2, $P<.01$, respectively). We witnessed high level (4.5 out of 5) of PACS/RIS usage among referring physicians and statistically significant increase in referring physicians' perception of improved patient care in following: interaction with radiology department staff (4 to 5, $P<.01$), ability to clearly show the findings to the patient (3.5 to 4, $P<.01$), and appropriate selection of imaging studies (4 to 4.5, $P<.05$).

CONCLUSIONS

Sequential PACS and RIS implementation significantly improves communication and collaboration between radiologists and referring physicians and overall satisfaction from better patient care. Management of RIS/PACS implementation can be based on validated questionnaires that allow real-time monitoring of the entire process. Based on our results further implementation throughout the CHS group is on the way.

ANALYSIS OF CALCIUM, IRON AND IODINE CONCENTRATIONS BY MATERIAL DECOMPOSITION MAPS DERIVED FROM DUAL-LAYER DUAL-ENERGY CT

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PURPOSE

Accurate estimation of calcium, iron and iodine concentrations by Dual Energy CT (DECT) provides significant information in various clinical applications. The aim of this study was to evaluate the accuracy of calcium, iron and iodine quantification derived from material decomposition images using single-source dual-layer DECT operated at 120 kVp.

MATERIALS AND METHODS

CT acquisitions were performed with a single-source dual-layer DECT prototype (Philips Healthcare, Andover, MA). The DECT was operated at 120 kVp to obtain high and low energy data. A Perspex phantom of 28 cm diameter containing test tubes with calcium chloride, iron chloride and iodine solutions of known concentration was scanned using 400 mAs and 3mm slice width. Material decomposition images were obtained, and the average gray level value in a "Region of Interest" (ROI) including each test tube in the slice was measured for calculating the solution concentration in the tube. The solutions were of physiological concentrations, ranging from 15- 400 mg/ml for calcium, 5-20 mg/ml for iodine, and 150- 2400 mg/ml for iron. For each material, two sets of phantoms with different concentrations were used: one set for calibrating the gray level values in each ROI into the known concentrations, and the other set for measuring unknown new concentrations. The measured values were then verified against the new concentrations of solutions in the corresponding tubes.

RESULTS

ROI values for the 15, 30, 200, and 400 mg/ml calcium solutions were 13.6±21.9, 23.5±22.2, 200.7±22.9, and 388.7±28.0 mg/ml. The measured iodine concentrations of the 5, 10, and 20 mg/ml were 4.8±1.0, 9.4±0.8, 16.7±1.1 mg/ml. For the iron solutions, the measured concentrations of 150, 300, 600, 1200 and 2400 mg/ml, used in the verification phase, were 153.7±81.4, 335.9±103.1, 624.5±84.8, 1104.4±87.5, 2213.1±100.1 mg/ml. These results yield a correlation of 0.99 between the actual concentrations and the corresponding concentrations derived from the ROI values in the material decomposition images.

CONCLUSIONS

Material decomposition images obtained with dual-layer DECT at 120 kVp can be used to estimate accurately "in vitro" concentrations of iodine, calcium and iron. At lower concentrations the variations from the actual values were smaller.

SCREENING FOR ABDOMINAL AORTIC ANEURYSM

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PURPOSE

Screening population for Abdominal Aortic Aneurysm (AAA) is a method of preventive medicine. The number of interventional procedures for treating AAA in Israel is significantly less than in the USA and this fact raise certain concerns. This may mean that Israeli patients are undertreated in terms of AAA due to underdiagnoses.

Sonographic screening for AAA in a high risk population is adopted by law in the USA as well as mammography for breast cancer and occult blood in stool and colonoscopy for colorectal cancer. The prevalence of AAA above 3.0 cm in the USA in a high risk population is 6 % and above 5.5 cm is 0.5 %. Early detection and treatment in a high risk population lower mortality as much as by half. However, screening for AAA in Israel still does not exist.

To evaluate the prevalence of AAA in high risk patients who underwent an abdominal US examination in Maccabi clinics.

MATERIALS AND METHODS

Patients who were referred by physicians for abdominal US examination between 2009 and 2011 were offered the opportunity to participate in the research. Inclusion criteria were males of 65 and older, smokers (current and former). Patients with a known history of AAA were excluded. Philips HD 11 US machines with a 5-2 megahertz convex probe were employed.

Evaluating Abdominal Aorta is a part of the routine US examination.The study included additional measurements of the abdominal aorta. Measurements of abdominal aorta were done in three levels: under the diaphragm, under the renal artery and above the bifurcation. Examinations were done according to a standard protocol.

RESULTS

Five hundred males were evaluated. Thirty four of 500 patients (6.8%) had AAA = or>3 cm. Five of 500 patients (1.0%) had AAA 5.5-6.9 cm. All patients with AAA more than 5.5 cm were older than 70. Above 50% of AAA were infrarenal, 30% of AAA were above the bifurcation of aorta. Patients with AAA = or > 3 cm were advised to follow up, patients with AAA > 5.5 cm were referred to open surgery or endoscopic treatment by graft stent. Our results of the prevalence of AAA in a high risk population mostly agree with published studies.

CONCLUSIONS

Screening of male patients with high risk factors for AAA revealed patients eligible for follow up and timely treatment. US is a safe, simple and achievable screening method with no additional risk to patients. Limitations of the study were: small population of the study, absence of follow up information and evaluation of complications.

DETECTION OF SUSPICIOUS CALCIFICATIONS ON SINGLE VIEW (MLO) MAMMOGRAPHY

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PURPOSE

Screening for breast cancer using the standard 2 views (CC and MLO) facilitates earlier detection of breast cancer compared with single view mammography in approx. 40% of screen detected cancers. There is however no data specifically regarding detection of suspicious BI-RADS 4 calcifications on single view mammography. The purpose of this study was to evaluate the performance of single oblique view mammography in detecting calcifications requiring further work-up.

MATERIALS AND METHODS

Retrospective review of 120 screening mammograms was performed. The study group was compromised of 3equally sized predefined groups (n=40 for each group): Group A – normal BI-RADS 1 or 2 mammogram, Group B – calcifications which underwent VAB with a benign result and Group C – calcifications which underwent VAB with a high risk (ADH) or malignant (DCIS or IDC) result. From each mammogram a single breast was reviewed in MLO projection only, for groups B and C the biopsied breast and for group A a side was randomly allotted. Mammograms from the various groups were mixed and reviewed on a dedicated mammography viewing workstation by a breast imaging specialist with over 10 years of experience who was blinded to the clinical status. On review, each case was scored as either "normal" or "requiring further evaluation". If "normal", the CC view was displayed to ascertain that calcifications were not missed on MLO view. If "requiring further evaluation", prior MLO views were displayed (when available) and the case was re-scored based on the comparison. Results of the review were correlated with pathology outcomes.

RESULTS

Seventy-eight of the 80 cases with calcifications which underwent biopsy were detected on MLO view only and scored as "requiring further work-up". In the 2 missed cases (1 DCIS and 1 benign) the calcifications were within surgical scars on both and visualized only on CC projection. On MLO views, calcifications were also noted in 6/40 cases which were originally diagnosed as BI-RADS 2, 4 of these were stable compared to prior films and 2 have not yet undergone further work-up.

CONCLUSIONS

The majority of suspicious calcifications can be detected on single view MLO mammography. If this finding is supported by further prospective studies, it may be possible to reduce mammography in patients undergoing multimodality screening to a single projection and thus reduce radiation. However, such an approach should be used with caution in a post-surgical breast.

CONVENTIONAL ULTRASOUND, NIPPLE ULTRASOUND AND SONOELASTOGRAPHY IN BREAST PAPILLARY LESIONS: DIAGNOSTIC CHALLENGES AND USEFULNESS

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PURPOSE
To compare conventional ultrasound diagnostic performance with that of sonoelastography when assessing breast papillary lesions. To identify and underline the diagnostic challenges and usefulness of each type of ultrasound in detecting and differentiating breast papillary lesions.

MATERIALS AND METHODS
A retrospective study was performed including patients diagnosed with breast papillary lesions between 2007 and 2012. Ultrasound examinations were performed by the same Consultant Radiologist using a Hitachi machine. Breast lesions were assessed using BI-RADS classification and Tsukuba elasticity score. Each case had a valid pathology report obtained post-surgery. Statistical analysis included determinations of sensivity (Se), specificity (Sp), positive and negative predictive values (PPV, NPV), false positive and negative rates values (FPR, FNR), K index of accuracy (K) and Youden's index (Y) of performance for ultrasound BI-RADS classification and elasticity Tsukuba score. Chi-squared test was applied to both methods of assessment.

RESULTS
The final analysis included two sets of patients: first one with 60 women diagnosed with para-areolar and peripheral papillary lesions (63% papillomas, 15% in situ carcinomas and 22% invasive carcinomas) and second one including 29 women diagnosed with strictly intramamelonary papillary proliferations (20 papillomas, 9 carcinomas). For the first set, statistical determinations for BI-RADS classification were as it follows: Se=82%, Sp=77%, PPV=64%, NPV=88%, FPR=16%, FNR=18%, K=5.14, Y=2.55, chi-squared test-p<0.001. Statistical determination for Tsukuba elasticity score were as it follows: Se=77%, Sp=57%, PPV=62%, NPV=66%, FPR=43%, FNR=23%, K=1.88, Y=2.35, chi-squared test-p>0.001. 80% of patients from the second set were referred for breast examination due to a suspicious nipple discharge and 20% accused non-specific symptoms such as nipple pain, tenderness, tingling or burn sensation. All appeared suspicious on elastography (score 4-5).

CONCLUSIONS
The study showed that the ultrasound BI-RADS classification is better than the Tsukuba elasticity score when assessing patients with breast papillary lesions, espeacially when it comes to specificity (74% versus 57%), negative predictive value (88% versus 66%) and acurracy-K index (5.14 versus 1.88). The study also revealed that sonoelastography does not help in a significant way when trying to differentiate benign from malignant papillary lesions (a significant percent of benign lesions appeared as malignant/rigid on elastography-FPR=43%). Nipple ultrasound is a fast, easy and reliable technique to be used in addition to classical ultrasound breast examination in patients presenting with nipple discharge or any other nipple related symptoms. It can spare the patient unnecessary investigations (such as galactography) and optimize further therapeutical management.

IMAGING ASPECTS IN NON-NEOPLASTIC BREAST INFLAMMATORY DISEASES

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PURPOSE
To analyze mammography, ultrasound and sonoelastography aspects encountered in non-neoplastic inflammatory breast diseases.

MATERIALS AND METHODS
The study was a longitudinal prospective one and included women referred to our Breast Unit between years 2008 and 2012. Inclusion criteria: all women examined by the same Consultant Radiologist and diagnosed with breast inflammatory diseases. Means of diagnostic: fine needle aspiration and percutaneous/excision biopsies (BI-RADS 4 and 5 lesions), short term follow up (BI-RADS 3 lesions) or mammography for plasma-cell mastitis. For each lesion, mammography, ultrasound and sonoelastography appearances were analyzed using standardized assessment systems such as BI-RADS and Tsukuba elasticity score.

RESULTS
Final analysis included 130 cases: 44 infectious mastitis (40 non-specific and 4 tuberculous), 73 non-infectious mastitis (77 through immune like mechanisms and 2 Mondor diseases) and 7 indeterminate (granulomatous) mastitis. Immune mastitis included the following lesions: inflammatory duct ectasia (35 cases), inflammatory cyst (20), chronic lymphocytic mastitis (6), plasma-cell mastitis (6), inflammatory cytosteatonecrosis (3), recurrent para-areolar abscess (3), periprosthetic mastitis (2), diabetes mastitis (1) and breast sarcoidosis (1).
For the 77 cases that were submitted to mammography the appearances were: asymmetrical density (BI-RADS 3, 23 cases), no changes (BI-RADS 1, 16 cases), opacities (BI-RADS 3, 14 cases), pinhead calcifications (BI-RADS 2, 12cases), distortion (BI-RADS 4, 1 case), intraductal air (BI-RADS 0, 1 case). For the 124 cases that were submitted to ultrasound the appearances were: complex cyst (BI-RADS 4 or 5, 50 cases), duct ectasia (BI-RADS 3, 34 cases), focal echogenicity change (BI-RADS 4 or 5, 30 cases), periprosthetic collection (BI-RADS 3, 2 cases), superficial thrombophlebitis (BI-RADS 2, 2cases). For the 20 cases that beneficiated of sonoelastography the aspects were: non-specific mosaic pattern in 5 cases (score 2, reverse score 3), stratified pattern (BGR) in 9 cases and suspicious-stiff appearance (score 4-5) in 6 cases.

CONCLUSIONS
Breast abscesses, granulomatous, chronic lymphocytic, sarcoidotic and diabetes mastitis display highly suspicious imaging aspects and thus require pathology control through biopsies.
Positive therapeutical response is often reassuring in inflammatory duct ectasia, inflammatory cysts and focal echogenicity changes induced by acute non-specific mastitis; thus pathological proof becomes in a majority of cases futile.
Inflammatory cytosteatonecrosis and plasma-cell mastitis may appear non-specific or suspicious on ultrasound and elastography. The diagnostic is clarified by mammography.
Elastography offers non-specific or suspicious information regarding the various types of mastitis. However it may confirm the fluid nature of a pseudosolid looking lesion (abscess, inflammatory cyst) through its BGR artifact.

SONOGRAPHIC DETECTION OF MICROCALCIFICATIONS- POTENTIAL OF NEW METHOD

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PURPOSE

Microcalcifications are a very important finding in asymptomatic patients with early breast cancer. Despite recent technical advances, sonographic detection of microcalcifications remains problematic, especially when they are located inside echogenic and fibroglandular breast tissue.
Does the easier microcalcification detection (EMD) method enable sonographic visualization of microcalcifications in breast tissue samples compared with mammography?

MATERIALS AND METHODS

Twenty women (6 malignant and 15 benign histologically proven breast lesions) were examined mammographically. In each patient 12 tissue samples were obtained by vacuum-assisted biopsy. For each patient, 5 randomly selected samples (total of 105 samples) were examined according to the study protocol within 20 min of biopsy. EMD was integrated in a high-end ultrasound system. The EMD method uses three level settings (0-2 blue, 3-5 violet, and 6-8 black-and-white; 14MHz). EMD and optimized B-mode scan (FC = Frequency and Spatial Compounding, THI = Tissue Harmonic Imaging) were evaluated and compared with microcalcifications detected by mammography (all 12 tissue samples were mammographically evaluated). Maximum microcalcification counts per sample were determined, and image quality and susceptibility to artifacts were estimated on a scale from 1-9. Microcalcifications were counted by 2 blinded readers. ANOVA and Sidak post-hoc testing, Pearson regression analysis (r), and Spearman rank correlation (rho) were performed. The intraclass correlation coefficient (ICC) was calculated, and an ROC analysis was conducted.

RESULTS

Blue level 1 achieved the best score (mean 1.5±0.7) ($p<0.05$ compared to black-and-white and violet). The number of sonographically and mammographically detected microcalcifications was not different ($p>0.05$, mean value 3.5±3.1 vs. 4.3±4.8) according to both correlation tests used ($p <0,001$, $r=0.708$, $rho=0.694$). The inter-rater reliability of 0.773 indicates little disagreement between the two modalities. ROC analysis showed mammography to be superior to ultrasound compared with histologic detection of microcalcifications (AUC = 0.837 vs. AUC = 0.728). Conventional B-Mode scanning without EMD detected no microcalcifications.

CONCLUTIONS

The diagnostic value of EMD is comparable to that of mammography in the detection of microcalcifications in breast tissue samples and superior to conventional B-mode sonography. Mammography is slightly superior and remains the gold standard in the detection of microcalcifications.

EARLY AND LATE FLUORESCENCE NEAR-INFRARED MAMMOGRAPHY FOR DETECTION AND DIFFERENTIATION OF BREAST CANCER

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PURPOSE
To assess detection of breast cancer and differentiation from benign lesions by means of fluorescence near-infrared imaging using early and late enhancement of indocyanine green (ICG), corresponding to the vascular and extravascular phase of the contrast agent.

MATERIALS AND METHODS
The study was approved by the ethical review board. All participants provided written, informed consent. Twenty women with 21 breast lesions were examined by near-infrared imaging before, during and after intravenous injection of ICG. Absorption and fluorescence projection images were recorded simultaneously on a prototype time-resolved near-infrared scanner (excitation wavelength: 780 nm) with the breast slightly compressed between two glass plates. Absorption and absorption-corrected fluorescence scans were compared to histopathologic results and mammography. Visibility scores, contrasts and diameters of lesions in fluorescence images were obtained and statistical analyses were conducted.

RESULTS
All 13 carcinomas were visible in the absorption-corrected fluorescence ratio images, which featured high contrast between tumors and surrounding breast tissue with a contrast of 25% to 64%. One of the eight benign lesions showed enhanced contrast in fluorescence scans during the late phase of ICG, yet all three fibroadenomas were not visible. Visibility scores for fluorescence ratio images were significantly higher than for absorption images. The positive predictive value for classifying carcinomas by fluorescence ratio images reached more than 90%.

CONCLUSIONS
Early and late fluorescence ratio images following application of indocyanine green can be used to detect and differentiate carcinomas of the breast from benign lesions at high contrast.

SHEAR-WAVE ELASTOGRAPHY OF SONOGRAPHICBREAST MASSES UNDERGOING CORE NEEDLE BIOPSY – HISTOPATHOLOGIC CORRELATION

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PURPOSE

Shear-wave elastography (SWE) is a new ultrasound based technology which can quantitatively evaluate the stiffness of a mass. The purpose of this study was to assess the correlation between maximal SWE values and histopathologic outcomes of breast masses undergoing ultrasound guided 14G core needle biopsies (CNB).

MATERIALS AND METHODS

Between Jan –May 2012, 101 breast masses in 92 woman undergoing 14G CNB had SWE performed on the day of biopsy. The maximal elastography value was recorded. Histopathology biopsy results were classified as malignant (IDC, ILC or DCIS), high-risk lesion (ADH or LCIS) or benign. Correlation between the maximal SWE value and the histopathologic group was evaluated, as were the values for various subgroups within the malignant and the benign groups. Comparison between groups was performed using the two-tailed t test.

RESULTS

Of the 101 biopsies, 65(64%) were benign, 35 (35%) malignant and 1(1%)ADH. The mean SWE value for benign lesions was 29.4±23kPa (range 5.7-148.8) compared to 138.4±72kPa (range 6.6-294.8) for malignant lesions ($p< 0.005$). Within the malignant group there were 4 DCIS, 3 ILC and 28 IDC (5 grade 1, 7 grade 2 and 16 grade 3). There was no significant difference in SWE values between IDC grade 1 or grade 2 and grade 3 ($p= 0.19$ and 0.13 respectively). Benign biopsies included 35 fibroadenomas (FA), 18 fibrocystic changes (FCC), 7 breast tissue, 3 papillomas and 2 others. The average SWE value for FA was 27.2±18 kPa and was not significantly different from FCC ($p=0.93$) however was significantly lower than the average value for an invasive cancer (144.9±70 kPa; $p<0.005$).

CONCLUSIONS

Maximal SWE values can reliably differentiate between malignant and benign breast masses on ultrasound and should be incorporated in the decision whether a biopsy is necessary.

DUAL-ENERGY CONTRAST-ENHANCED DIGITAL MAMMOGRAPHY VS MAMMOGRAPHY ALONE : INITIAL CLINICAL RESULTS

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PURPOSE

To assess the diagnostic accuracy of Dual-Energy Contrast-Enhanced Digital Mammography (CEDM) as an adjunct to mammography (MX) versus Mammography alone.

MATERIALS AND METHODS

53 women underwent CEDM. Average age 49.8 (range 27-73 years). A pair of low- and high-energy images was acquired using a modified full-field digital mammography system. Exposures were taken in MLO at 2 min and CC at 4 min after the injection of 1.5 ml/kg of an iodinated contrast agent. Indication for the examination were: 4 patients with a known breast cancer for preoperative needle localization. 17 women with a palpable lesion, 7 adjunct study to mammography findings. 25 routine mammography. Sensitivity, specificity, were estimated.

RESULTS

13 patients with carcinoma (11 invasive breast carcinoma, 1 DCIS, and 1 invasive breast carcinoma with DCIS) 4 benign , 36 no findings on mammography and CEDM (BIRADS 1-2) . Breast density was BIRADS 3 in 38 women , BIRADS 4 in 8 women and BIRADS 2 in 7 women .

CEDM identified all 13 invasive breast carcinoma. DCIS presenting as microcalcifications were not seen on CEDM in 2 patients. Mammography identified 11 patients with breast carcinoma.

Sensitivity was higher for MX+CEDM than it was for MX (93% vs. 84%) with no loss in specificity.

CONCLUSIONS

Initial clinical results show that CEDM has better diagnostic accuracy than mammography alone.

EVALUATION OF RESIDUAL BREAST TISSUE POST MASTECTOMY USING BREAST MRI

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PURPOSE

To measure the residual breast tissue in patients who underwent mastectomy with implant reconstruction using breast MRI.

MATERIALS AND METHODS

Retrospective review of the breast MRI examinations performed at our institute between January and November 2011, in 45 women who had mastectomy with implant reconstruction. Residual breast thickness was evaluated at 4 points (3, 6, 9, 12 o'clock). We used the axial T2 sequence for the measurement of residual breast tissue at 3 and at 9 o'clock, and the sagittal T1 weighted sequence for the measurement at 12 and at 6 o'clock.
Breast MRI was performed on 1.5 Tesla with a dedicated breast coil and a standard dynamic implant bilateral breast MRI protocol.
Patient's demographic data was collected from "Sheba" hospital archives.
Statistics included average and standard deviation and t-test.

RESULTS

45 women were evaluated, the number of breasts evaluated was 88. Mean age 43.6, range (26-61years).
We compared residual breast tissue post mastectomy due to carcinoma(n= 45) vs. preventive mastectomy(n=43).

Table - average width at 3, 6, 9, 12 o'clock.

	Mean (mm)	std. Deviation	Min	max
Point 3	8.8	5.6	0	31.7
Point 6	13.3	9.6	2.1	47.8
Point 9	9.3	6.1	0	42.2
Point 12	13.3	11.0	1.3	53.4

There was no statistical difference in residual breast tissue at any of the four points measured (12, 3, 6, 9) when comparing mastectomy due to carcinoma versus preventive mastectomy.

CONCLUSIONS

In women undergoing mastectomy either for breast carcinoma or prevention we have shown residual breast tissue measuring between 0 to 53.4 mm, with the maximum thickness at 12 o'clock. There was no statistical difference in the residual breast thickness between the two groups. As far as we know this is the first attempt to evaluate residual breast tissue in patients following mastectomy and reconstruction.
The important clinical significance is the need for follow up due to the possible risk of recurrence in the residual tissue.

PAGET'S NIPPLE DISEASE: RADIOLOGICAL/PATHOLOGICAL CORRELATION

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PURPOSE

To define mammographic and sonographic sensitivity in Paget Disease

MATERIALS AND METHODS

A retrospective review of 16 patients with Paget disease diagnosis was performed. Mammographic and sonographic findings with clinical correlation were analyzed.

RESULTS

We found low sensitivity for mammography ultrasound in Paget's disease diagnosis.

CONCLUSIONS

When clinical suspicion or pathological findings of Paget's Disease are present ,with normal mammographic or sonographic results, it is important to perform preoperative MRI to better assess nipple involvement and underlying breast pathology.

POSTERS

MULTIPARAMETRIC CLASSIFICATION OF BOLD HYPEROXIA AND DYNAMIC SUSCEPTIBILITY CONTRAST MAPS: STUDY OF THE HEALTHY BRAIN

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PURPOSE

Blood oxygenation level dependent (BOLD) contrast and dynamic susceptibility contrast (DSC) imaging are commonly used to evaluate brain hemodynamics. BOLD contrast can be obtained using hyperoxia challenge, that affects both tissue oxygenation and blood flow. In DSC imaging, gadolinium is injected, and a time series of T2/T2* weighted images is acquired. Kinetic analysis of the DSC data yields several hemodynamic. The aim of this study was perform multimodal hemodynamic characterization, and to obtain reference values of the normal brain.

MATERIALS AND METHODS

Brain hemodynamic characterization was performed in twenty one healthy volunteers using multimodal magnetic resonance imaging (MRI). MRI protocol included DSC imaging, BOLD during hypercapnia and during hyperoxia challenges. Unsupervised cluster analysis was performed in each subject based on the three methods, resulted with three tissue types identified as the blood-vessels&dura (BVD), gray matter (GM) and white matter (WM).

RESULTS

Several hemodynamic parameters were calculated from the three methods and were measured in several brain areas: in the three brain tissues; in the three main vascular territories within the GM cluster; and in arteries and veins within the BVD Cluster. GM and WM tissue clusters were significantly different by their hemodynamic characteristics, supporting the grading vascularity of the tissues with BVD> GM> WM. Within the GM, significant prolong DSC transfer time and delayed start times were detected for the posterior cerebral artery territory relative to other territories. Significant delayed DSC start time was detected at the area of the veins relative to arteries.

CONCLUSIONS

This study provides reference values in healthy brain for various hemodynamic parameters that may be clinically important in studying patients with cerebrovascular diseases.

CONSECUTIVE INTEGRATED PACS AND RIS IMPLEMENTATION IMPROVES COMMUNICATION AND COLLABORATION BETWEEN RADIOLOGISTS AND REFERRING PHYSICIANS AT A UNIVERSITY HOSPITAL

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PURPOSE

Clalit Health Services (CHS) is the largest HMO in Israel (4 million members, 12 Hospitals and 1400 outpatient clinics). Initially 18 months ago state-of-the-art Web deployed PACS was implemented and used with legacy RIS at Meir Medical Center (MMC). For the past year the legacy RIS was replaced by a new integrated state-of-the-art RIS. Our aim was to assess the benefits delivered by the sequential deployment of integrated state of the art PACS and RIS. .

MATERIALS AND METHODS

Integrated RIS system (Carestream Health, Inc) was installed in MMC 18 months following PACS integration. Two-phase validated 1-5 Likert-scale anonymous questionnaires were distributed among radiologists and referring physicians. First at March 2011 on PACS with legacy RIS implementation 13/16 radiologists (10 attending and 3 residents) and 31/52 referring physicians responded. Second questionnaire on PACS and RIS implementation was issued to the same 13/16 radiologists and 39/61 referring physicians at March 2012.

RESULTS

Following the RIS implementation we observed an increase in radiologists interaction with referring physicians (3.5 to 4, $P<.05$), mostly at the level of detailed clinical information (2.5 to 3, $P<.01$), which clearly shown that meticulous message on clinical issues directly affects the radiologists' satisfaction. We also found an increase in relevancy of information to radiologists (4 to 4.5, $P<.01$); significant decrease in number of rejected requests for imaging (3 to 1.5, $P<.01$) and clear confirmation by the radiologist's perception of these trends (3.5 to 4, $P<.01$; 2.5 to 2, $P<.01$, respectively). We witnessed high level (4.5 out of 5) of PACS/RIS usage among referring physicians and statistically significant increase in referring physicians' perception of improved patient care in following: interaction with radiology department staff (4 to 5, $P<.01$), ability to clearly show the findings to the patient (3.5 to 4, $P<.01$), and appropriate selection of imaging studies (4 to 4.5, $P<.05$).

CONCLUSIONS

Sequential PACS and RIS implementation significantly improves communication and collaboration between radiologists and referring physicians and overall satisfaction from better patient care. Based on our results further implementation throughout the CHS group is on the way.

PITFALLS AND SOURCE OF ERRORS IN CAROTID IMAGING

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PURPOSE

The purpose of this presentation is to report the role of carotid CT Angiography (CTA) in equivocal carotid ultrasound Doppler examinations based in several sources of errors in imaging the neck vessels- normal variants of carotid morphology causing increased flow velocities, heavy calcified and ulcerated plaques, critical stenosis vs occlussion, cases after surgery or endovascular procedures and findings beyond transducer reachment -

MATERIALS AND METHODS

We selected 10 equivocal cases out of 92 consecutive ultrasound examinations that unmatched clinical working diagnosis and were referred to CTA in which CTA was discordant with US diagnosis, having an impact in the management of these specific cases by changing therapeutic strategies.

RESULTS

Our retrospective study proved that despite time lapse in testing dates, variety of examiners and different ultrasound equipment encountered in everyday circumstances, US Doppler showed a high specificity (96,3%) and positive predictive value (93,8%) for all degrees of stenosis, uphelding the importance of ultrasound, although the low sensitivity (78,9%) and negative predictive value (86,7%,) supported the need for CTA in selected cases.

CONCLUSIONS

Ultrasound Doppler remains an excellent diagnostic tool for the majority of cases; endarterectomy or stent placement vs medical treatment will follow upon its results. Spiral CT due to its superb contrast and spatial resolution is able to define and grade significant carotid pathology not depicted by Doppler US.
CTA is indicated for those cases in which discrepance with clinical findings and undefined results on US Doppler arise. Conventional angiography remains mainly for therapeutic endovascular procedures.

IMAGING ASPECTS WITH UNEXPECTED PATHOLOGY RESULT: A PICTORIAL ESSAY

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PURPOSE

The paper main purpose is to present a series of cases which from clinical and imaging point of view did not appear to hide a surprising pathology report. According to case, the paper refers also on some of the errors which led to an initial misdiagnosis or misassumption with emphasis on the subtle clues or factors that could have led to the right conclusion.

MATERIALS AND METHODS

4 patients were selected, all investigated in the Radiology Department of Cluj Napoca ER County Hospital, between 2008 and 2011. All cases had valid pathology reports. The imaging examinations performed according to situation varied between radiographs, US, CT and MRI.
The final pathology reports were as it follows: cerebral intravascular lymphoma, thoracic chordoma, isolated psoas muscle non-Hodgkin lymphoma and primary breast acute myeloid leukemia.

RESULTS

All 4 cases are presented with the complete clinical, laboratory, imaging and pathology data.
Each cased is furthered discussed in comparison with literature data and according to situation with emphasis upon what was done bad or good before reaching the final diagnosis.

CONCLUSIONS

Valid radio-imaging reports are more likely to be obtained when radiologists reach their conclusion after an integrative assessment. In order to do that he needs access to correct, complete clinical and paraclinical data. And more beneficially, he needs to be integrated in a multidisciplinary comisson able to discuss problematic cases and eventual errors.

STERNAL PSEUDOTUMOR OF CHILDHOOD – DON'T TOUCH LESION

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PURPOSE

Rapidly growing mass in a child is always a reason for concern for the parents and the caring physician. The common reaction is oncologic consultation, imaging and early tissue diagnosis. We present three cases of a rapidly growing peristernal mass in infants, with unique radiologic findings, favoring a non aggressive lesion, in which a conservative approach of sonographic follow up was chosen.
We review the typical x-ray, MRI and US imaging in this rather new and rare entity, separating it from the more aggressive group of lesions in this location and age group. We suggest that the classic appearance should imply a wait and see approach, with sonographic follow-up studies up to resolution, rather than invasive intervention.

MATERIALS AND METHODS

Between 1.2010 and 1.2012, two infants with rapidly growing peristernal mass were examined in our hospital and a third one was referred. In one case x-ray, sonography and MRI were performed and in the other two sonography was used as a single modality. In this retrospective study we review the clinical, laboratory and imaging findings of these patients.

RESULTS

We noticed a dumbbell soft tissue structure lay between the sternal segments or between a sternal segment and a cartilagenous rib, widening the space between them. This image was shown both in sonography and in MRI. In US and MRI, the lesion was a well defined avascular structure, with no periosteal reaction and with no invasion of the surrounding tissues. On the very early studies a mild hyperemia was noticed in the subcutaneous tissues around the lesion, which resolved on follow-up studies. These unique qualities, shown very nicely with both ultrasound and MRI, favor a subtle non invasive lesion.
The major differential diagnosis for chest wall lesions in infants includes infectious and malignant processes. In the absence of local and systemic signs of infection, and in the absence of aggressive findings in imaging, a self limiting pseudotumor of the sternum should be suggested.

CONCLUSIONS

We suggest that ultrasound should be used as a single modality in these cases both for primary diagnosis and for follow-up. Being a radiation free modality with very good conspicuity for these superficial lesions, easy to perform with no need for sedation, reproducible and non expensive, this is the optimal tool for positively and correctly identify this benign pseudotumor and set the basis for a conservative approach for this self limiting pathology.

TREASURESOF AWOMAN'S CHEST: REVIEW OF UNIQUE THORACIC IMAGING FINDINGS IN WOMEN

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PURPOSE

Traditionally, women imaging is thought of as screening for and evaluation of diseases of the female breast and pelvis. However, a number of chest pathologies are unique to women and should be recognized as such by general radiologists, as well as chest and women-imaging specialists.

MATERIALS AND METHODS

Content organization: Gender-specific chest findings will be classified into normal anatomical variants, primary lung pathologies, thoracic involvement by breast and gynecological disease,and certain complications of provided treatment. Pathologies that are predominantly seen in women, but might also be found in men, gender differences in the course of the same diseases, as well as primary breast disease,are excluded from the present discussion.

RESULTS

This exhibit will outline typical imaging findings of Turner's syndrome, lymphangioleiomyomatosis, thoracic endometriosis and catamenial pneumothorax. Differential features of the female specific metastatic thoracic disease will be highlighted based on clinical presentation and original tumor characteristics. Finally, classical and unusual findings related to treatment the diseases unique to women will be illustrated.

CONCLUSIONS

The existing literature on chest findings unique to women is very limited. However, awareness of specific thoracicpathologies exclusive to women, in correlation with clinical information may lead to correct diagnosis.

SMA-RELATED PSEUDOMASS AS A FORM OF REVERBERATION ARTIFACT IN A 10 YEAR OLD BOY

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PURPOSE

Artifacts are encountered routinely in clinical ultrasonography practice. The majority of them can be interpreted as "by-products" of the physical process of ultrasound image generation. If misinterpreted as such, ultrasound artifacts can lead to serious misdiagnosis. The ability to recognize and eliminate potentially correctable ultrasound artifacts is of great importance to image quality improvement and optimal patient care.

MATERIALS AND METHODS

We describe a case of a 10 year old boy with acute abdominal pain, an unremarkable physical examination and normal blood test. Abdominal sonography was performed, which showed a hyperechoic intraluminal mass in the abdominal aorta between the origin of the superior mesenteric artery (SMA) and the ostia of the renal arteries, closely related to the origin of the SMA. Consequently, a computed tomographic aortogram (CTA) was performed, which effectively ruled out an aortic intraluminal filling defect.

RESULTS

Due to mismatched findings of US versus CTA, this aortic mass eventually proved to be an artifact, probably due to acoustic reverberation, not a thrombus. We present the ultrasonographic and computed tomographic findings and provide relevant discussion thereof.

CONCLUSIONS

The incidence of an aortic thrombus or an intravascular mass in children is extremely rare. The former can be seen as a complication of intra-arterial catheter placement in a neonate and very occasionally in a young patient with structural aortic anomalies, cyanotic heart disease or a prothrombotic state, or secondary to trauma, dehydration or sepsis. Our patient had none of the above.
An echogenic focus within the lumen of the abdominal aorta just distal to the origin of the SMA, specifically in a thin patient without relevant clinical symptoms, should always raise the suspicion of an SMA-related pseudomass - a form of reverberation artifact (or possibly, mirror-image artifact). This artifact is generated when the transducer, SMA and aorta are in alignment .The fat anterior to the SMA is reflected in the aortic lumen, resulting in an intraluminal echogenic artifact. When scanning the aorta outside this plane, no such artifact can be identified. Therefore, the aorta should be scanned in multiple planes, both with and without the SMA, to confirm whether the lesion disappears and can thus be interpreted as a reverberation artifact from the SMA.

ULTRASONOGRAPHIC DIASNOSIS OF ACUTE APPENDICITIS IN A 6-MONTH-OLD INFANT COEXISTING WITH ILEAL OCSTRUCTION CAUSED BY AN OMENTAL BAND

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PURPOSE

Acute appendicitis is the most common surgical emergency in childhood and may present at any age, but it is an uncommon entity during the first 3 years of life and an extremely rare condition in infants younger than 12 months. The initial symptoms of appendicitis in infants are often ill-defined and nonspecific. An accurate early clinical diagnosis is critical for the outcome, but is very difficult to achieve in this age group.

MATERIALS AND METHODS

Herein, we describe the case of successful diagnosis by ultrasonography of acute appendicitis in an infant boy, who had an unclear clinical presentation on admission. Clinical evaluation did not yield any diagnosis requiring emergency surgery. Plain abdominal radiography raised suspicion for small bowel obstruction. Abdominal ultrasound was ordered for further evaluation and showed an excessive amount of intraabdominal fluid, hyperechoic mesenteric fat and an abnormal, inflamed appendix. This diagnosis was confirmed by surgery. An additional finding during surgery was yet another rare condition – an omental band causing ileal obstruction.

RESULTS

We present the ultrasonographic findings and provide appropriate discussion. Our report describes the preoperative sonographic diagnosis of acute appendicitis in an infant with the use of well-established sonographic criteria for the disease. Using a proper technique, we were able to make the diagnosis, despite the unclear clinical presentation. Of additional interest in our case is the coexistence with another very rare condition – congenital omental band causing a clinically significant ileal obstruction. We present the ultrasonographic findings and provide appropriate discussion.

CONCLUSIONS

The case presented here exemplifies the benefits of sonography as an extremely useful method for true, early diagnosis of acute appendicitis in young infants. Although once believed rare, acute appendicitis in a very young infant, either with or without intestinal obstruction, should be considered in the differential diagnosis of an acute abdomen. Ultrasound can reliably identify the inflamed appendix and distended bowel loops, shorten the diagnostic workup and provide useful information for surgical planning.

FETAL UPPER AIRWAY ABNORMALITIES

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PURPOSE

Fetal upper airway abnormalities are infrequent but can have catastrophic outcome during delivery, significant post natal morbidity and poor quality of life. They are classified into extrinsic and intrinsic causes. The external causes include large neck masses, typically lymphatic malformation, teratoma or neuroblastoma. The rare intrinsic abnormalities include laryngeal stenosis/atresia, tracheal atresia/ agenesis and cysts.These entities require awareness, as the diagnosis is not always straightforward. Prenatal diagnosis is facilitated by recognizing the imaging features of Congenital High Airway Obstruction Syndrome (CHAOS). The recent advances in US and fetal MRI technique allow for more precise and detailed diagnosis.

The purposes of this presentation are to:

1. Describe the normal sonographic and MR appearance of the no rmal fetal airway, from mouth to tracheal bifurcation.
2. Discuss the advantages and pitfalls of each imaging modality in the diagnosis of fetal upper airway abnormalities.
3. Illustrate the imaging findings in CHAOS.

RESULTS

The prenatal and postnatal imaging of patients suspected of airway abnormality presented to the Fetal Assessment Unit in our hospital, will be presented. The typical imaging features of Congenital High Airway Obstruction Syndrome (CHAOS) will be described,with emphasis on two patientsdiagnosed with Fraser syndrome and laryngotracheal cleft. Postnatal correlation will be provided.

CONCLUSIONS

Fetal high airway obstruction is rare but prenatal diagnosis can be expedited by knowledge of the imaging features of CHAOS. This will permit better perinatal care, with proper intervention planning, genetic counseling and may improve postnatal outcome.

OUTCOME ANALYSIS OF MRI GUIDED INTERVENTIONAL PROCEDURES – OUR EXPERIENCE

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PURPOSE

The purpose of this study was to evaluate our experience in performing MRI-interventional procedures, according to lesion characteristic, in and out of hospital referrals, and BRCA carriers parameters.

SUBJECTS AND METHODS

Thirty one cases scheduled for MRI-guided breast intervention were retrospectively retrieved. MRI-guided procedures included either clip placement for localization or core biopsy which was performed using a vacuum-assisted 9 gauge needle, followed by placement of a localizing clip. MRI findings and Vacuum-assisted biopsy histology were correlated.

RESULTS

Vacuum-assisted biopsy was performed in 29 (93%) cases, and clips only were placed for localization in 2 cases (7%). Lesions' median size was 0.8 cm (range, 0.2-2 cm, SD 0.6). Cancer was present in 8(26%) of the cases. Atypical ductal hyperplasia (ADH) was present in 2 cases (7%), which was confirmed at surgery as well. 18 (59%) of the procedures were out of hospital referrals, and 13 (41%) were in hospital referrals. 25% of the diagnosed cancer cases were out of hospital referrals, and 75% in hospitals referrals. We were aware of the presence of BRCA mutation in 8 (26%) of the patients. 3/8 (38%) of the cancer cases were diagnosed in a BRCA mutation carriers patient.

CONCLUSIONS

MRI-guided interventional procedures are known to be a fast, safe, and accurate alternative to surgical biopsy for breast lesions detected on MRI. Though literature numbers for program auditing exist, we found that the number of cancer cases detected is significantly higher in BRCA carries. Auditing number modifications need to be considered for these high risk populations. This might be achieved by combining all local centers experience with this unique population.

PELIOSIS HEPATIS – RARE, CONFUSING CONDITION

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PURPOSE

Presented a review of radiological findings in Peliosis Hepatis, a rare entity with variable radiological patterns. It is important to recognize the diagnosis of peliosis hepatis because it may mimic several different types of focal hepatic lesions, from adenomatosis to metastatic disease of liver.

MATERIALS AND METHODS

We'll discuss three peliosis hepatis cases. We illustrate the spectrum of imaging findings of peliosis hepatis, including US, CT, MR. We present a review publications and compare of outstanding literature, with a comparison to the cases that presented before.

RESULTS

Peliosis hepatis is a rare benign disorder causing sinusoidal dilatation and the presence of multiple blood-filled lacunar spaces within the liver. "Peliosis" is a term derived from the Greek "pelios", which means "purple", referring to the color of the liver parenchyma with peliosis. The lesions typically multiple and involve the whole liver in most cases. The cause of peliosis hepatis can be related to drugs (anabolic steroids, oral contraceptives, corticosteroids, toxins (polyvinyl chloride, arsenic) infections disease (TB ,AIDS related infection) and various malignancies, especially HCC. Some other conditions are described as associated with peliosis hepatis, including Spru,DM, necrotizing vasculitis. In 20-50% of patients, no associated condition is identified. The natural course of peliosis hepatis is regression after drug withdrawal, cessation of steroid therapy, or resolution of an associated infectious disease. Complications may include liver failure, portal hypertension, and liver rupture and hemoperitoneum. In general, if untreated, peliosis hepatis may be rapidly fatal.

Imaging findings on US examination are non specific included hypoecogenic lesions in patients with steatosis, hyperecogenic in cases health liver, heterogenic nodules in cases of bleading in to the lesion. Imaging findings on CE CT, peliotic lesions can be hypodense compare to liver parenchyma in the early series and tend to become progressively isodense with time. The leasions communicating with sinusoids display the same attenuation of blood vessels, thrombosed areas may have the appearance similar nonenhanced nodules. The findings on MRI depend on the age and status of the blood component. On T2-weighted sequences, peliotic lesions are usually hyperintense to liver parenchyma with multiple foci of high signal, likely secondary to hemorrhagic necrosis. On T1-weighted sequences, the lesions are hypointense in most cases, because of the presence of subacute blood. On T1-weighted images after contrast material injection, peliotic lesions usually enhanced. Similar to CT, the enhancement is typically centrifugal (from the center to the periphery of the lesion).

CONCLUSIONS

Peliosis Hepatis is a rare entity that can be suspected and identified by noninvasive imaging modalities. Prompt identification will lead to a benign clinical course, while misdiagnosis lead to unnecessary procedures, patient confusion and rare, but dangerous complications.

THE "CAVE OF THE WARRIOR" REVISITED - DIFFERENTIAL DIAGNOSIS FOR THE UNILATERAL ENDOCRANIAL THICKENING OF A 6,000 YEARS OLD SKULL

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PURPOSE

Introduction: The paleopathological investigation of an adult male discovered in Wadi el-Makkukh (Judean Desert), dating from the Chalcolithic period (4th millennium BCE), was recently "reopened" in order to diagnose an unusual pathology, which was revealed when the osteological remains underwent computed tomography (CT) examination.

MATERIALS AND METHODS

CT scans were performed using a Philips iCT 256 scanner at the Carmel Medical Center in Haifa, Israel, and reviewed using a Brilliance Workspace Portal (Philips Medical Systems, Cleveland, Ohio).

RESULTS

Scans of the cranium revealed localized thickening of the right frontal bone, causing expansion of the diploic space on the affected side. Due to the invagination of the inner table, the frontal cranial fossa on the right side was greatly reduced, compared to the left. Contrastingly, the posterior fossa is smaller on the left side. Other abnormalities in the skull included the enlargement of the maxillary sinuses; the elevation of the petrous part of the temporal bone and of the sphenoid bone on the right side; and the absence of convolutional markings above the right orbital roof.

CONCLUSIONS

The most probable diagnosis for these intriguing clinical features is Dyke-Davidoff-Masson syndrome (cerebral hemiatrophy), a rare disorder insofar unknown in the paleopathological record. Differential diagnosis includes intradiploic hematoma, lipoma of the skull, fibrous dysplasia, unilateral hyperostosis frontalis interna, meningioma, and progressive facial hemiatrophy (Parry-Romberg syndrome). As visual external assessment of the cranium revealed no gross deformations or evidence of trauma, the discovery of this unusual pathology emphasizes the value of employing medical imaging in paleopathology research.

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CLINICAL ASSESSMENT OF THE USE OF DIGITAL BREAST TOMOSYTHESIS, IS IT THAT EASY – A RESIDENT TRIAL

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PURPOSE

Digital breast tomosynthesis (DBT) is an emerging technology. Recent studies have shown that it has significant effect in reducing recall rates, it is equal to spot compression and magnification views in its capabilities, and it increases reader's confidence when reading mammography. We found similar results when we evaluated the performance of two experienced mammographers using DBT as compare to digital mammography. We were interested in inquiring the technology performance when used by a non experienced radiologist, (who is not a mammographer).
To evaluate the use of DBT in addition to full-field digital mammography (FFDM) when the reader is a non experienced radiologist, who is not a mammographer.

MATERIALS AND METHODS

22 known cancer lesions who underwent FFDM as well as DBT in two view [mediolateral oblique (MLO)] and craniocaudal (CC) of both breasts were retrieved. Image interpretation was performed by using two protocols: Standard FFDM and FFDM as well as DBT. Reading was performed by a 4rd year residence, who had no experience in reading mammograms, using dedicated mammography workstations. Each case was interpreted twice with both protocols. Subjective scores (1-5, 1 the least 5 the most) were given for the conspicuity of the findings and for the confidence in defining their malignant versus benign nature.

RESULTS

Pathology diagnosis of the 22 lesion included 15 IDC, 4 ILC, 2 Papillary and 1 medullary carcinoma. Mean lesion size ± SD was 23±19.5, range 6-74 mm.
Mean breast density graded according to the BIRADS lexicon was 2.6±0.7.
FFDM readings detected findings in 16/22 (72%) cases, as compare to FFDM and DBT readings that found finding in 19/22 (87%) cases.
A - Conspicuity score 1-5
FFDM mean conspicuity score was 3, FFDM and DBT mean conspicuity score was 4.5.
B – Confidence score 1-5
FFDM mean confidence score was 3.5, FFDM AND DBT mean confidence score was 4.4.
All findings were statistically significant $p>0.0005$.

CONCLUSIONS

DBT is an emerging exciting technology which has many advantages. Though experience does matter, the advantages are pronounced even when it is used by a non experienced reader.

PRENATAL RADIOLOGY OF BRAIN DEVELOPMENTAL ANOMALIES

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PURPOSE

To present our experience with ultrasound for the prenatal evaluation of brain malformations in a large series of patients.

PATIENTS AND METHODS

During the years 2008-2009, 211594 pregnant women underwent prenatal ultrasonography in our institution. MRI was performed in 30 equivocal cases. Pathomorphological examination was performed in case of abortion.

RESULTS

The following developmental anomalies of the fetal brain were revealed by prenatal ultrasound in our study group: Anencephaly (N=84), Craniorashischisis (N-8), Exencephaly (N=39), Frontal encephalocele (N=2), Occipital Encephalocele (N=10), Arnold-Chiari malformation (N=20), Arinencephaly (N=1), Cortical Atrophy (N=1), anomalies of girus structure (N=5), Hydranencephaly (N=6), Dandy Walker syndrome (N=26), Holoprosencephaly (N=27), aplasia and hypoplasia of cerebellum and its vermis (N=23), aplasia and hypoplasia of a corpus callousum (N=27), anomalies of cavum septi pellucidi (N=2).

MRI was required in 13 cases of suspected Dandy Walker syndrome and 12 cases of suspected Holoprosencephaly. MRI confirmed all sonographic diagnosis.

In 5 cases ultrasound diagnosis was not certain and prenatal MRI allowed excluding fetal brain developmental anomaly.

CONCLUTIONS

Prenatal sonography proved to be very accurate for the prenatal diagnosis of congenital brain defects. MRI is an important adjunctive in difficult cases for increasing the diagnostic confidence.

ENTRAPMENT OF THE EXTERNAL ILIAC ARTERY IN A COMPETITIVE CYCLIST

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Over past few years Computer Tomography Angiography (CTA) is widely used to diagnosis of various Arterial Compression Syndromes.

A rare case of external compression of Left Iliac Artery in competitive cyclist was diagnosed and treated with surgical exploration.

As far as we know it is the first case of this pathology diagnosed and treated in Israel.

CECAL VOLVULUS WITH SPONTANEOUS RESOLUTION: REPORT OF TWO CASES

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Cecal volvulus is a quite rare, and potentially very dangerous, cause of intestinal obstruction accounts for approximately 1-1.5% of all causes of intestinal obstruction in adults. Cecal volvulus is regarded as a surgical emergency.

We presented two patients with cecal volvulus that was diagnosed on abdominal CT and resolved spontaneously; A 27-year-old man presented with acute abdomen while in another patient, a 78-year-old asymptomatic woman, with sigmoid carcinoma, a perforated cecal vovulus was incidentally found on PET-CT performed for follow up.

Although the only effective treatment of cecal volvulus is reported to be surgical, our cases emphasize the chance of both spontaneous resolution of this rare entity as well as an asymptomatic course, even in a complicated cecal volvulus.

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