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 30 – November 1, 2013
כ"ו-כ"ח בחשון תשע"ד, ימים רביעי - שישי

President of the conference:
Prof. Jacob Sosna, Chairman of ISRA

Organizing Committee:
Prof. Jacob Sosna – Chairman
Prof. Moshe Graif – Honorary President of ISRA
Jean Mani MD, Jean Claude Sadik MD, Prof. Jean Luc Drape (President Afiim)
A. Blachar MD, E. Konen MD, M. Amitai MD, N. Hiller MD
D. Shaham MD, A. Bloom MD, J.D. Laredo MD, H. Azoulay MD

Scientific Committee:
N. Hiller MD (Chairman), **L. Appelbaum MD, E. Atar MD, A. Blachar MD**
G. Bartal 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:
F. Koskas MD, P. Douek MD, J. Cynamon MD, J. C. Sadik MD, G. Frija MD
L. Berlin MD, F. Caseiro-Alves MD, P. Ellenbogen MD, J. Patti, MD
B. Allen MD, M. Wecheler MD

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), **A. Engel MD, I. Shelef MD**

ISRA Website:
www.israel-radiology.org.il

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

EINSTEIN

CME Accreditation Information
Israel Radiological Association Annual Meeting

Needs: The needs assessment for this activity were determined on the basis of national guidelines, published literature and a survey performed at the previous ISRA annual meeting and on the basis of national guidelines and published literature, and these needs are addressed in the **Learning Objectives**.

Intended Audience: Medical Doctor degree or equivalent. Post graduate training with completion of residency is one of the following specialties: Diagnostic Radiology, Surgery, Internal Medicine, OB-GYN, Pediatrics, Oncology, Rheumatology, Radiation Therapy, Physical Medicine & Rehabilitation

Learning Objectives:

- Understand the recent technological advancement in CT and MR examinations and how to utilize these in daily practice.
- Understand the most recent science behind the role of breast imaging in reducing breast cancer morbidity and mortality.
- Understand the role and advancements in imaging and healthcare informatics to improve patient care and to better assure data reliability, integrity, security and privacy.
- Understand how to optimally utilize neurovascular imaging to assure that endovascular therapy options are always considered, where appropriate.
- Understand the current state-of-the-art imaging approaches to articular derangement diagnosis and treatment.
- Understand the latest advances in the imaging and management of hepatobiliary neoplasms.
- Understand the latest radiation reduction strategies.
- Understand the diagnostic, iatrogenic or therapeutic complications of disease processes.
- Understand the latest MR strategies and advancements in the staging of disease.
- Understand the ultrasound advancements and methods in which these are adapted to enhance diagnostic capabilities.

CME Reviewer: Nogah Haramati, MD, Chief of Radiology, Professor of Clinical Radiology and Orthopedic Surgery Albert Einstein College of Medicine, Montefiore Medical Center, Bronx, New York, USA.

Accreditation Statements: This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education (ACCME) through joint sponsorship of Albert Einstein College of Medicine of Yeshiva University and the Israel Radiological Association, Israel. Albert Einstein College of Medicine of Yeshiva University is accredited by the ACCME to provide continuing medical education for physicians.
Albert Einstein College of Medicine of Yeshiva University designates this live activity for a maximum of 17.25 AMA PRA Category 1 CreditsTM. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

American with Disabilities Act: If you require any special dietary or ADA accommodations, please contact us at: Tel: 972-3-7610802/7 Fax: 972-3-7610799
Registration for the meeting is online at: the ISRA website: www.israel-radiology.org.il
The registration costs have not yet been determined at the time of the preparation of this statement.

Conflict of Interest Statement: The "Conflict of Interest Disclosure Policy" of Albert Einstein College of Medicine requires that faculty participating in any CME activity disclose to the audience any relationship(s) with a pharmaceutical or equipment company. Any presenter whose disclosed relationships prove to create a conflict of interest, with regards to their contribution to the activity, will not be permitted to present.
The Albert Einstein College of Medicine also requires that faculty participating in any CME activity disclose to the audience when discussing any unlabeled or investigational use of any commercial product, or device, not yet approved for use in the United States.

Equal Opportunity Statement: The Albert Einstein College of Medicine is an equal opportunity institution.

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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+C - 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 in the regisration Kit, will be requested at the entrance of each social event.

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

Quiz: Interactive quiz will take place Thursday at Hall A between 15:00 to 15:45.

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 C+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 של הכנס 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: תצוגת הפוסטרים תתבצע **על גבי מסכי פלזמה**, אשר ימצאו בשטח התערוכה במהלך כל הכנס.

הקוויז: הקוויז השנה ייערך באופן אינטראקטיבי באולם המליאה.
בין 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

Bepex Ltd.

Dexcel pharma

Dinco

DMS – Carestream Health

Eldan Electronic instruments

ElsMed Ltd.

Getter Bio-Med Ltd.

Inframed Medical Technologies

Medtechnica Ltd.

PHILIPS HEALTHCARE

SIEMENS Healthcare

Shilo Medical Innovation

Softemed

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-14 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:
ד"ר ראדו רוזנברג ממרכז רפואי רמב"ם, חיפה וד"ר מיכל גבאי מהדסה ירושלים

הזוכה במילגה ע"ש ד"ר מיכל מידן לשנת 2012:
ד"ר נינה ברעם ממרכז רפואי סורוקה, באר-שבע

The prize is sponsored by SIEMENS Israel

אורח הכבוד לשנת Guest of Honor 2012

לזכרו

פרופ' אלכסנדר רוזנברגר

פרופ' אלכסנדר רוזנברגר היה מראשוני הרופאים אשר הניחו את היסוד לרדיולוגיה המודרנית בארץ, ואשר כל מעייניו נתונים היו ליישור קו עם הרדיולוגיה העולמית. בימיו, התקדמה הרדיולוגיה בעולם באורח מדהים ובלתי יאמן, והוא בחזונו, ובראיית הנולד המיוחדת שלו, השכיל להצעיד אותה גם בארץ, בצעדיה הראשונים אל מה שהיא כיום.

פרופ' רוזנברגר סיים את לימודי הרפואה באוניברסיטה העברית בירושלים בשנת 1954. את לימודי הרדיולוגיה עשה בבית החולים רמב"ם בחיפה, תחת שרביטו של פרופ' מונק. בשנת 1966, נסע לסטאנפורד שבארה"ב ונכנס לרזי האנגיוגרפיה אצל פרופ' אברמס הידוע. בשנת 1970, הוא קיבל לידיו את ניהול המחלקה לרדיולוגיה בביה"ח רמב"ם בחיפה ובתפקידו זה נשאר עד פרישתו לגמלאות בשנת 1992. מאז ועד יומו האחרון הוא המשיך להאציל מנסיונו ביעוצים ובהוראת מתמחים וסטודנטים.

פרופ' רוזנברגר היה דמות המנהיג ברדיולוגיה של מדינת ישראל הן מבחינה מקצועית-מדעית והן מבחינה ארגונית-ארצית. השגיו המקצועיים והמדעיים רבים ומרשימים. בשנת 1973 הוא התחיל בארץ את הנושא של רדיולוגיה פולשנית. הוא היה הראשון שביצע ביופסיות מנגעים בריאה ובמדיאסטינום והראשון שהתחיל פעולות פולשניות אנדו-וסקולריות כמו עצירת דימומים במערכת העיכול ובכליות.

פרופ' רוזנברגר היה בין הראשונים שהכניסו לשימוש את ה-CT כמכשיר עיקרי בטראומה, בעיקר בפציעות חודרות. נסיון רב נצבר בשנת 1982 במלחמת שלום הגליל ופרופ' רוזנברגר היה לשם דבר בנושא זה בארץ ובעולם. הוא כתב מונוגרפיות על אבחון פציעות מלחמתיות ב-CT וכתב ספר על טראומה בחזה ובבטן. ראויה לציון העובדה שהוא הוזמן לצבא ארה"ב כיועץ לפני החלטה על קליטה CT או חדרי שיקוף ניידים. הוא זה שתמך בהכנסת CT לצבא ארה"ב. בנוסף לכל אלה, כתב מאמרים רבים, פרקים בספרים של אברמס ודונדלינגר, והיה חבר מערכת בעתון SCVIR.

פרופ' רוזנברגר זכה להכרה והוקרה בינלאומית. הוא היה חבר כבוד באיגודים הרדיולוגים בצרפת וביוגוסלביה והיה פרופסור אורח בהרווארד ובאוניברסיטת פנסילבניה.

במשך מספר שנים היה יושב הראש של CIRSE - החברה האירופית לרדיולוגיה פולשנית וקרדיו-וסקולרית, וארגן בשנת 1986 את הכנס השנתי של חברה זו בירושלים. בשנת 2002 הוזמן פרופ' רוזנברגר לכנס CIRSE בלוצרן, כאורח כבוד ולאות הוקרה על תרומתו והישגיו). בנוסף, ארגן כנסים רבים ארציים ובינלאומיים נוספים שזכו להשתתפות מכובדת של אורחים מהארץ ומהעולם.

כמנהל מחלקה, היה פרופ' רוזנברגר בין הראשונים בארץ שיזמו והתחילו לימודים סדירים למתמחים. תורנויות המתמחים הראשונות ברדיולוגיה התחילו ביוזמתו. הוא חנך דור של רדיולוגים שחלקם היום מנהלי מחלקות באיכילוב, בנהריה, בקופ"ח מכבי בת"א ורמב"ם. רבים מהם מנהלי יחידות. בשנים 1970-1971, כאשר נפתח ביה"ס לרפואה בטכניון, ארגנו וקבעו הוא וחבריו מהמחלקה את תכנית הלימודים ברדיולוגיה.

פרופ' רוזנברגר השאיר את חותמו גם מנקודת מבט ארגונית ברמה ארצית. משנת 1978 כהן כיושב ראש השני של איגוד הרדיולוגים בישראל, וככזה נרשמו לזכותו השגים לא מעטים. הוא פעל רבות והצליח להביא להכרה ברדיולוגיה כמקצוע מיוחד (כמופיע בתלוש משכורת) על אף חוסר התמיכה מצד ההסתדרות הרפואית ולמרות מחאותיה. הוא יזם את חברות האיגוד הישראלי בחברה הרדיולוגית האירופית. פרופ' רוזנברגר וחבריו בביה"ח רמב"ם היו הראשונים בארץ שארגנו את בחינות ההתמחות ברדיולוגיה.

עד ימיו האחרונים היה זקוף וצלול ועבד במקצוע שאהב בחברת דור התלמידים שגידל ובמחלקה האהובה עליו אשר לבנייתה היה שותף.

אלכס הלך לעולמו ב- 18.7.2013 שנה לאחר פטירת אשתו האהובה ורה. הוא השאיר אחריו בן - אורי, בת - אילנה והנכדים.

"חבל על דאבדין ולא משתכחין". יהי זכרו ברוך !

Prof. Yacov Itzchak

Prof. Yacov Itzchak was born in Bagdad, Iraq in1939 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.

Program at a Glance

Wednesday October 30, 2013

	Hall A
11:00-12:00	Registration
12:00-13:00	Refresher and Educational Course: Vascular imaging and Intervention - State of the Art
13:00-13:30	**Light Lunch Break**
13:30-15:10	Refresher and Educational Course: Vascular imaging and Intervention - State of the Art
15:10-15:30	**Coffee Break**
15:30-16:30	Refresher and Educational Course: Vascular imaging Intervention - State of the Art
16:30-17:30	Satelite Symposium Sponsor by Philis & Medtechnica
17:30-19:00	AFIIM Workshop
19:30	***Welcom Cocktail***

Thursday October 31, 2013

	Hall A	Hall B
08:00-08:45	Registration	
08:45-09:00	Opening Remarks: J. Sosna MD, Chairman of ISRA	
09:00-09:30	Guest Lecturer: G. Frija MD (France)	
09:30-10:00	Guest Lecturer: L. Berlin MD, (USA)	
10:00-10:30	Guest Lecturer: F. Caseiro-Alves MD, (Portugal)	
10:30-10:45	Guest of Honor Ceremony - 2013 Prof. Y. Barki	
10:45-11:15	***Coffee Break***	
11:15-13:00	Session 1 Abdominal Imaging	Session 2 Chest Imaging
13:00-14:00	***Lunch Break***	
14:00-15:00	ISRA Meets ACR	
15:00-15:45	Interactive Quiz	
15:45-16:15	***Coffee Break***	

	Hall A	Hall B	Hall C
16:15-17:36	Session 3 Interventional Radiology	Session 4 Breast Imaging	Session 5 Pediatric Imaging
20:00	***Gala Dinner***		

Friday November 1, 2013

	Hall A	Hall B
08:15-09:15	Complications in Image Guided Interventions	
09:15-09:30	Guest Lecturer: M.Wecheler MD, (USA)	
09:30-11:00	Session 6 Neuroradiology	Session 7 Innovations & Informatics
11:00-11:30	***Coffee Break***	
11:30-12:00	Guest Lecturer: L. Berlin MD, (USA)	
12:00-13:00	Session 8 Cardiac Imaging	Session 9 Muscoloskeletal Imaging
13:00-13:30	Michal Meidan Award Closing Remarks	
13:30-14:00	***Light Lunch***	

Wednesday, October 30, 2013

Refresher and Educational Course: Vascular Imaging and Intervention – State of The Art Moderators: E. Atar, I. Shelef

11:00-12:00	**Registration and light refreshments**
12:00-12:20	Coronary imaging – State of the art **Tamar Gaspar MD**, Israel
12:20-12:40	Innovations in stroke imaging **Ilan Shelef MD**, Israel
12:40-13:00	Interventional treatment of stroke **Yaaqov Amsalem MD**, Israel
13:00-13:30	***Light Lunch Break***
13:30-13:50	Ultrasound of the supra-aortic vessles **Jean Claude Sadik MD**, France
13:50-14:10	CTA and MRA for vascular imaging **Galia Rosen MD**, Israel
14:10-14:30	Aortic imaging from the vascular surgeon point of view **Fabian Koskas MD**, France
14:30-14:50	Aortic imaging from the vascular radiologist point of view **Philippe Douek MD**, France
14:50-15:10	Percutaneous treatment of visceral aortic aneurysms **Eli Atar MD**, Israel
15:10-15:30	***Coffe Break***
15:30-15:50	Treating hypertension – state of the art **Allan Bloom MD**, Israel
15:50-16:10	Handling vascular grafts & fistulas in dialysis patients J**acob Cynamon MD**, USA
16:10-16:30	Treatment of diabetic foot – state of the art **Igor Kogan MD**, Israel
16:30-17:30	Latest innovation in muskuloskeletal imaging **Sponsor by Philips & Medtechnica** **Carlo Martinoli MD**, Italy
17:30-19:00	Fifth AFIIM Workshop Hands-on training Carotid and vertebral duplex ultrasound imaging: A practical approach **Jean Claude Sadik MD**, France
19:30-22:00	***Welcome Cocktail***

Thursday October 31, 2013

08:00-08:45 **Registration**

08:45-09:00 Opening Remarks - **J. Sosna** MD, Chairman of ISRA — **Hall A**

09:00-09:30 Radiation protection in Europe
Guest Lecturer: **G. Frija** MD, France

09:30-10:00 Overdiagnosis, Incidentalomas, and Overexposure to Radiation: The Latest Ethical and Legal Dilemmas Facing Radiologists Today
Guest Lecturer: **L. Berlin** MD, USA

10:00 - 10:30 The incidental focal liver lesion: how to characterize, how to manage
Guest Lecturer: **F. Caseiro-Alves** MD, Portugal

10 :30-10 :45 Guest of Honor Ceremony-2013: **Prof. Y.Barki**

10:45-11:15 ***Coffee Break***

11:15-13:00 **SESSION 1: ABDOMINAL IMAGING** — **Hall A**
Parallel Session *Chairmen: **A. Blachar, L. Copel***

11:15-11:30 Vascular lesions and pseudo-lesions of the liver
Guest Lecturer: **F. Caseiro-Alves** MD, Portugal

11:30-11:39 Ultrasound Surveillance of hepatocellular carcinoma in Israel
L. Appelbaum, I. Levy, T.Nesher, Y. Ashur, D. Shouval, R. Safadi, O. Shibolet
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

11:39-11:48 Prevalence of hepatic steatosis identified on unenhanced low-dose computed tomography in adults suspected of urolithiasis
A. Chernihovski, O. Slovak, R. Sivan-Hoffmann, N. Loberant
Western Galilee Hospital, Nahariya, Israel

11:48-11:57 Advanced 3D CT image analysis of chronic liver disease: Splenic and segmental liver ratios correlate with the stage of hepatic fibrosis in hepatitis C patients
E. Lotan, S. Raskin, Z. Ben-Ari, M. Amitai
Sheba Medical Center, Tel Hashomer, Israel

11:57-12:06 The postoperative anatomy and complications of laparoscopic sleeve gastrectomy with emphasis on MDCT
S. Barnes, Y. Amitai, D. Mercer, S. Eldar ,A. Subhi , A. Blachar
Sourasky Medical Center, Tel-Aviv, Israel

12:06-12:15 Cost-benefit analysis of routine UGI contrast studies after sleeve gastrectomy
A. Tabak, R. Grinbaum, I. Mizrachi, N. Begblaiter, N. Simanovsky, N. Hiller
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

12:15-12:24 RLQ abdominal abscess in women - The feasibility of CT for differentiating tubo ovarian versus appendicular origin
J. Khodak, N. Simanovsky, T. Fux, N. Hiller
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

12:24-12:33 Correlation between diffusion-weighted imaging and wall enhancement MR in routine evaluation of patients with ileal Crohn's disease
B. Makogon, N. Berkovitz, M. Vasserman, L. Ringler, P.Gotlieb, L. Copel
Assaf-Harofeh Medical Center, Zerifin, Israel

12:33-12:42 CT urography reading by a community radiologist versus an uroradiologist compared with nephroureteroscopy findings in upper tract transitional cell carcinoma suspicion
O. Portnoy, L. Guranda, T. Erlich, H. Winkler
Sheba Medical Center, Tel Hashomer, Israel

12:42-12:51 Stercoral colitis a lethal disease - CT findings and clinical characteristics
M. Saksonov, N. G. Bachar, S. Morgenstern, A. R. Zeina, M. Vasserman, O. Portnoy, O. Benjaminov
Rabin Medical Center, Petah-Tiqva, Israel

12:51-13:00 Discussion

11:15-13:00 **SESSION 2: CHEST IMAGING** **Hall B**
Parallel Session *Chairmen: **I. Marom, Y. Rozenman***

11:15-11:24 The accuracy of a novel software for automated analysis of the volumes of the cardiac chambers on CT pulmonary angiography
Y. Amitai, O. Rogowski, S. Adam, E. Soikher, S. Berliner, G. Aviram
Sourasky Medical Center, Tel-Aviv, Israel

11:24-11:33 Decreased left atrial volume predicts higher mortality in patients with acute pulmonary embolism
E. Soikher, S. Adam, H. Shmueli, S. Berliner, Y. Amitai, U. Bendet, G. Aviram
Sourasky Medical Center, Tel-Aviv, Israel

11:33-11:42 Chest radiography as a gate keeper to prevent staff and inpatients exposure to Tuberculosis (TB) related to migrants from high incidence countries
A. Bendet, V. Schechner, A. Blank, M. Lidji, M. Savion, Y. Carmeli, M. Graif, G. Aviram
Sourasky Medical Center, Tel-Aviv, Israel

11:42-11:51 Aortic and pulmonary artery enhancement at a routine chest MRI: Can it be done?
N. Berkovitz, M.Vasserman, L.Ringler, P.Gotlieb, L. Copel
Assaf-Harofeh Medical Center, Zerifin, Israel

11:51-12:00 Increased epicardial adipose tissue thickness as a predictor of hypertension: A cross sectional observational study
E. Atar , D. Dicker, V.Haminsky ,R. Kornowski , G. N. Bachar
Rabin Medical Center, Petah-Tiqva, Israel

12:00-12:09 Comparison of ventilation/perfusion assessed by SPECT/CT and functional CT in patients with pulmonary emphysema
V. Froeling, F. Doellinger, R.H. Hübner, A. Pöllinger, R. Bucher, W. Brenner, B. Hamm, N. Schreiter
Charité, Augustenburger, Berlin, Germany

12:09-12:18 Imaging of pulmonary emphysema: Do pulmonary function tests correspond with CT pulmonary volume and emphysema quantitative analysis?
A. Poellinger, R. H. Huebner, J. M. Kuhnigk, H. Haberstroh, V. Froeling, N. Schreiter, F. Doellinger
Charité, Augustenburger, Berlin, Germany

12:18-12:27 Evaluation of software based analyzing of ventilation/perfusion SPECT/CT in patients with pulmonary emphysema
N. Schreiter, F. Döllinger, R. H. Hübner, A. Pöllinger, R. Bucher, W. Brenner, B. Hamm, V. Froeling
Charité, Augustenburger, Berlin, Germany

12:27-12:36 The CT halo: A new sign in pulmonary metastases following adoptive cell therapy for metastatic melanoma, possible clinical significance
S. Shrot, J. Schachter, R. Shapira-Frommer, M. J. Besser, S. Apter
Sheba Medical Center, Tel Hashomer, Israel

12:36-12:45 Do incidentally discovered pulmonary emboli on contrast-enhanced abdominal CT scan warrant further evaluation?
Y. Yagil, A. Engel, L. Guralnik
Rambam Medical Center, Haifa, Israel

12:45-12:54 Views of specialists vs. residents on the utility of a CAD system for the detection of pulmonary nodules in chest radiography during routine clinical work
D. Shaham, I. Gonen, I. Leichter
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

12:54-13:00 Discussion

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

14:00-15:00 **ISRA MEETS ACR** **Hall A**

14:00 -14:20 ACR history, structure and pillars.
Opportunities for international dose registries.
ACR educational offerings for Israeli Radiologists
Guest Lecturer: **P. Ellenbogen** MD, USA

14:20-14:40 ACR Commission on International Relations.
Appropriateness criteria and decision support- US and european initiatives
Guest Lecturer: **J. Patti** MD, USA

14:40-15:00 ACR health policy institute and imaging 3.0. international applicability
Guest Lecturer: **B. Allen** MD, USA

15:00- 15:45 **INTERACTIVE QUIZ** **Hall A**
*Chairmen: **Y. Bar-Ziv, G. Bartal***

15:45-16:15 ***Coffee Break***

16:15-17:36 **SESSION 3: INTERVENTIONAL RADIOLOGY** **Hall A**
Parallel Session *Chairmen: **A. Bloom, I. Kogan***

16:15-16:24 Safety and efficacy of cryoablation of renal tumors in a high-risk patient population at a community hospital
M. Oselkin, J. Kashanian, L. Rostomian, S. Honig, D. Silver, S. Sobolevsky
Maimonides Medical Center, Brooklyn, NY, USA

16:24-16:33 Optimizing pulsed irreversible electroporation deposition
A. Wandel, M. Faruja, I. Nissenbaum, E. Ben-David, L. Appelbaum, S. N. Goldberg
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

16:33-16:42 CT guided procedures using the adaptive 3D Intervention suite
M. Zaghal, N. Bogot, A. Peizer and I. Hadas
Shaare-Zedek Medical Center, Jerusalem, Israel

16:42-16:51 Diagnostic retrograde trans-femoral lower extremity angiography with 3F dilator
E. Atar, S. Litvin, A. Cohen, H. Neiman, A. Belenky
Rabin Medical Center, Israel

16:51-17:00 The use of amplatzer plugs in complicated pulmonary a-v shunts in HHT patients
E. Bruckhaimer, T. Dagan, A. Cohen, M. Mei Zahav, E. Atar
Rabin Medical Center, Israel

17:00-17:09 Subintimal angioplasty of very long (≥40 cm) femorotibial occlusions in high risk surgical patients with critical lower extremity ischemia
C. Rubinstein, N. Caplan, R. Al-Housseini, Y. Samet, H. Anner, A.Bloom, A. Klimov
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

17:09-17:18 Percutaneous sclerotherapy of the ISV'S for BPH
Y. Gat, M. Goren
Maaynei Hayeshua Medical Center, B'nei B'rak, Israel

17:18-17:27 Attainable radiation doses for left varicocele embolization
A. Verstandig , B. Shamia, V. Shreibman, D. Ravel
Shaare-Zedek Medical Center, Jerusalem, Israel

17:27-17:36 Traumatic injury of the thoracic aorta treated with stent-graft: Is long term CT-Angiography follow-up justified?
U. Rimon, A. Shinfeld, G. Gayer
Sheba Medical Center, Tel Hashomer, Israel

16:15-17:36 **SESSION 4: BREAST IMAGING** **Hall B**
Parallel Session *Chairmen: **A. Grubshtein, D. Giorgio***

16:15-16:24 A new compound polymeric breast biopsy marker: Non-migrating and readily seen on mammography, ultrasound and MRI
B. N. Bloch, J. A. Kaplan, and M. W. Grinstaff
Boston University Medical Center, Boston, MA, USA

16:24-16:33 The impact of a same day adjuvant screening breast ultrasound by a technologist on workload and patient care - Preliminary results
T. Arazi-Kleinnman, J. Weinstein, N. Shabshin
Assuta Medical Center,Tel-Aviv, Israel

16:33-16:42 The incremental value of breast MRI in BRCA mutation carriers: Is it dependent on breast density?
T. Sella , T. Arazi-Kleinman
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

16:42-16:51 Digital mammography: Impact on underdetection of invasive lesions and overdiagnosis
D. Gekhtman, Y. Cohen, S. Strano
Shaare-Zedek Medical Center, Jerusalem, Israel

16:51-17:00 Radioguided lesion localization surgery for non-palpable breast cancer: Initial experience
A. Chernihovski , M. Gersh, N. Loberant, R. Lindroth-Eyal, J. Jerushalmi, A. Livoff, A. Drobot
Western Galilee Hospital, Nahariya, Israel

17:00-17:09 MR outcomes of patients referred for short term follow-up
T. Sella , G. Zeltzer, E. Carmon, T. Arazi-Kleinman
Hadassah-Hebrew University Medical Center, Jerusalem, Israel

17:09-17:18 Contrast-enhanced dual-energy digital mammography vs. conventional digital mammography and ultrasound: Evaluation of palpable lesions
A. Shalmon, A. Rundstein, Y. Servadio, O. Halshtok, M. Gottlieb, E. Konen, M. Sklair-Levy
Sheba Medical Center, Tel Hashomer, Israel

17:18-17:27 Breast lesion excision system (Intact®) - Initial experience
M. Sklair-Levy, A. Shalmon, A. Rundstein, Y. Servadio, O. Halshtok, E.Konen, A. Yosepovich
Sheba Medical Center, Tel Hashomer, Israel

17:27-17:36 Discussion

16:15-17:27 **SESSION 5: PEDIATRIC IMAGIMG** **Hall C**
Parallel Session *Chairmen: **L. Kornreich, L. Ben-Sira***

16:15-16:24 Disrupted functional connectivity in NF1 patients with and without optic pathway gliomas
B. Shofty, O. Lesman, S. Constantini, D. Ben-Bashat, M. Arzi, L. Ben-Sira and I. Kahn
Dana Children's Hospital, Tel-Aviv Medical Center, Israel

16:24-16:33 The effect of chemotherapy on optic pathway gliomas and their sub-components: A volumetric MR analysis
M. Mauda-Havakuk, B. Shofty, S. Constantini, D. Ben-Bashat, R. Dvir, L. Pratt, L. Weizman, L. Joskowicz, M. Tal, M. Yalon, L. Ravid and L.Ben-Sira
Dana Children's Hospital, Tel-Aviv Medical Center, Israel

16:33-16:42 Comparison of diagnostic value of CT-venography and MR-venography in diagnosis of neonatal sinus vein thrombosis
A. Ben Ely, M. Shroff, H. Branson, M. Joshi, M. Moharir
The Hospital for Sick Children, University of Toronto, Canada

16:42-16:51 Utility of both lateral and anterior-posterior spine radiographs for the evaluation of discitis in young children
A. Aizer-Dannon, M. Bar-Lev, Y. Inbar, E. Atar, A. Ilivitzki, J. Amir, O. Benjaminov, G. N. Bachar
Schneider Children's Medical Center, Petach Tikva, Israel

16:51-17:00 Reduction of non indicated VCUG examinations in children by an intervention program
L. Kornreich, S. Grozovsky, D. Ben Meyr, O. Konen, M. Davidovits
Schneider Children's Medical Center, Petach Tikva, Israel

17:00-17:09 Comparison of low dose chest CT with chest CR in diagnosis and management of pediatric pulmonary tuberculosis
G. Bartal, E. Kadakovska, A. Ozolina, E. Livcane, I. Ozere, E. Valtere
Meir Medical Center, Kfar Saba, Israel

17:09-17:18 Discrepancy between ultrasound and fetal MRI occipitofrontal and biparietal diameters measurements
G. Yaniv, E. Katorza, V. Tsehmaister Abitbol, G.Twig, S. Baderrt, C. Hoffmann
Sheba Medical Center, Tel Hashomer, Israel

17:18-17:27 Reduced ADC values in PCR-proven CMV-infected fetal brain
G. Yaniv, S. Lipitz, E. Katorza, E. Konen, D. Kidron, C. Hoffmann
Sheba Medical Center, Tel Hashomer, Israel

20:00 ***Gala Dinner***

Friday November 1, 2013

08:15-09:15 **COMPLICATIONS IN IMAGE GUIDED INTERVENTION** — **Hall A**
*Chairmen: **J. Cynamon, G. Bartal***
Participants: E. Atar, U. Rimon, L. Appelbaum, A. Verstandig, J. Cynamon, L. Bellaiche

09:15-09:30 Expanding your radiology PACS into an enterprise imaging system
Guest Lecturer: **M. Wecheler MD**, USA

09:30-11:00 **SESSION 6: NEURORADIOLOGY** — **Hall A**
Parallel Session *Chairmen: **M. Gomori, C. Hoffman***

09:30-09:39 Advanced volumetric imaging as an everyday auxiliary tool for the evaluation of nervous system tumors
L. Ben-Sira, D. Ben-Bashat, S. Freedman, J. Roth, M. Mauda Hvakuk, L. Ravid, L. Pratt, L. Weizman, L. Joskowicz, S. Constantini, B.Shofty
Sourasky Medical Center, Tel-Aviv, Israel

09:39-09:48 Four dimensional CT for localization of occult parathyroid adenomas in 20 patients with primary hyperparathyroidism
A. R. Zeina, N. Reindorp, U. Soimu, M. M. Krausz, A. Nachtigal
Hillel Yaffe Medical Center, Hadera, Israel

09:48-09:57 Paired, low and high kv, conventional polychromatic non-enhanced head CT in the same patients - Image quality analysis
N. Caplan, E. Ben-David, S. N. Goldberg, J. Sosna, R. Levinson, I. S. Leichter, J. M. Gomori
Hadassah Hebrew University Medical Center, Jerusalem, Israel

09:57-10:06 Dynamic CTA on neuro-angiography -The Ottawa Hospital experience
R. Glikstein, S. Chakraborty
The Ottawa Hospital, University of Ottawa, Canada

10:06-10:15 Characterization of changes in CT density, at low and high energy, of commonly imaged anatomic structures, in clinical head CT scans and in a phantom
E. Ben David, I. Leichter, R. Levinson, J. Sosna, Y. Levy, S. Goldberg, J. Gomori, E. Al
Hadassah Hebrew University Medical Center, Jerusalem, Israel

10:15-10:24 The clinical significance of ependymal enhancment on presentation in patients with malignant glioma
D. Paz, F. Darawshe, O. Person-Keidar, T. Tzuk-Shina, A. Eran
Rambam Health Care Campus, Haifa, Israel

10:24-10:33 Preliminary results of flow diversion device (Silk Stent) in the treatment of intracranial aneurysms in fifteen subjects: Medium and long term follow up
D. Tampieri, R. La Piana, M. del Pilar Cortes
McGill University, Montreal-QC, Canada

10:33-10:42 Traumatic spine findings in post mortem virtual autopsy
S. Tal, P. Gottlieb, N. Berkovitz
Assaf Harofeh Medical Center, Zerifin, Israel

10:42-10:51 Directional diffusivity compared for differing cervical cord white matter areas in normal and RRMS patients
N. Berkovitz, P. Gottlieb, S. Tal
Assaf Harofeh Medical Center, Zerifin, Israel

10:51-11:00 The value of 99m-tc-sestamibi SPECT/CT in assessment of parathyroid adenoma - What do we need more?
M. Cohenpour, O. Ivchuk, O. Volkov, R. Gold, A. Stefanski, A. Halevy, H. Golan
Assaf Harofeh Medical Center, Zerifin, Israel

09:30-11:00 *Parallel Session* **SESSION 7: INNOVATIONS & INFORMATICS** **Hall B**
*Chairmen: **E. Bar-Meir, E. Konen***

09:30-09:39 Introducing virtopsy into a country religiously opposed to autopsy
N. Berkovitz, M. Vasserman, P. Gottlieb, S. Tal
Assaf Harofeh Medical Center, Zerifin, Israel

09:39-09:48 Evaluation of a novel fully automated software for osteoporosis detection in MDCT scans performed for other indications
E. Blumfield, A. Blumfield, Z. Keidar
Albert Einstein College of Medicine, Bronx, NY, USA

09:48-09:57 Conventional body CT images reconstructed from dual-energy datasets by novel dual-layer spectral detector CT - Analysis of diagnostic quality
M. Gabbai, J. Sosna, S. Mahgerefteh, R. Zimam, I. Leichter
Hadassah Hebrew University Medical Center, Jerusalem, Israel

09:57-10:06 Does retrospective image analysis with spectral detector dual-energy CT have potential added clinical value?
M. Gabbai, I. Leichter, R. Zimam, J. Sosna
Hadassah Hebrew University Medical Center, Jerusalem, Israel

10:06-10:15 Improved image quality of virtual mono-energetic images generated at 120 kVp by a novel Spectral-Detector CT (SDCT) prototype
M. Gabbai, I. Leichter, R. Zimam, J. Sosna
Hadassah Hebrew University Medical Center, Jerusalem, Israel

10:15-10:24 Simultaneous benefits of spectral analysis and automatic dose reduction with spectral Detector CT Technology
I. Leichter, M. Gabbai, Z. Romman, J. Sosna
Hadassah Hebrew University Medical Center, Jerusalem, Israel

10:24-10:33 Design of a patient and structure specific 3D-print treatment planning phantom for radiation therapy of prostate cancer
B. N. Bloch, M. Heyns, K. Buch, K. Breseman, M. Rusu, A. Madabhushi, C.C. Jaffe, C. Lee
Boston Medical Center, Boston, MA, USA

10:33-10:42 Enhancing the toolbox of medical students with basic ultrasound skills using the "Flipped Classroom" approach
G. Dichterman, M. Barzilai, A. Barzilai, M. Flugelman
Carmel Medical center, Haifa, Israel

10:42-10:51 A multi-disciplinary departmental process for shortening the time between ordering of CT and US examinations for ER in hospitalized patients and the availability of written reports
E. Nitay, D. Shaham, L. Applebaum, M. Ben-Lulu, S. Ahmed Akram, N. Greenbaum, S. Roitman, J. Tirosh, A. Sadeh, H. Ganish, N. Caplan, A. Perry, J. Sosna
Hadassah Hebrew University Medical Center, Jerusalem, Israel

10:51-11:00 Communication of radiology reports to patients: Do they understand the results?
N. Shabshin, I. Korek-Abadi, M. Scheyfer-Kravitz, J. Shemer
Assuta Medical Center, Tel-Aviv, Israel

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

11:30-12:00 Missing the radiologic finding and failing to communicate the finding that is detected: The two most common reasons radiologists are sued for malpractice
Guest Lecturer: **L. Berlin MD**, USA

12:00-13:00 **SESSION 8: CARDIAC IMAGING** **Hall A**
Parallel Session *Chairmen: **G. Aviram, T. Gaspar***

12:00-12:09 The accuracy of cardiac MRI in differentiating between Intra cardiac tumor and thrombus
E. Slonimsky, O. Goitein, A. Hamdan, Y. Salem, Y. Eshet, O. Konen, E. Konen
Sheba Medical Center, Tel Hashomer, Israel

12:09-12:18 Coronary lesions: Comparison of coronary CT angiography lesion length and inserted coronary stent length
E. Lotan, P. Fefer, E. Di Segni, A. Hamdan, E. Eshet, E. Konen, S. Matetzky, O. Goitein
Sheba Medical Center, Tel Hashomer, Israel

12:18-12:27 Comparison of LV mass as derived by echocardiography and cardiac CT as a function of age
D. R. Zwas, Y. Stokar, R. Durst, H. Milovanov-Bekker, A. Shauer, D. Shaham, D. Gilon, C. Lotan, D. Leibowitz
Hadassah Hebrew University Medical Center, Jerusalem, Israel

12:27-12:36 Single center randomized controlled study for the evaluation of the cost effectiveness of coronary CT angiograpy in the chest pain unit - Interim analysis
A. Shaur, A. Weiss, D. Shaham, E. Bekker- Milovanov, J. Sosna, C. Lotan, R. Durst, J. Assaf
Hadassah Hebrew University Medical Center, Jerusalem, Israel

12:36-12:45 Cardiac computed tomography for predicting left atrial appendage occluder device size
O. Goitein, A. Grupper, E. Di Segni, A. Hamdan, V. Guetta, I. Hai, D. Luria, M. Glikson, E. Konen
Sheba Medical Center, Tel Hashomer, Israel

12:45-12:54 Cardiac MRI (CMR) for coronory imaging in pediatric patients – Initial experience
Y. Salem, O. Goitein, J. Jacobson, D. Mishali, J. Danieli, U. Katz, D. Almelech, E. Di Segni, T. J. Hegesh, E. Konen
Sheba Medical Center, Tel Hashomer, Israel

12:00-13:00 **SESSION 9: MUSCULOSKELETAL IMAGING** **Hall B**
Parallel Session *Chairmen: **L. Bellaich, G. Fluser***

12:00-12:15 Advanced imaging of the axial skeleton in spondyloarthropathy: New classifications, interpretation and utility
Guest Lecturer: I. Eshed MD, Israel

12:15-12:24 The blind spot of the hip MR arthrography: Ligamentum teres injury
Y. Freedman, N. Shabshin, Y.Beer, D. Morgenstern
Assuta Medical Center, Tel-Aviv, Israel

12:24-12:33 Atypical femoral fractures-radiological evaluation and biphosphonate exposure: A two center experience
L. Tripto Shkolnik, E. Segal, A. Jaffe, S. Ish-Shalom, R. Bachrach, A. Nachtigal, D. Militianu
Hillel Yaffe Medical Center, Hadera, Israel

12:33-12:42 Atypical femoral fractures - Thick cortex hypothesis challenged
L. Tripto Shkolnik, A. Jaffe, R. Bachrach, A. Nachtigal
Hillel Yaffe Medical Center, Hadera, Israel

12:42-12:51 Is contrast material needed for reliable MRI scoring of synovitis of the hand in patients with rheumatoid arthritis? A systematic comparison at four different MRI field strengths
I. Eshed , S. Krabbe, M. Qstergaard, P. Bøyesen, J. M. Müller, F. Therkildsen, O. Rintek Madsen, M. Axelsen, S. Juhl Pedersen
Sheba Medical Center, Tel-Hashomer, Israel

13:00-13:30 **Michal Meidan Award Ceremony, Closing Remarks**

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

ABSTRACTS

ULTRASOUND SURVEILLANCE OF HEPATOCELLULAR CARCINOMA IN ISRAEL

L. Appelbaum[(1)], I. Levy[(2)], T.Nesher[(2)], Y. Ashur[(2)], D. Shouval[(2)], R. Safadi[(2)], O. Shibolet[(3)]

[(1)]Radiology Department, Hadassah-Hebrew University Medical Center,
[(2)]Liver Unit, Department of Gastroenterology, Hadassah-Hebrew University Medical Center, Jerusalem, Israel,
[(3)]Liver Unit, Department of Gastroenterology, Tel-Aviv Medical Center, Israel

Background: Recent AASLD and EASL guidelines for surveillance of hepatocellular carcinoma (HCC) endorse the use of ultrasound as a sole modality for follow-up of chronic hepatitis and cirrhotic patients for early diagnosis of HCC. Alfa fetoprotein (AFP) is no longer considered by these guidelines as a screening tool. Patients are supposed to undergo liver ultrasound every 6 months. However, most HCC patient in Israel are diagnosed sporadically and not as a part of surveillance program and are thus diagnosed at a late stage of disease.

Aims: To evaluate the utilization of surveillance guidelines among HCC patients in Israel and the additive value of AFP in the diagnosis of HCC.

Materials and Methods: A prospective analysis of a common HCC database in two liver centers in Israel established in June 2011.

Results: One hundred twenty four consecutive HCC patients diagnosed between June 2011 to March 2013 were included. Mean age was 67.0±11, 90 patients were males (76%). Etiology of HCC was HCV 56%, NASH 24%, Alcohol 15%, HBV 11%, and Cryptogenic 4%. Child Pugh stage A/B/C was 72%, 20%, 8% respectively. AFP 0-20/ 21-200/ >200ng/ml were in 53%, 21%, and 26% of the patients respectively. Tumor within Milan criteria were in 56 patients (45%). Only 47 patients (38%) were diagnosed while on a surveillance program, 24 of them (51%) were within Milan criteria compare to 77 patients diagnosed sporadically, of which 20(26%) were within Milan criteria ($p<0.0xxx$). Surveillance rate were 11% , 30% and 43% in alcohol , fatty liver and HCV patients respectively. AFP triggered the diagnosis in 16/124 patients (13%), AFP triggered the diagnosis mainly in patients under surveillance: 11 of 47 patients (23%).

Conclusions: Ultrasound surveillance of HCC in this cohort was unsatisfied, performed in only 38% of the cohort. Sixty eight patients (55%) were diagnosed late and beyond the Milan criteria. AFP triggered the diagnosis in 23% of the patients under surveillance suggesting that there is a role for the use of AFP in the screening for HCC in Israel.

PREVALENCE OF HEPATIC STEATOSIS IDENTIFIED ON UNENHANCED LOW-DOSE COMPUTED TOMOGRAPHY IN ADULTS SUSPECTED OF UROLITHIASIS

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Purpose: To investigate the prevalence of hepatic steatosis (HS) on low-dose unenhanced CT in adult patients with clinical symptoms of renal colic and correlation of HS with clinical risk factors and urolithiasis.

Materials and Methods: 147 low-dose unenhanced abdominal CT scans, performed in our department between 1/2010 and 4/2010 for patients with symptoms of renal colic were retrospectively analyzed by two radiologists independently. 65% of patients were male; patients ranged in age from 18-84 (average 46.0±15.1). We did not include the patients with known chronic hepatic disease, alcohol abuse, or oncology patients.
All studies were performed on 64-MDCT scanners (Philips). CT attenuation values in Hounsfield units were measured on a single selected image using a standard region of interest, and including three measurements for the liver and two for the spleen. Liver attenuation ≤40 HU was used as threshold criterion for HS, a number which has been shown to be the most accurate for moderate-to-severe disease. Liver- to-spleen ratio (L/S) ≤ 1 was measured as addition criterion for HS, and was compared with mean liver attenuation. Clinical and laboratory data were recorded, including age, sex, history of diabetes mellitus and hyperlipidemia; laboratory evaluations included cholesterol, triglyceride, HDL, LDL. Patients with HS were compared with non-HS group on the basis of demographic and clinical risk factors and for presence of urolithiasis.

Results: Mean liver attenuation was 51.9±10.3 (SD) HU. Mean spleen attenuation was 47.0±3.8 (SD) HU. The prevalence of moderate-to-severe HS was 12.9 % (19/147), Liver- to-spleen ratio (L/S) ≤ 1 in this group was 94.7 %. Liver-to-spleen ratio ≤1 in non-HS group was 14.1 %. Within the HS group there were 84% males (one-sided chi-square test p=0.04). The prevalence of urolithiasis in all the studies was 70.7 %. The prevalence of urolithiasis in HS group was 71.1 % and in non-HS group 68.4 %. No statistical correlation was shown between HS and urolithiasis.
There was no statistical difference in presence of HS and diabetes mellitus or history of dyslipidemia. Statistical significance was found between abnormally high triglyceride level and HS (Fisher's exact test p=0.04).

Conclusions: Detection of hepatic steatosis is clinically important as a potential condition that can progress to chronic liver disease. Wide use of low-dose unenhanced CT for diagnose of urolithiasis provides an opportunity to diagnose hepatic steatosis in the general population. The prevalence of moderate-to-severe HS on low-dose unenhanced CT for adults with symptoms of renal colic was 12.9 %.

ADVANCED 3D CT IMAGE ANALYSIS OF CHRONIC LIVER DISEASE: SPLENIC AND SEGMENTAL LIVER RATIOS CORRELATE WITH THE STAGE OF HEPATIC FIBROSIS IN HEPATITIS C PATIENTS

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Purpose: To develop a multiparametric model to stage liver fibrosis, by using standard CT images and 3D volumetric software. To explore a correlation between hepatic lobe and splenic volumes and the stage of liver fibrosis in patients with hepatitis C virus (HCV) infection.

Materials and Methods: Seventy-eight consecutively enrolled HCV patients underwent liver stiffness evaluation by elastography (SuperSonic), between April 2012 and March 2013. We have identified three patient groups. Group 1 had liver fibrosis stage F0-F3[N=55], while groups 2 and 3 had cirrhosis [F4] classified with Child-Pugh scoring as either compensated [Group 2, N=19] or decompensated [Group 3, N=23]. We then, retrospectively, retrieved data from all patients groups 1, 2, and 3 [N=5, 7, and 7 so far, respectively] to assess the proportion of the hepatic left lateral segment volume (LSV) and caudate lobe volume (CLV) to the total liver volume (TLV) and the splenic volume (SV). We calculated our volumetric data using portal venous phase 5 mm reconstruction slices and semi-automated liver segmentation software (Liver™, Philips Corporation, Einthoven, NL).

Results: From the initial 19 patients analyzed so far, we found a statistically significant positive correlation between CLV/TLV ratio and the hepatic fibrosis stage. The CLV/TLV ratio increased from 1.8±0.3 in group 1 to 3.9±1.1 in group 3 ($P<0.001$) and from 1.9±0.3 in group 2 to 3.9±1.1 in group 3 ($P<0.001$), but the CLV/TLV ratio did not change significantly in groups 1 & 2. LSV/TLV ratio and SV were not found to have statistically significant association with the hepatic fibrosis stage, though numerically they have presented with higher average values with increasing fibrosis stage (1<2<3).

Conclusions: Our preliminary results suggest that CLV/TLV ratio can be associated to the stage of liver fibrosis in patients with HCV liver disease. CLV/TLV is a promising non-invasive method for detection of cirrhosis and hepatic decompensation in patients with HCV infection. This technique uses the subtle liver changes to assess the stage of liver fibrosis. Further work in liver and splenic characteristics, and 3D modeling, is needed to better realize the value of our measurements in liver disease staging.

THE POSTOPERATIVE ANATOMY AND COMPLICATIONS OF LAPAROSCOPIC SLEEVE GASTRECTOMY WITH EMPHASIS ON MDCT

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Purpose: In the last few years LSG has become one of most popular bariatric surgeries performed.
To our knowledge, only few data exists in the radiologic literature regarding the spectrum of postoperative anatomical changes and post-operative complications, with emphasis on computed tomography findings . Thus, the aim of this study is to systematically assess the spectrum of CT findings in the post-operative period and to determine it's clinical significance.

Materials and Methods: A total of 84 abdominal CT scans of 50 patients were retrospectively reviewed in consensus by two senior abdominal radiologists, blinded to clinical data. These patients performed a CT scan due to suspected postoperative complications during the years 2010-2012.
The CT scans were reviewed with regard to post-operative day, scan technique and CT guided procedures performed. Pattern and locations of major complications such as contrast leak, abscesse, hematoma and splenic infarct were assesed. In addition we evaluated the feasibility of percutaneous drainage versus conservative or surgical treatment in all patients diagnosed as suspected staple line leak and abscess.

Results: Six of the 50 patients (12%) had a contrast leak depicted on post operative CT. All of the contrast leaks depicted were in a superior posterior location relative to the staple line.
A total of 14 out of the 50 patients (28%) had an abscess depicted. Of the 14 patients who had a post operative abscess, 9 (64%) were negative for a post operative leak.
The most common location for a post operative abscess was adjacent to the superior staple line (9 of 14, 64%). 4 of the 14 patients with abscess (28%) were percutaneously drained under CT guidance.
Sixteen of the 50 patients (32%) had a postoperative hematoma depicted on CT. The most common hematoma locations were perisplenic and near the gastrosplenic ligament.
Eleven of the 50 patients (22%) had a post operative splenic infarct. All of the splenic infarcts depicted except one (90%) were in a superior posterior location.
Twenty of the 50 patients (40%) had a pleural effusion depicted on post operative scans.

Conclusions: Our retrospective study identifies the common radiological patterns of the major postoperative complication following sleeve gastrectomy. Radiologists should be familiar with the normal postoperative anatomy and possible complications of this common procedure.

COST-BENEFIT ANALYSIS OF ROUTINE UGI CONTRAST STUDIES AFTER SLEEVE GASTRECTOMY

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Background: Sleeve gastrectomy has become an increasingly popular bariatric procedure for the treatment of severe obesity due to its simplicity, decreased long term complications and comparable effectiveness to gastric bypass. Major complications are staple line leak and obstruction. Controversy exists regarding the usefulness of UGI studies at the first postoperative day in a pursuit for possible complications.

Purpose: To determine the cost-benefit of routine UGI contrast swallow on the first day following sleeve gastrectomy.

Materials and Methods: We retrospectively reviewed the hospital's records to identify patients who underwent sleeve gastrectomy between 1.1.2012 and 1.6.2013. Invariably all these patients had Iodine based contrast swallow study at first postoperative day. Reports from all imaging studies and medical files were retrospectively reviewed, and complications were recorded. The Institutional Review Board waived the requirement for informed consent.

Results: A total of 722 patients met inclusion criteria (237 males, 485 females; mean age 41 years, range 14-70). Mean BMI was 43 kg/cm2 (range 25-70). 721 out of 722 POD studies were normal. The total cost of these examinations was 180,500 $. There were complications in five patients (complication rate 0.7%). In one patient, a new hiatal hernia occurred during the operation with incarceration and obstruction, which was revealed on the UGI study 1 day after surgery. Four cases of leak were apparent on postoperative days 5,7,23, and 90. In these four patients, UGI performed 1 day after surgery was normal; repeat examinations were performed due to clinical signs suggesting a complication.

Conclusions: Performing routine UGI contrast studies 1 day after sleeve gastrectomy is clearly not cost-benefit. UGI contrast studies are not efficient to screen for suture line leaks, and should be performed only when there is clinical suspicion for a complication.

RLQ ABDOMINAL ABSCESS IN WOMEN – THE FEASIBILITY OF CT FOR DIFFERENTIATING TUBO-OVARIAN VERSUS APPENDICULAR ORIGIN

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Purpose: To investigate which abdominal CT findings can differentiate between right tubo-ovarian abscess (TOA) and periappendicular abscess (PAA).

Materials and Methods: We retrospectively reviewed abdominal CT examinations and medical records of 91 women diagnosed with PAA (58, 64%) or right TOA (33, 36%). Presenting symptoms and CT signs were recorded. Descriptive statistics were used to analyze the results.

Results: Mean age was 46 years (range 18–89) in the PAA group and 37 years (range 21–54) for the TOA group. Clinical symptoms and signs including fever, gastrointestinal symptoms, abdominal pain, peritoneal signs and leukocytosis occurred with similar frequency in the groups; however, pain on cervical motion was significantly more common in the TOA group ($P<0.0001$). Location of pain was RLQ in 59% of women with PAA, while it was diffuse in 47% of those with TOA. Mean diameter and wall thickness were similar in both groups. Internal gas was seen only in women with PAA (33%). Signs that were more common in women with PAA included arrowhead sign (90% vs 6%) mesenteric lymphadenopathy (84% vs 33%), small bowel wall thickening (55% vs 21%), fluid in the right paracolic gutter (50% vs 18%), and cecal wall thickening (48% vs 9%). In contrast signs more often seen in women with TOA were contralateral fat effacement (58% vs 12%) and pelvic fluid (64% vs 31%). The lesion was located anterior to the mesoovarium in 84% of PAA group and posterior in 76% of TOA group. In all cases of TOA the right ovarian vein could be followed entering the lesion.

Conclusions: Distinct CT features can increase diagnostic certainty regarding the origin of RLQ abscess in young women.

CORRELATION BETWEEN DIFFUSION-WEIGHTED IMAGING AND WALL ENHANCEMENT MR IN ROUTINE EVALUATION OF PATIENTS WITH ILEAL CROHN'S DISEASE

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Purpose: In the acute setting, patients with ileal Crohn's disease have been described to have pathological wall enhancement and restriction in diffusion (measured by a decrease in affinity diffusion coefficient (ADC)). We assessed whether the association was retained in the non acute setting and if there is any correlation between these two parameters.

Materials and Methods: Twenty five patients (13M, 12F), aged 11-67 years (mean 28.6 ±15.9) with active known Crohn's disease (per reference and laboratory test) were scanned on a 1.5T MR system (Siemens MAGNETOM Aera) between 01/2012 and 05/2013. The scans were retrospectively reviewed. There was a mean time gap of 2.2 months (0.1-8.6 months) between the examination request and the performance of the MR, during which patients were under treatment. On MR, ileal involvement was defined by one or more of the above: wall thickening (>3mm), wall edema, ulcers, a stenotic segment, comb sign and regional mesenteric lymph nodes (average 4.5 findings per patient, all had wall thickening). Enhancement of the involved ileal wall was compared with muscle enhancement (pectoralis) as a control. Quantitative restriction of diffusion (ADC) was measured in the involved ileal wall. Each patient served as their own control with wall enhancement and ADC values measured in a remote ileal loop with no signs of disease involvement. The diffusion and enhancement data were examined for correlation (Pearson correlation coefficient).

Results: All patients had ileal loop involvement. Mean wall enhancement was 324.2 enhancement units (EU) in involved ileal loop, 230.8 EU in control ileal loop and 130.9 EU in muscle. Wall enhancement in the involved ileum was 1.43 times higher on average than in the normal ileum (corrected with muscle enhancement) ($p<0.01$). Mean ADC value was 0.93 X 10-3 mm2/sec and 2.41 X 10-3 mm2/sec in involved and control ileum, respectively ($p<0.001$). Correlation between pathological wall enhancement and ADC was not shown ($r=0.11$, $p=0.61$).

Conclusions: In Crohn's disease, when the patient is not in the acute setting, there is a significant association with both increase in wall enhancement and decrease in ADC values. However, no correlation was found between these parameters.

CT UROGRAPHY READING BY A COMMUNITY RADIOLOGIST VERSUS AN URORADIOLOGIST COMPARED WITH NEPHROURETEROSCOPY FINDINGS IN UPPER TRACT TRANSITIONAL CELL CARCINOMA SUSPICION

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Background: Multidetector CT urography (CTU) is the customary diagnostic imaging in patients suspected to have upper urinary tract urothelial carcinoma. Major surgical decisions are based on the reported findings. Uretero-nephroscopy can serve as an additive diagnostic tool. Contemporary urological literature considers endoscopy as a non-mandatory procedure. Our aim was to compare between CTU findings reviewed by a community radiologist, by an uroradiologist and findings at diagnostic nephroureteroscopy, in upper tract transitional cell carcinoma (TCC) suspicion.

Materials and Methods: Recruited retrospectively were patients with clinically suspected upper tract TCC during 2004-2011 that underwent CTU and diagnostic nephroureteroscopy. CTU was performed on 16 or 64 MDCT units. Images were reviewed originally by community radiologists and separately by a single uroradiologist (blinded to all clinical data and original report) for tumor suspicion, location and size. Nephroureteroscopy was performed by a single endourologist. CTU readings were compared to endoscopic findings.

Results: 34 patients were included (mean age 61±11.8 years). Average follow up period was 31 months. Comparison of CTU original reports and endoscopic findings showed major discrepancies in 16 patients (47%). In 14 patients (41%) radiologists suspected tumor that was not found at nephroureteroscopy. In 2 patients (6%) original reports missed tumors. Comparing uroradiologist's reading to endoscopic findings showed major discrepancies only in 6 patients (18%). No tumor was missed.

Conclusions: CTU must be reviewed by a dedicated radiologist to substantially reduce discrepancies with endoscopic findings. Radiologists must be familiar with pitfalls in the interpretation of CTU findings. Nephroureteroscopy should be considered in equivocal cases.

STERCORAL COLITIS (SC) A LETHAL DISEASE- CT FINDINGS AND CLINICAL CHARACTERISTICS

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Purpose: To describe the imaging findings of SC, to accentuate the importance of their prompt recognition, their clear description, and proper communication with the clinician to this potentially fatal entity.

Materials and Methods: A retrospective study. 13 patients with SC were recruited. Demogarphic, clinical and laboratory data, operation room records, pathological reports were obtained and reviewed. Abdominal radiographs were reviewed for the location of fecal impaction, the site of the distended colon and for abnormal gas. CT scans were reviewed for SC features including, location of fecal impaction, colon wall thickening (>3 mm), mucosal sloughing, pericolonic stranding, proximal colon dilatation (left colon >6 cm), mesenteric hyperemia, extra luminal gas, and peri-colonic fluid.A senior pathologist reviewed pathologic specimens macroscopic and microscopic conclusions were given.

Results: 8 women (62%), 5 men (38%) median age 66y.o were included in the study. Most common presentation was abdominal pain, distension and intestinal obstruction. 11 patients (85%) had signs of acute inflammation, 5 patients (38%) presented with septic shock. Imaging findings included: severe colonic distention pronounced in the site containing large amount of fecal material. The most distended part was the rectum (5 patients). The median diameter of the distended portion was 9.1 cm (range 6-19 cm). Colonic wall thickening was demonstrated in 9 patients (75%). Pericolonic fat stranding was encountered in all patients. Mesenteric hyperemia was evident in 7 patients (58%) mostly adjacent to the impacted site. Free peritoneal air in 2 patients (17%), pneumatosisintestinalis in 2 patients (17%) and pericolonic fluid in 2 patients (17%). Pathology demonstrated hemorrhagic mucosal layer necrosis, colonic wall thinning and transmural necrosis.7/13 patients died (46%).

Conclusions: A large fecalomatous mass and distension of the colon, wall thickening and pericolonic fat stranding are most suggestive signs of SC. Proper description of the tomographic findings as well as close communication with the clinician, are of major importance due to the potentially devastating consequences of SC. The radiologist and the surgeon must be aware of this potentially severe complication caused by fecal impaction.

THE ACCURACY OF A NOVEL SOFTWARE FOR AUTOMATED ANALYSIS OF THE VOLUMES OF THE CARDIAC CHAMBERS ON CT PULMONARY ANGIOGRAPHY

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Purpose: Currently measurements of the ratio between the diameters of the right and left ventricles is one of the methods in use for the assessment of right ventricular dysfunction in patients diagnosed with pulmonary embolism (PE) by CT pulmonary angiography (CTPA). Volumetric analysis of the cardiac chambers might be superior to 2D assessment. Our aim was to investigate the accuracy of a new software for automated analysis of the volume of the cardiac chambers in non-gated CTPA studies.

Materials and Methods: We retrospectively analyzed a series of 95 non-gated CTPA studies performed for suspected PE (n=57 with PE; n=38 negative for PE) using a new software (Cardiac Analysis, Extended Brilliance Workspace, research version, Philips Healthcare, Cleveland, OH, USA) which automatically segments all cardiac chambers and provides their volume. The software allows simultaneous viewing of the segmentation results superimposed on the original images in various views. In order to validate the correctness of the segmentation, each chamber was evaluated by two radiologists in consensus, for conformity to cardiac anatomy. The results were scored as: 1- perfect, 2- good (up to 10% of the chamber's volume was inaccurately segmented), or 3- failed (more than 10% inaccurate). For chambers with good automatic segmentation, we used manual corrections with the software's tools. In order to evaluate the reproducibility of the software, we reloaded 40 consecutive studies at a later date and compared the two sets of measurements.

Results: The results were perfect in 48 (50%), good in 38 (40%) and failed in 9 (10%) of the studies. After excluding the failed cases, the mean (SD) volumes obtained were: right ventricle 102 (34) ml, right atrium 78 (33) ml, left ventricle 60 (21) ml and left atrium 74 (25) ml. Percentage of median (IQR 25-75) and range in ml of manual corrections were: right ventricle 0 (0-0), 2-4.6; right atrium 1.3 (0-2.9), 4-11; left ventricle 0.6 (0-3.8), 3-11; left atrium 0 (0-0), 0.2-3.3. Assessment of the reproducibility of the automatic volumetric measurements revealed no difference between the two sets of measurements.

Conclusions: The performance of the new software for volumetric analysis of the cardiac chambers is perfect or good in 90% of CTPA studies. Large scale studies are required to determine its role in risk stratification of patients with acute PE.

DECREASED LEFT ATRIAL VOLUME PREDICTS HIGHER MORTALITY IN PATIENTS WITH ACUTE PULMONARY EMBOLISM

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Purpose: Right heart failure is the most important cause of mortality in acute pulmonary embolism (PE), currently evaluated by echocardiography. The role of CT pulmonary angiography (CTPA) for risk stratification in acute PE is still under evaluation. The goal of our study was to investigate the association between the volumes of the right and left cardiac ventricles and atria with adverse prognosis using the CTPA data.

Materials and Methods: We retrospectively analyzed 450 consecutive patients diagnosed with acute PE by CTPA between 1.1.2009-31.12.2010. Each CTPA was investigated by measuring the right ventricular (RV) and left ventricular (LV) diameters on 4-chamber reconstruction, and was assessed using a novel volumetric analysis software which segments all cardiac chambers from non-gated CTPA images, and provides the volumes of the RV, LV, right atrium(RA) and left atrium (LA) automatically. The association between the diameters and volumes of the cardiac chambers to adverse outcome which was expressed by mortality in 30 days, was analyzed. All analyses were adjusted to age, gender, and co-morbidity index.

Results: Seventy nine (17.5%) patients were excluded: 47 (10.4%) due to unsatisfactory segmentation, 7 (1.6%) due to scan inadequacy, and 25 (5.6%) due to severe pre existing conditions associated with compression of any cardiac structure or the major pulmonary arteries. Out of 371 patients which were included in the final study group, 39 (10.5%) died within 30 days. Mortality was significantly associated with reduced LA volumes (odds ratio =1.49 (CI 1.09-2.04, P=0.016 for 20 ml decrease)) and higher ratios between the volumes of RA/LA (odds ratio =1.91 (CI 1.06-3.5, P=0.031)). No significant association was found between mortality and the ratio of the RV/LV diameters, RV, LV and RA volume measurements, age and gender.
CHAID (CHi-squared Automatic Interaction Detection) analysis of the influence of various measurements on mortality showed that RA/LA volume ratio had the best value for poor outcome prediction, with a mortality of 19.8% for the 111 patients with the RA/LA volume ratio ≥ 1.315 and of 6.5% among the 260 patients with RA/LA volume ratio < 1.315 (P=0.003).

Conclusions: RA/LA volume ratio >1.3 is associated with higher mortality at 30 days. Volumetric analysis of the heart using CTPA data may be useful for risk assessment in patients with acute PE. Since it is done immediately following PE diagnosis by CTPA, it may allow faster risk stratification of these patients who carry large spectrum of outcomes.

CHEST RADIOGRAPHY AS A GATE KEEPER TO PREVENT STAFF AND INPATIENTS EXPOSURE TO TUBERCULOSIS (TB) RELATED TO MIGRANTS FROM HIGH INCIDENCE COUNTRIES

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Purpose: In 2011-12, an estimated 70,000 East African migrants settled in Tel Aviv. A dramatic increase in the incidence of new TB cases in our institution followed, from 8 to 23 cases/105 hospital days, resulting in several large-scale nosocomial exposures to TB from allegedly asymptomatic patients with active TB. We intervened to protect hospitalized patients and staff from accidental exposures to TB.

Materials and Methods: In order to detect active pulmonary TB, chest radiographs (CR) were performed to all patients with high risk for TB presenting for various medical conditions to our medical center in the period of July2012-Jan 2013. This population was defined as persons without medical insurance nor past medical records, who arrived from high incidence countries for TB, expected to be hospitalized for >24 hours. CRs were immediately categorized as low probability or possible active TB. Patients with possible TB were immediately placed in airborne isolation and evaluated accordingly.

Results: 1260 CRs were performed during the intervention period to the target population. One hundred nineteen of them (9.4%), performed in 116 patients, were categorized as possible active TB based on the radiography findings, 83 of them were fully evaluated. Pulmonary TB was confirmed in 22 (26%) patients. Importantly, five of them showed no respiratory symptoms. During the pre-intervention period (Jan-June 2012) 7 patients in the target population contributed a total of 73 days in which they had active TB and were not isolated, thus putting other patients and staff at risk of exposure to TB, whereas during the intervention period, only one patient contributed 12 days in which he had active TB and was not isolated.

Conclusions: Detection of possible active TB among high-risk populations by CR performed upon admission is an effective tool for reducing in-hospital exposure. The fact that a significant minority of positive TB patients had no respiratory symptoms, highlights the need for such screening, since without this intervention, their diagnosis would have been delayed.

AORTIC AND PULMONARY ARTERY ENHANCEMENT AT A ROUTINE CHEST MRI: CAN IT BE DONE?

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Purpose: To measure the enhancement pattern of the aorta (AO) and the pulmonary artery (PA) at 3 different points in time (35, 70 and 100 sec) and to verify if they maintain a high level of enhancement.

Materials and Methods: Twenty Seven patients (18M, 9F), aged 21-91 years (mean 59 ±15), were scanned on a 1.5T MR system (Siemens MAGNETOM Aera) between 1/2011 and 5/2013. Patients were referred for neoplastic investigation (N=24), myasthenia gravis (N=2) and ectopic parathyroid adenoma (N=1). We retrospectively examined the pre and post Dotarem (35, 70 and 100 sec) 3D T1 fat saturated GRE scan (VIBE) in consensus by two readers. Dotarem was injected with a dose of 0.2 ml/kg (0.1mmol/kg) at rate of 2 ml/second. Enhancement units (EU) were measured with ROI in the ascending aorta and the main pulmonary artery. The ratio of enhancement post vs. pre Dotarem was calculated. For all time points, an enhancement rate of an additional 300% for the aorta and 200% for the pulmonary artery in comparison to pre-Dotarem EU was accepted as a high level of enhancement. As an additional test, to control for background noise, each EU of the vessel was divided by EU of muscle (pectoralis) at that point in time and compared to pre-enhancement ratio to muscle.

Results: From pre-enhancement AO (73EU) and PA (80EU), to post injection 35sec (AO=412 EU, PA=323 EU), 70sec (AO=357EU, PA=307 EU) and 100sec (AO=301EU, PA=244 EU), enhancement was shown to remain high during that time. The ratio of additional enhancement compared to pre-enhancement EU was 4.71, 3.99, 3.24 for the aorta and 3.65, 3.37, 2.52 for the pulmonary artery (35, 70 and 100 seconds, respectively, all $p<0.01$). The aorta and pulmonary artery enhancement, adjusted to muscle EU, was statistically significant, for aorta 5.04, 4.02 and 3.39 and for pulmonary artery 4.09, 3.49 and 2.80 (35, 70 and 100 seconds, all $p<0.01$).

Conclusions: Significant enhancement of the aorta and pulmonary artery post-Dotarem injection was retained for at least 100 seconds. During that time numerous scans are possible with a high ratio of enhancement of these arteries.

INCREASED EPICARDIAL ADIPOSE TISSUE THICKNESS AS A PREDICTOR OF HYPERTENSION: A CROSS-SECTIONAL OBSERVATIONAL STUDY

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Purpose: To determine if epicardial adipose tissue thickness, a new cardiometabolic risk factor, is associated with essential hypertension.

Materials and Methods: The sample included 127 asymptomatic patients with one or more cardiovascular risk factors consecutively referred for cardiac computed tomography angiography. Findings were collected prospectively and compared between the hypertensive (n=39) and normotensive (n=88) patients.

Results: The hypertensive group had a significantly higher mean epicardial adipose tissue thickness than the normotensive group (2.81±1.6 vs. 2.07±1.43 mm; p=0.011) and a significantly higher mean coronary-artery calcium score (316.8±512.6 vs. 108.73±215, p=0.0257). On receiver characteristic curve analysis, epicardial adipose tissue thickness ≥2.4 mm predicted the presence of hypertension with sensitivity 86.5%, specificity 59.5%, positive predictive value 48.5%, and negative predictive value 90.9%. The odds ratio for a patient with tissue thickness ≥2.4 mm having hypertension was 1.396 (95%CI 1.033-1.922). Factors independently associated with hypertension were body mass index (OR 1.297, 95% CI 1.043 - 1.613), low-density lipoprotein level (OR 0.985, 95%CI 0.972-0.998) and age (>50 years>; OR 3.901, 95%CI 1.184-12.852). A model score was developed using the logistic regression coefficients for calculation of individual risk.

Conclusions: Hypertensive patients have significantly higher-than-normal epicardial adipose tissue thickness on coronary computed tomography angiography. Thickness ≥2.4 mm is predictive of hypertension and an associated increase in calcium score. Epicardial adipose tissue thickness may serve as a risk indicator of hypertension and cardiovascular morbidity.

COMPARISON OF VENTILATION/PERFUSION ASSESSED BY SPECT/CT AND FUNCTIONAL CT IN PATIENTS WITH PULMONARY EMPHYSEMA

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Purpose: Endobronchial valve placement (EVP) is a new treatment option for patients with pulmonary emphysema (PE). Imaging of lung function is desired to evaluate the least functional lung areas. The aim of this study was to investigate associations of ventilation/perfusion single photon emission computed tomography-computed tomography (V/P SPECT/CT) and functional computed tomography (fCT) in patients with PE.

Materials and Methods: Nineteen patients (11 men, 7 women; median age: 68.6 years) with PE and COPD (GOLD III/IV) were evaluated by standardized V/P SPECT/CT (Tracer: T99m MAA and Tc99m Aerosol) and fCT for EVP. Software based analyzing system (SBAS) was used to assess counts per lung lobe (CpLO) and volume per lung lobe (VpL). Counts density per lobe (CDpLO=CpL/VpLO) and a ratio CpLO/counts per lung (RCDpL) were calculated. fCT was used to assess differences of lobe volume (LOV), lung volume (LUV) and a ratio difference of lobe emphysema (LOE)/lung emphysema (LUE) (=RLOE/LUE) of lung emphysema in inspiration and expiration. Intermethod variability and association was analyzed using Spearman`s Rho correlation coefficient. Descriptive parameters of lobe based analysis are given as mean (range).

Results: Comparing V/SPECT/CT to fCT parameters yielded correlation coefficients for the volume ratio vs. count density ratio of 0.05. (-0.24 - 0.29) and for the emphysema ratio vs. count density ratio of -0.07 (-0.28 – 0.13). All correlations were not significant ($p>0.05$). Comparing P/SPECT/CT to fCT parameters yielded correlation coefficients for the volume ratio vs. count density ratio of 0.23 (0.02 - 0.44) and for the emphysema ratio vs. count density ratio of -0.02 (-0.27 - 0.23). All correlations were not significant ($p>0.05$).

Conclusions: There was no significant correlation between fCT and V/P SPECT/CT parameters in patients with PE. For planning of endobronchial valve placement it should be considered that fCT and V/P SPECT/CT give no comparable functional information of sPE.

IMAGING OF PULMONARY EMPHYSEMA: DO PULMONARY FUNCTION TESTS CORRESPOND WITH CT PULMONARY VOLUME AND EMPHYSEMA QUANTITATIVE ANALYSIS?

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Purpose: FEV1% is defined as the ratio of forced expiratory volume in one second (FEV1) and forced vital capacity (FVC). FEV1% is the most important clinical parameter in the evaluation of pulmonary obstructive disease and pulmonary emphysema. The aim of this study was to assess correlations between pathologic FEV1% and parameters of quantitative volumetric CT analysis in COPD (chronic obstructive pulmonary disease) patients with pulmonary emphysema.

Materials and Methods: Inspiratory and expiratory CTs with identical scanning parameters (120 kV, 100 mA) of 33 patients with confirmed COPD GOLD IV(Global Initiative for Chronic Obstructive Lung Disease) and pulmonary emphysema were evaluated with quantitative analysis of lung parenchyma. We performed computerized detection of total lung volume and proportionate emphysema. The used software MeVisPULMO3D (v3.42, Fraunhofer MEVIS, Bremen, Germany) is able to detect lung areas with a physical density below -950 HU and determine the ratio of normal and emphysematous lung parenchyma (i.e. emphysema score). Relative differences of lung volumes and emphysema scores were calculated between inspiratory and expiratory CT. A Student's t-test was performed to prove the hypothesis that small differences between both quantitative CT parameters correlate with lower results for FEV1%.

Results: The results for FEV1% ranged from 12.0 to 42.0% (mean 26.50%) of the estimated value. Lung volume in expiratory CT scans ranged from 67.38 to 99.71% (mean 15.62%) of the inspiratory CT lung volume. There is a strong statistical correlation of low results for FEV1% and low differences of lung volume in inspiration and expiration ($p < .005$).
Emphysema scores ranged from 11.7 to 51.6% (mean 28.74%) in inspiratory CT and 7.7 to 43.7% (mean 23.12%) in expiratory CT. The relative difference of emphysema score between inspiratory and expiratory CT ranged from +11.94 to -45.21% (mean -20.95%). There is no statistical correlation of low FEV1% values and singular inspiratory or expiratory CT emphysema score (inspiration: $p = .404$, expiration: $p = .209$). A strong statistical correlation was found for low FEV1% and low relative differences of emphysema scores ($p = .026$).

Conclusions: Small relative differences of lung volumes and emphysema scores between inspiratory and expiratory CT show a statistically significant correlation with low FEV1% in COPD GOLD IV patients with pulmonary emphysema. There is no significant correlation of FEV1% and lung volume / emphysema score measured from inspiratory or expiratory CT only.

EVALUATION OF SOFTWARE BASED ANALYZING OF VENTILATION/PERFUSION SPECT/CT IN PATIENTS WITH PULMONARY EMPHYSEMA

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Purpose: New software based analyzing systems (SBAS) are available for ventilation/perfusion (V/P) SPECT/CT. Purpose of this study was to evaluate reproducibility of SBAS for V/P SPECT/CT in patients with pulmonary emphysema (PE) and to compare it to visual interpretation (VI) of V/P SPECT/CT.

Materials and Methods: Twenty-one patients (12 female, 9 male; median age: 69) with clinically confirmed PE and COPD (GOLD IV) were scanned with V/P SPECT/CT. Data was analyzed by two independent observers using SBAS and VI,. SBAS was used to assess counts per lung lobe (CpL) and volume per lung lobe (VpL). Counts density per lobe (CDpL=CpL/VpL) and a ratio CpL/counts per lung (RCDpL) were calculated. VI was performed using a 100 point scale to assess mean counts per lung lobe. Interobserver variability and association for SBAS and VI were analyzed using Spearman's Rho correlation coefficient. Analysis was performed lobe based and descriptive parameters are given as mean (range).

Results: SBAS yielded excellent lobe based correlation between both observers (all; $p < 0.05$): CpL [perfusion: 0.96 (0.91 - 0.99); ventilation: 0.03 (0.73 - 0.99)], CDpL [perfusion: 0.96 (0.87 - 0.99); ventilation: 0.92 (0.72 - 0.99)]; RCDpL [perfusion: 0.97 (0.93 - 0.995); ventilation: 0.91 (0.74 - 0.99)].
Correlation of VI was modest to good and correlated in 5/5 lobes 0.66 (0.47 – 0.78) in perfusion and in 3/5 lobes 0.49 (0.36 – 0.58) in ventilation significantly ($p < 0.05$).
For observer I correlation of SBAS and VI was 0.41 (0.11 - 0.63) which was significant ($p < 0.05$) for 3/5 lobes in perfusion and 2/5 lobes in ventilation.
For observer II correlation of SBAS and VI was 0.44 (0.15 - 0.71) that was significant ($p < 0.05$) with SBAS for 2/5 lobes in perfusion and 3/5 lobes in ventilation. Mean time of SBAS analyses was 45 min compared to 5 min for VI per patient.

Conclusions: Software based analysis offers more reproducible parameters in functional lung imaging by V/P SPECT/CT in patients with pulmonary emphysema than visual analysis.

THE CT HALO: A NEW SIGN IN PULMONARY METASTASES FOLLOWING ADOPTIVE CELL THERAPY FOR METASTATIC MELANOMA, POSSIBLE CLINICAL SIGNIFICANCE

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Introduction: Thecomputerized tomography (CT) halo-sign refers to a zone of ground glass attenuation surrounding a pulmonary nodule. Pulmonary metastatic nodules exhibiting a halo sign are seen mainly in pre-treated hypervascular tumors, including melanoma. We describe the appearance of a "halo sign" following treatment by adoptive transfer of autologous tumor infiltrating lymphocytes (TIL) to melanoma patients with lung metastases.

Materials and Methods: The study included 29 melanoma patients with pulmonary metastases who received TIL therapy. Pre and post-treatment chest CT scans were retrospectively reviewed for the presence of a halo sign and its correlation with therapeutic response. Improvement was assessed according to the RECIST.

Results: A pulmonary halo sign was not seen in any of the pre-treatment scans. This sign was observed in four of twelve patients who responded to therapy (complete or partial response), and was not seen in any of those who failed to respond.

Conclusions: This preliminary study describes the appearance of a CT halo sign in melanoma with lung metastases, following TIL therapy, a CT finding that has not been previously reported. Its appearance may indicate a good response to such therapy. A suggestive mechanism could be the successful peri-tumoral localization and activity of the transferred lymphocytes in the metastatic site. Our findings emphasize the importance of applying new assessment criteria for immunological anti-cancer therapies (irRC).

DO INCIDENTALLY DISCOVERED PULMONARY EMBOLI ON CONTRAST-ENHANCED ABDOMINAL CT SCAN WARRANT FURTHER EVALUATION?

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Purpose: Unsuspected pulmonary embolism (PE) is a well-recognized entity; however there are no publications regarding incidentally discovered PE on contrast-enhanced (CE) abdominal CT scans. The aim was to determine the added value of a CE-chest CT scan to abdominal CT scan for the confirmation of PE.

Materials and Methods: CE-chest CT and abdominal CT examinations of 40 patients in whom PE was detected on the abdominal CT examination were retrospectively studied. Data pertaining to patient characteristics and CT examinations were obtained from computerized medical records. PE was evaluated by the observation of occlusive pulmonary arterial filling defects on contiguous images. Verification of PE and quantification of arterial clot load using the Miller scoring system was assessed on both examinations.

Results: The study population included 18 (45%) men and 22 (55%) women, with a mean age of 64.5 years (range, 22-89 years). Twenty (50%) patients had a history of active malignancy and 7 (17.5%) of previous thromboembolic episode. All patients diagnosed with PE by the abdominal CT scan had positive PE findings on the chest CT scan as well. The average difference in arterial clot load score between the two scans was 21%. In 47.5% of the cases no difference in score was observed.

Conclusions: Positive PE findings on CE-abdominal CT scan can provide the necessary information required for decision on patient management. Therefore, incidental discovery of PE on CE-abdominal CT scan does not warrant further evaluation by a CE-chest CT scan.

VIEWS OF SPECIALISTS VS. RESIDENTS ON THE UTILITY OF A CAD SYSTEM FOR THE DETECTION OF PULMONARY NODULES IN CHEST RADIOGRAPHY DURING ROUTINE CLINICAL WORK

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Background: CAD software has been shown to be advantageous for identifying pulmonary nodules on chest radiographs. This study prospectively evaluated the feedback of specialists and residents after using such CAD device in routine clinical work, and compared it with their prior expectations.

Materials and Methods: CAD software was installed on the hospital's PACS and was available during routine clinical work. Physicians in the departments of Radiology, Internal Medicine, Surgery, Pulmonary, Thoracic Surgery, Emergency Medicine, Infectious Diseases and Anesthesiology were formally instructed regarding the purpose, use, advantages and limitations of CAD in chest radiography. 123 physicians (66 specialists and 57 residents) participated in the study and completed a questionnaire indicating their expectations from CAD. Three months later, after using the CAD device in routine clinical work, they were asked to complete a feedback questionnaire.

Results: 74 participants (39 specialists and 35 residents) completed the feedback questionnaire. 44.3% of the participants expected that CAD would be useful, however only 16.6% indicated in the feedback questionnaire that it was indeed useful. The feedback indicated that CAD was significantly more useful for residents than specialists (p=0.04). Only 6.9% responded that CAD adversely affected their workflow, and only 6.5% felt that CAD increased their fatigue. While 44.7% expected false marks to be disturbing, only 23% reported in the feedback questionnaire that it was disturbing. When asked to indicate their preferences of CAD sensitivity vs. specificity on a scale of 10 (0=minimal sensitivity with very few false marks, 10=maximal sensitivity with many false marks), the score in the feedback questionnaires (6.2) was higher than the expectations' score (5.2), with a significant change only for the specialists' score (6.6 vs.5.3, p=0.006)

Conclusions: While the usefulness of CAD in chest radiography in routine clinical use was considered relatively low, CAD did not adversely affect workflow or increase fatigue. False marks disturbed less than expected, and most users preferred CAD with slightly higher sensitivity at the expense of more false marks.

SAFETY AND EFFICACY OF CRYOABLATION OF RENAL TUMORS IN A HIGH-RISK PATIENT POPULATION AT A COMMUNITY HOSPITAL

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Incidental discovery of renal masses have increased with the wide-spread integration of cross-sectional imaging. The increased incidence in patients with additional comorbidities has led to the development of nephron sparing techniques. This report represents our experience with percutaneous cryoablation of renal tumors in a high-risk population at a community hospital.

A retrospective chart review of patients with renal masses treated between 2007 and 2012 was performed. Indications for cryoablation included multiple medical co-morbidities, solitary kidney, synchronous bilateral renal masses, horseshoe kidney, Von-Hippel-Lindau syndrome, or renal insufficiency. US and CT imaging was used to guide cryoprobe insertion with ice ball monitoring with CT. Follow-up imaging was obtained at three, six, 12 months post treatment and annually thereafter.

From 2007 to 2012 a total of 108 ablations were performed in 94 patients. The mean patient age was 70 years-old. Nine patients had a solitary kidney and eight patients had previous partial nephrectomy. Co-morbidities included morbid obesity, diabetes mellitus, coronary artery disease, pulmonary disease and renal insufficiency. Mean tumor size treated was 3.0 cm in largest diameter, ranging from 1.4 to 6.7 cm. One patient had simultaneous bilateral cryoablation and one patient with a solitary kidney had three separate tumors ablated. One case was technically unsuccessful due to equipment failure. Two patients had repeat cryoablation at three months for residual tumor. Nine patients had tumor recurrence found on surveillance imaging.

The most common complication was perinephric hemorrhage. Ten cases required transfusion, and in those patients the average pre-operative hemoglobin was 11 g/dl.Procedures with greater than 3.5 probes, hemoglobin less than 12.5 g/dl, tumor size greater than 3.55 cm and age greater than 75 years were all associated with a greater likelihood of complications. Incidence of complications did not correlate with tumor location within the kidney or proximity to vital structures.

Our experience with percutaneous cryoablation of small renal masses offers similar results in efficacy to published data. Additionally, the results demonstrate that percutaneous cryoablation is relatively safe in patients with renal cancer who are poor surgical candidates. One unexpected correlation made was that patients with significant adverse events also had the lowest baseline hemoglobin levels. This observation underscores the need for pre-operative optimization of hemoglobin in order to decrease the incidence of postoperative complications associated with hemorrhage. In addition, patients of advanced age and those who will have four or more probes inserted should be carefully monitored in the post-operative period.

OPTIMIZING PULSED IRREVERSIBLE ELECTROPORATION DEPOSITION

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Purpose: To determine optimal settings for creating large zones of IRE-induced ablation.

Materials and Methods: IRE ablation (n = 33) was performed in vivo in pig liver (n= 7, Yorkshire swine 92 – 105 kg) under ultrasound guidance using two IRE electrodes, 18 gauge, tip exposure of 2cm, 1.5-2cm inter-electrode spacing and Nanonknife generator (Angiodynamics, Fremont, CA). Energy deposition was applied at 2,250 to 3,000V for 10 – 100 pulses per application cycle. In addition, to varying the number of pulses, the number cycles of IRE application (1-12) and the time interval between IRE applications (10-900 sec) were systematically varied. Electrical parameters including applied current and tissue resistance were measured throughout the ablation. Cross-sectional zones of ablation were measured by gross and histopathology. These data were compared and correlated with IRE pulse parameters to determine optimal settings.

Results: For a 15 min application time, optimal ablation of 6.7 ± 0.2 x 3.3 ± 0.1 cm was produced at 100 pulses of 100 μsec and 3000V with 100 sec time intervals. This was substantially larger than the 5.5 ± 0.2 x 2.0 ± 0.3 cm produced by continuous application at otherwise controlled parameters ($p < 0.01$). Varying the time interval between cycles of IRE application from 100 to 900 seconds altered both the maximum resistance and the diameter of treatment in a dose-dependent. For examples, for 4 cycles of 50 pulses, 100 - 300 sec interval delay between cycles decreased the active resistance by 30 ± 9.6 ohms and produced a diameter of 3.6 ± 0.2 with 600 - 900 sec delay showing virtually no change in resistance and producing a diameter of 3.0 ± 0.3 ($p < 0.01$). Altering the number of pulses or voltage for a constant 100 sec interval delay also produced dose dependant changes in max resistance (210 ohms range) and short-axis coagulation diameter (from 2.4 ± 0.3 – 3.1 ± 0.4 cm).

Conclusions: These results establish that IRE not only induces tissue ablation, but also dynamically alters tissue characteristics in ways that can be used to further improve the treatment effect. Introduction of relatively short refractory period can indeed create larger, more clinically usefutACSccsacdl zones of ablation than continuous application.

CT GUIDED PROCEDURES USING THE ADAPTIVE 3D INTERVENTION SUITE

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Background: CT guided procedures are very common in radiologic departments. Various procedures are performed including biopsies from all organs, collections drainage and tumor ablation. CT enables intervention performing thanks to excellent anatomic visualization. However, the procedures are usually time-consuming and involved with significant radiation exposure. In the last 1.5 years we are using the 3D Adaptive Intervention Suite, which is a relatively new technique that allows rapid low-dose images with full in-room control. The purpose of this study is to determine and explain the advantages and efficacy of this technique.

Materials and Methods: Two hundred and fifty patients underwent CT guided procedures, undertaken on the SOMATOM Definition AS with the 3D Adaptive Intervention Suite, the procedures included 90 lung biopsies, 22 tumor ablations (RFA), 100 draining procedures and 38 other biopsies. Time length of the procedures, patient radiation exposure, success rate and complications were recorded and compared with similar procedures on the previous equipment.

Results: In the new technique approximately 3-8 minutes was required for lung biopsies with diagnostic percentage of 93%, compared to 10-25 minutes in the old technique. And nearly 18 minutes is required for RFA nowadays compared with 28 minutes in the previous technique. The complication rate is significantly lower.

Conclusions: The 3D Adaptive Intervention Suite enables faster and more efficient procedures with low radiation dose to the patient, with excellent results and low complication rate.

DIAGNOSTIC RETROGRADE TRANS-FEMORAL LOWER EXTREMITY ANGIOGRAPHY WITH 3F DILATOR

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Purpose: To report of a new technique utilizing the 3F inner dilator of 4F micropuncture set as a diagnostic catheter for retrograde trans- femoral angiography of the pelvis and lower extremity and conversion to an antegrade approach under road-map fluoroscopy if intervention is needed.

Materials and Methods: During 2 years (June 2012- June 2013), 35 patients, age range 60-93, without previous angiographic imaging underwent diagnostic angiographies in this technique. Of them 25 patients underwent antegrade intervention under road-map guidance in the same session. For bolus chase angiography only 10 cc of contrast was injected at rate of 2 cc/second for stepping angiographies 2-4 cc of contrast were injected manually or by power injector at each step.

Results: Diagnostic images were obtained in all examinations. No hematomas were noted during the retrograde angiographies and after conversion to antegrade approach. Hidden iliac stenoses were identified in 2 patients that were successfully treated. Accurate antegrade access was achieved in all interventions performed. Contrast media reduction from 35-45 cc to 10-16 cc was achieved in the diagnostic phase.

Conclusions: The use of 3F dilator for diagnostic angiography is safe procedure that shorter bed restriction after diagnostic angiography, requires less contrast media and allows detection of pelvic vascular pathologies that are missed if antegrade approach is preformed and enables immediate accurate antegrade access if needed.

THE USE OF AMPLATZER PLUGS IN COMPLITED PULMONARY A-V SHUNTS IN HHT PATIENTS

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Purpose: To report about our use of Amplatzer plugs in pulmonary AV shunts (PAVMs) inHereditary Hemorrhagic Telangiectasia (HHT) patients.

Materials and Methods: In Schneider Children's Medical Center located the Israeli center for HHT patients. Patients with PAVM are referred for percutaneous shunts closure. From 2001 to 2013 30 such patients, age range 5-49,and median age 33 who had complex or multiple pulmonary AV M's were treated with Amplatzer plugs alone or with combination of regular plugs.

Results: Successful closure of the desired AV shunts was achieved in all and no immediate complications had occurred. In about a third of the patients, usually in patients who had multiple AVM's in both lungs or who developed new or bigger PAVMs, additional procedures was needed performed in the same manner. Oxygen saturation increased from 88.4 ± 6.1 to 96.4 ± 0.5. Utilizing this device, normal pulmonary branches are spared from serving as an anchor. Although not measured we feel that the use of the plugs seems to shorten the intervention radiation time.

Conclusions: No records of embolic events or late pneumonias were found. The use of the plugs is accurate, safe and cause decrease in the radiation dose. Their use is recommended especially today with the variety of diameters and shapes of Amplatzer plugs.

SUBINTIMAL ANGIOPLASTY OF VERY LONG (≥40 CM) FEMOROTIBIAL OCCLUSIONS IN HIGH RISK SURGICAL PATIENTS WITH CRITICAL LOWER EXTREMITY ISCHEMIA

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Purpose: To review our experience with subintimal angioplasty in high-risk patients with critical lower extremity ischemia and ≥40 cm arterial occlusions.

Material and Methods: We retrospectively reviewed outcomes from endovascular interventions performed in 2008–2012 for ≥40 cm atherosclerotic occlusions in critical limb ischemia. Comorbidities, pre- and postprocedure ankle-brachial indices (ABI), procedure details, limb salvage, and survival rates were recorded.

Results: Eighteen patients [15 M:3 F; ages 59–92 years (mean 76)] with comorbidities/high-risk for bypass were included. Symptoms included rest pain (5/18, 28%), digital ulcerations (11/18, 61%), and frank gangrene (2/18, 11%). Comorbidities included smoking history (virtually all patients), diabetes (13/18, 72%), hypertension (16/18, 89%), hyperlipidemia (13/18, 72%), chronic renal failure (9/18, 50%), ischemic heart disease (14/18, 78%), congestive heart failure (10/18, 56%) and chronic lung disease (5/18, 28%); 12 patients (67%) were on statin therapy. Access was via ipsilateral or contralateral common femoral artery with ultrasound guidance. No crossing/re-entry devices were used. Subintimal angioplasty was successful in 17/18 (94%); 1 procedure failed because of severe arterial calcifications; and 4/18 (22%) required stenting. Pre- and 30-day postprocedure ABI were 0–0.61 (mean 0.41) and 0.51–0.97 (mean 0.72), respectively.

Acute thrombosis (1/18) was managed with thrombolysis. Bleeding (2/18, 1 retroperitoneal, 1 gastrointestinal) did not require surgical exploration. Four patients (22%) requiring reinterventions for stenosis/reocclusion underwent surgical bypass. There was 1 above-knee and 1 below-knee amputation.

Conclusions: In selected patients with chronic critical lower extremity ischemia, subintimal angioplasty can provide revascularization and defer amputation even in the presence of extensive disease with long occlusions.

PERCUTANEOUS SCLEROTHERAPY OF THE ISV'S FOR BPH

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The angiographic technique for bilateral percutaneous sclerotherapy of the ISV's for treatment of BPH is based on the technique used for varicocele treatment (Gat Goren Technique). The technique will be described. A series of 228 patients have undergone this treatment for BPH . Ranging in age from the 5th to the 8th decades in age, the patients had prostate volumes (estimated by ultrasound) ranging from under 40 ml to over 200 ml. Pre-treatment evaluation included evaluation of renal function (BUN, serum creatinine), serum PSA and IPSS questionnaire of prostate dysfunction. Patients have been followed for between 6 months and four years. Post-procedure improvement was rapid, with patients noticing improved stream and reduced nocturia within 1-2 weeks, sometimes even sooner. Prostate volumes decreased by over 50% towards normal volume for patient's age. A few minor complications were recorded—altogether, fewer than 1 % (temporary scrotal and inguinal discomfort, localized small inguinal hematoma, allergic reactions to iodinated contrast). Side effects include improvement in serum testosterone levels due to treatment of the varicocele in patients with low testosterone. This is a safe, effective, learnable method requiring a minimum of specialized equipment.

ATTAINABLE RADIATION DOSES FOR LEFT VARICOCELE EMBOLIZATION

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Purpose: To report our experience with a radiation reduction program with dose auditing for 100 cases of left varicocele embolization performed by a single operator on a state of the art interventional suite incorporating radiation reduction features.

Materials and Methods: A radiation reduction program for left spermatic vein embolization was developed with the following components. Technique requiring minimal fluoroscopy time, use of low dose presets and rigorous use of fluoroscopy free virtual collimation and patient repositioning based on last image hold.
The following data was collected for 100 consecutive cases of left spermatic vein embolization performed by a single operator using a standard technique from a right internal jugular vein approach: Height, weight, fluoroscopy time, kerma air product and skin entry dose.
Compensation for body habitus was achieved from the sagittal diameter of the outflow and inguinal portions of the spermatic vein and a room specific correction factor determined using a water phantom. The sagittal diameter was derived from the patient's body mass index using a correction factor derived from computerized tomography sagittal measurements taken from scans performed on 25 males without chronic disease.

Results: The median fluoroscopy time was 3 minutes (range 1-23.8 mean 4.5). The median radiation dose (kerma air product) was 0.54 cGy/Cm2 (range 0.12 6.52 mean 0.82). There was a trend to a decrease in the radiation dose/second corrected for sagittal diameter over time as well as an increase in collimation measured as Pka/SED.

Conclusions: Using standard technique and radiation reduction features in modern IR units, very low exposure rates for left varicocele embolization can be achieved. There was a trend to increased collimation and decreased radiation dose per second corrected for body sagittal diameter during the course of the study.

TRAUMATIC INJURY OF THE THORACIC AORTA TREATED WITH STENT-GRAFT: IS LONG TERM CT-ANGIOGRAPHY FOLLOW-UP JUSTIFIED?

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Objective: To report the results of long term (>5 years) CT angiography follow up after thoracic endovascular aortic repair in patients with traumatic thoracic aortic injury.

Materials and Methods: We reviewed all follow up CT angiographies performed in patients with traumatic thoracic aorta injury treated by endovascular stent-graft between 2002 and 2008. Of the 14 patients treated, four had available CTA only up to 7 months post implantation, two were foreign citizens and went back to their home countries after the treatment, and one did not have any follow up CTA available for review. Seven patients had CT angiography scans for more than 5 years. All patients were men with mean age 26 years. The injury site was at the ligamentum arteriosum in all. Talent device was used in 4 patients and Gore TAG device in 3 patients. The mean device diameter and length were 24.6mm and 103mm respectively.
Follow up included annual outpatient clinic surveillance and CT angiography scans which were reviewed for any device-related complications.

Results: Thirty three CT scans performed 64 to110 months (mean 76) after stent-graft implementation were reviewed. The mean follow-up number of scans per patient was 4.7 (range 2-8). Intra-graft circular mural tissue at the distal part of the stent-graft was seen in one patient, which did not change on the following exams and was not treated. Stable lack of proximal device apposition was seen in all patients. No other radiological complications (e.g. aortic infection, aneurysm or pseudoaneurysm, device struts break, migration, collapse, endoleak) were detected. None of the patients developed hypertension.

Conclusions: CT angiography did not reveal any complications developing throughout the long term follow-up. These results suggest that long term CT angiography follow up may not be indicated.

A NEW COMPOUND POLYMERIC BREAST BIOPSY MARKER: NON-MIGRATING AND READILY SEEN ON MAMMOGRAPHY, ULTRASOUND AND MRI

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Background: All of the currently available breast biopsy markers, most of which containing titanium, are visible on Mammography, but frequently are not distinctly visualized on Ultrasound and MRI. Furthermore, these markers show often fast and/or slow migration, and therefore are not locating the cancer accurately and reliably.

Purpose: To develop a permanent polymeric biopsy marker that does not show fast and slow migration, and is clearly visualized on all imaging modalities.

Materials and Methods: Biopsy markers were prepared by melt pressing polymer films loaded with superparamagnetic iron oxide nanocrystals and a thin SuperElastic Nitinol wire within a flexible polyethylene matrix. The polymeric markers can be rolled and inserted into the deployment needle and when released unfolds to lock within the tissue. The resulting biopsy markers were deployed into ex vivo chicken breast tissue, cow breast tissue, agar, and biopsy training phantoms and imaged on standard clinical ultrasound, 1.5 and 3T MRI, and Mammography systems. Finally, calibration curves were performed to determine the ideal amount needed for robust observation by Mammography and MRI. Visibility of the marker by ultrasound was from the polymer itself. Phantom studies simulating stereotactic core needle biopsies and the accordion effect were performed for assessment of migration. Slow migration was also quantified by force-displacement measurements.

Results: 40 different biopsy marker prototypes were fabricated. Upon deployment of the biopsy marker into the tissue it underwent a successful conformational change to permanently lock it into place. The top-performing candidate was identified via Mammography, Ultrasound, and MRI by visibility measurements. Stereotactic phantom studies proofed that the new marker does not show fast migration. Excellent visualization under Mammography, ultrasound and MRI was observed. The marker was successfully deployed through a standard introducer/trocar without fast migration.

Conclusions: A multimodal imaging biopsy marker was successfully designed and evaluated in ex vivo models. Studies are ongoing to evaluate the marker in a human MDA MB 231 breast tumor model, and clinical studies are in preparation.

THE IMPACT OF A SAME DAY ADJUVANT SCREENING BREAST ULTRASOUND BY A TECHNOLOGIST ON WORKLOAD AND PATIENT CARE - PRELIMINARY RESULTS

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Purpose: At Assuta Medical Centers Network, dedicated breast technologists that underwent a structured training program perform breast ultrasound (US). In order to provide good service to the patients, the technologist may decide to perform US adjuvant to screening mammography during the same visit. The current indications for screening breast US as adjuvant to mammography include high risk patients with dense breast. Since we had the impression that the volume of the adjuvant US was too high we sought to investigate the indications for US performed, and whether these US had changed patient management and outcome.

Materials and Methods: We reviewed files of all patients who underwent screening mammography and adjuvant US during the visit by a trained breast imaging technologist and based upon the technologist's decision during Nov-Dec, 2010. Demographics including patient age, family and personal history of breast and ovarian cancer, as well as other cancers, personal history of fertility treatments, doctor's referral letter, breast density. Based on these, indications for US were categorized as follows: indicated (high risk+dense breast), a lesion identified in prior screening exams, a known benign lesion from a prior screening, doctor's referral, dense breast, family history high risk and technologist's judgment. Indicated US + lesion in current mammography were considered as justified. Justified and unjustified USs were correlated with final BIRADS and biopsies.

Results: 94 patients (age range 37-78, mean 55 years) performed same day screening mammography and US at a single site. Thirteen patients (14%) had a indicated US (high risk+dense breast), a lesion identified in current mammography (9), a known benign lesion from a prior screening (12), doctor's referral (13), dense breast (14), family history high risk (20), and technologist's judgment (13). There were 22 justified US and 72 unjustified. In this study group there was only 1 biopsy, in a patient that had a family history of breast cancer, non-dense breast and a lesion in the current mammography which was benign. Non of the unjustified US had changed the management or outcome. One justified US changes the management but not the outcome.

Conclusions: Same day US based on a technologist judgment can significantly raise the workload without a positive impact on management or outcome. Unjustified doctor's referrals and misjudgment of the technologists were the predominant contributing factors.

THE INCREMENTAL VALUE OF BREAST MRI IN BRCA MUTATION CARRIERS: IS IT DEPENDENT ON BREAST DENSITY?

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Objectives/Purpose: It is known that the sensitivity of mammography decreases with rising breast density, thus adjunct imaging with US and MRI is recommended for high risk women with dense breast tissue. MRI in particular has been shown to be the most sensitive imaging modality for breast cancer detection. The purpose of this study was to examine whether the added value of MRI over mammography for cancer detection in BRCA mutation carriers is related to breast density.

Results: 2732 breast MRI examinations were performed during the study period, 709 were screening MRI in BRCA mutation carriers. Twenty-eight patients were excluded from analysis due to bilateral mastectomy. Group A included 278 (41%) patients and group B 403 (59%). BIRADS 1 or 2 was reported in 86% of patients in group A and 76% of patients in group B. BIRADS 3 was reported more in patients with dense breasts, 16% vs. 7%. BIRADS 4 or 5 was reported in 7% of patients with non-dense breast vs. 8% in patients with dense breast. Of the 53 patients with a biopsy recommended based on MRI, 14 were lost to follow-up. The remaining 39 (11 in Group A and 28 in Group B) had either a biopsy or at least 1 year follow up MR. Malignancy was found in 3/11 patients with a biopsy recommendation in Group A and in 5/28 patients in Group B for a malignant biopsy rate of 27% and 18% respectively. The overall MR cancer detection yield for Group A was 1.1% (3/278) and for Group B was 1.2% (5/403) and was comparable to the 1.47% supplemental MR cancer detection yield reported in the literature.

Conclusions: The overall MR outcomes were similar between the 2 groups with no difference in the cancer detection rates. These results suggest that screening MRI is equally beneficial for BRCA carriers with dense and non-dense breasts and thus should be offered as part of the screening protocol for all carriers regardless of breast density.

DIGITAL MAMMOGRAPHY: IMPACT ON UNDERDETECTION OF INVASIVE LESIONS AND OVERDIAGNOSIS

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Objective: We sought to test the hypothesis that compared to analog film screen mammography: Digital mammography with its higher KVp misses more small invasive lesions Ultrasound detected lesions are as a result increased in number DCIS lesions are over represented on digital studies. There is a tendency to potential overdiagnosis

Materials and Methods: Retrospective review of population screened by digital mammography and dedicated adjunct breast ultrasound Feb 2013- Aug 2013. 1705 screening cases. Results were compared with 2003 Israeli population analog data and general published population data.

Results: 20 carcinomas detected in population within study period, 16 invasive lesions detected (7 on digital mammography; 9 on adjunct ultrasound), 4 DCIS lesions detected on digital mammography, 1 of 4 (25%) of DCIS lesions detected over age 65, 4 of 20 (20%) of invasive lesions detected over age 70.

Conclusions: Ultrasound appears to be an especially important adjunct study within the context of digital screen mammography. DCIS was not over represented. There is a potential case to be made for overdiagnosis of both DCIS and invasive lesions screened by digital mammography and dedicated adjunct breast ultrasound.

RADIOGUIDED LESION LOCALIZATION SURGERY FOR NON-PALPABLE BREAST CANCER: INITIAL EXPERIENCE

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Purpose: Radioguided occult lesion localization (ROLL) was developed in the European Institute of Oncology in 1998, where it is used routinely.
We describe our experience using ROLL with sonographic guidance for non-palpable breast cancer.

Materials and Methods: Since August 2012 we have performed ROLL procedure for 8 occult lesions in 7 patients (median age was 61); one patient had bilateral carcinoma. All the lesions were non-palpable and were previously diagnosed on biopsy with ultrasonographic guidance. There were 5 lesions of invasive duct carcinoma and 3 cases of DCIS. Mean size of lesions was 9 mm. ROLL procedures were done in the department of nuclear medicine to avoid radioactive hazards. The localization of breast lesions was performed by two experienced radiologists with ultrasound guidance using portable ultrasound station. Under local anesthesia a 22-gauge spinal needle was placed with its tip in the lesion or just near the border of the lesion, depending on solidity of the tumor, and 0.1-0.2 millicurie (mCi) of Technetium 99m with macroaggregates of albumin (Tc-MAA) was injected, followed by 1 cc of saline solution. In the cases of invasive carcinoma, ROLL was followed by sentinel node detection using intradermal injection of 500 mCi of Tc-nanocolloid. One the same day surgical excisions were done guided by a gamma-detecting probe. After the excision of the specimen, the probe was used to check for residual radioactivity at the excision site to confirm that the radioactive area was removed. Specimen margins were assessed by frozen sections.

Results: Breast lesions were correctly localized by the radiotracer in all the cases. ROLL procedure allowed rapid, easy and accurate surgical removal with reduced specimen volume and good cosmetic results. Sentinel node identification and removal was successful in all the cases. Positive margins were diagnosed by frozen sections in two cases and additional tissue removal was performed.

Conclusions: ROLL technique can be successfully integrated into practice with coordinated effort of radiologist, nuclear medicine specialist, surgeon and pathologist.

MR OUTCOMES OF PATIENTS REFERRED FOR SHORT TERM FOLLOW-UP

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Purpose: To assess the MR outcome and the cancer yield on breast MR exams performed for short term follow-up of probably benign lesions detected on prior MRI

Materials and Methods: We reviewed all patients who underwent breast MRI between 2009-2011 at a single institution, in which the referral indication was: "short term follow-up of a probably benign MR lesion". The results of the follow-up MRI were recorded as well as continued follow-up information, including biopsy results if performed. Breast density and hormonal status were also assessed.

Results: Of 2745 breast MRI examinations during the study period, 146 (5%) exams in 137 patients were performed for short term (6 month) follow-up of a prior probably benign MR lesion (BI-RAD 3 lesion). 107/137 (78%) of the women were high risk for breast cancer; 65 had a family history, 54 had prior breast cancer, 24 were BRCA mutation carriers and 3 had prior mantle radiation. The majority of patients (80%) having MRI for short term follow up had dense (ACR 3&4) breast tissue. 97/137 (71%) had no menstrual cycle. In 106/146 (73%) MRI examinations performed for short term follow-up the questionable lesion was either stable or decreased in size, yielding a BI-RADS 2 score. In 6/146 (4%) there was no finding and the examination was scored BI-RADS 1. In 11 patients (7.5%) an additional 6 month follow-up exam was recommended (BI-RADS 3), all but 1 were stable on continued follow-up. One patient with a repeat BI-RAD 3 score progressed and continued to MR biopsy yielding ADH and LCIS. In 23/146 exams (15.5%) a biopsy was recommended (BI-RADS 4), 16 of these 23 had a biopsy performed, 12 (75%) yielding a benign result and 4 (25%) yielded a high risk lesion (3 ADH and 1 RS). 4/23 were lost to follow-up and 3/23 had no biopsy but normal 1 year follow-up MRI. In the 146 examinations assessed, 5 MRI's yielded a high risk lesion, for a high risk lesion rate of 0.03 with no malignancies detected.

Conclusions: The probability of a malignancy in a BI-RAD 3 MRI examination is negligible and recommending follow-up MRI for such lesions is a safe approach. BI-RAD 3 MR lesions are more common in women with dense breast tissue.

CONTRAST-ENHANCED DUAL-ENERGY DIGITAL MAMMOGRAPHY VS. CONVENTIONAL DIGITAL MAMMOGRAPHY AND ULTRASOUND: EVALUATION OF PALPABLE LESIONS

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Introduction: Mammography is the well-established, cost-effective imaging technique for breast cancer detection. However, mammography has limitations, with overall sensitivity of 75-85%, especially in dense and treated breasts. Ultrasound is therefore used to complement mammography in dense breasts. Contrast-enhanced breast-imaging techniques (CT and MRI) are used for detection of angiogenesis by tracking contrast agent up-take and wash-out in tissues. The development of dual-energy contrast-enhanced digital mammography (CEDM) has made possible the use of intravenous contrast enhancement with mammography. Our study was undertaken to assess the diagnostic accuracy of dual-energy CEDM as an adjunct to mammography versus mammography alone or mammography with ultrasound in patients with palpable abnormalities.

Materials and Methods: This study was approved by the institutional review board. From June 2012 to December 2012, 17 consenting women with a mean age of 43.6 years (range 27-64) were enrolled in this study. All presented with a palpable breast abnormality. Exclusion criteria included pregnancy or possible pregnancy, allergy to iodinated contrast agent and compromised renal fuction. A pair of low- and high-energy images was acquired using a modified full-field digital mammography system. Exposures were taken in MLO view at 2 minutes and in CC view at 4 minutes after injection of 1.5 ml/kg of iodinated non-ionic contrast agent IOPAMIRO 370 (755.3 mg/ml). Dual-energy CEDM was compared to full-field digital mammography, ultrasound and MRI.

Results: Of the 17 women presenting with a palpable abnormality, 6 diagnosed with IDC (1 patient with 3 ipsilateral masses), 1 IDC+DCIS, 3 cysts, 1 acute inflammation, 1 hamartoma density 5 diagnosed with no abnormal finding. CEDM depicted 9 of the 9 malignant lesions, while conventional digital mammography depicted 6. US demonstrated all of the 9 tumors. MRI identified all tumors when performed to evaluate extent of disease in 4 patients. CEDM demonstrated peripheral enhancement in 2 of 3 cysts, while US demonstrated all three cysts. Hamartoma was demonstrated on mammography and US, but did not enhance on CEDM and MRI.

Conclusions: CEDM is a fast imaging technique for characterizing breast lesions by identifying angiogenesis associated with carcinoma. Initial clinical results show that CEDM has better accuracy than mammography alone. Our data suggest that CEDM alone is as accurate as digital mammography complemented with US.

BREAST LESION EXCISION SYSTEM (INTACT®) - INITIAL EXPERIENCE

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Background: Percutaneous imaging-guided breast biopsy is widely applied to evaluate breast lesions. The minimally invasive Breast Lesion Excision System (BLES) (Intact Medical) uses radio frequency to ablate breast tissue and allows specimen removal in a single pass.

Materials and Methods: A prospective study was conducted between December 2012 and July 2013 on 15 biopsy procedures using Breast Lesion Excision System (Intact®) biopsy device. Patients average age 52.3, range 33-75years. The average size of the lesions 0.9 cm, range 0.4-1.4cm. Diagnoses obtained from biopsy specimen were compared with previous core needle biopsy and to final diagnosis on surgical excision specimen when indicated.

Results: Of the 15 patients, 7 patients with a final diagnosis of radial scar, no upgrade following Intact BLES excision. 7 patients with fibroadenoma, in 2 patients with atypia. In 4 patients close margins following the BLES excision, with short term 3 months follow-up recommended. 1 patient with papilloma, was upgraded to low grade DCIS, surgical excision recommended. There were no complications.

Conclusions: Breast lesion excision system using RF provides a safe alternative to excisional biopsy for high risk breast lesions. The high rate of complete removal withought upgrade in those lesions offers the option of avoiding subsequent surgery for small high risk lesions. This study requires further conformational data.

DISRUPTED FUNCTIONAL CONNECTIVITY IN NF1 PATIENTS WITH AND WITHOUT OPTIC PATHWAY GLIOMAS

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Background: In neurofibromatosis, disruption of connectivity of the central nervous system occurs at multiple levels. These include synaptic plasticity, axonal integrity, and gross level reorganization; for example due to low-grade gliomas and other anatomical NF-related changes. It is possible that some of the NF1-associated cognitive impairments are caused by these structural changes. The basal ganglia are implicated in movement control as well as in procedural learning and cognitive coordination. We sought to characterize the organization of the visual, motor and attention networks in NF1 patients with (N=13) and without (N=11) OPG. We hypothesized that the presence of OPG is an indication for (1) additional burden on the visual system and subsequent reorganization abnormalities, and (2) an indicator for heavier NF1 burden and therefore potential reorganization abnormalities that are beyond the visual system. Resting state functional connectivity MRI is a novel method utilizing spontaneous fluctuations in the blood-oxygenation level dependent signal measured in fMRI for the detection of functional neuronal networks. This method is useful for the evaluation of cortical organization of patients unable to cooperate in conventional fMRI.

Materials and Methods: In this study, we utilized this method for the evaluation of functional networks in toddlers and young children (age 2-10, N=24) undergoing routine, clinical MRI while under anesthesia.

Results: Initial analyses demonstrate differences in recruitment of the visual cortex and regions implicated in attention between the groups. Further, we observed a differential recruitment of the basal ganglia suggesting a heavier reliance on this system.

Conclusions: These results suggest that OPG in NF1 patients cause systemic changes in functional connectivity and cortical organization. Further clinical studies and comparison to pre-clinical models are needed to verify these results.

THE EFFECT OF CHEMOTHERAPY ON OPTIC PATHWAY GLIOMAS AND THEIR SUB-COMPONENTS; A VOLUMETRIC MR ANALYSIS

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Introduction: Optic pathway gliomas (OPG) represent 5% of pediatric brain tumors. OPG are one of the hallmarks of NF1, presenting in 15-30% of these patients. Introduction of novel volumetric imaging methods enable accurate assessment of the tumoral changes under chemotherapy. In this study we examined the effect of chemotherapy on the gross total solid volume (GTSV) of the tumor as well as its various sub-components.

Material an Methods: The tumors of 17 patients with OPG that were treated with chemotherapy were measured using our novel, previously described method 12. Twelve were boys, 10 have NF1, with 1 to 6 chemotherapy protocols. Average follow-up time was 3 years and 4 months, and an average of 5.5 imaging studies per patients were included. Two MR studies per patient were correlated with chemotherapy treatment, one before initiation of a specific protocol and the other after finishing at least 6 months on treatment. Total 3D volumetric measurement of the tumor was segmented into the gross total solid volume which included the solid-non-enhancing and solid-enhancing, and cystic components. The relative percentile change of each of the component following treatment was calculated.

Results: During the treatment period with vincristine and carboplatin an average reduction of 10% (SD 23%) in the GTSV was noted. Solid-non-enhancing components were reduced by an average of 4.9% (SD 23%), solid-enhancing were reduced by 4.8% (SD 36%) and the cystic component grew under therapy by an average of 15% (SD 40%). Two patients had de-novo appearance of a cystic component.
In patients with a cystic component at presentation (n=7) a reduction of 16% (SD 23%) in the GTSV and an increase of 27% (SD 50%) in the cystic component was noted following intial treatment protocol. In patients lacking a cystic component at presentation a reduction of 9% (SD 30%) in the solid non-enhancing component and increase of 8% (SD 46%) in the solid-enhancing component was noted.

Conclusion: Initial treatment with vincristine and carboplatin seems to have an effect mostly on the solid components in patients with a cystic component at presentation. The cystic component seems to be unaffected by chemotherapy, and contributes to the subsequent growth of the gross total volume. Treatment with vincristine and carboplatin does not seem to reduce gross tumor size in tumors without cystic component but may have a stabilizing effect. The tumor in this subgroup was stable.

COMPARISON OF DIAGNOSTIC VALUE OF CT-VENOGRAPHY AND MR-VENOGRAPHY IN DIAGNOSIS OF NEONATAL SINUS VEIN THROMBOSIS

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Purpose: Although cerebral sinovenous thrombosis (CSVT) is an uncommon disorder in neonates, the subsequent morbidity, mortality and adverse neurodevelopmental sequelae highlight the importance of establishing an early diagnosis with an appropriate therapeutic plan. The clinical signs and symptoms are non-specific and diagnosis is primary based on the imaging findings. However, there is no consensus, which study CTV or MRV should be a method of choice for the diagnosis of neonatal CSVT. The aim of our study is to compare diagnostic value of CTV and TOF MRV in diagnosis of neonatal CSVT, to optimize protocols of CT and MRI for suspected CSVT and to describe possible pitfalls of each method and find ways to avoid them.

Materials and Method: We undertook a retrospective review of the medical records and brain MRI/MRV, CT/CTV studies of the brain of the neonates with presumed CSVT. The inclusion criteria were neonates (birth to 28 days, term, and preterm) with presumed CSVT, presented to our institution between January 1994 and December 2011, who during their investigation underwent both MRV and CTV- in total 63 neonates. We excluded the patients who had more than 24 hours time interval between two exams. Final study population included 16/63 neonates (12M:4F). Independent review was performed by 2 certified pediatric neuroradiologists, which were blinded to clinical data and diagnosis. Unenhanced and contrast-enhanced CT images, each MRI sequence and MRV source images were reviewed separately. Assessment of each main superficial and deep venous structure was performed separately regarding presence of thrombosis. We used Kappa Statistics to measure agreement between rater and modality.

Results: Early presentation (on the first postnatal week) was seen in 10 patients (62.5%); late presentation (during the subsequent 3 weeks)- in 6 patients (37.5%). Indication for imaging were seizures in 6 patients, seizures with encephalopathy in 3, seizures with lethargy in 2, seizures with HIE in 1, HIE screening in 2, hydrocephalus in 1 patient. Intracranial bleed was found in 12 (75%) patients. Superficial venous structures were involved in 9 (56.25 %) patients; isolated deep venous structures were involved in 1 (6.25 %) patient and simultaneous deep and superficial venous structures were involved in 6 (37.5 %) patients. Agreement between CTV and MRV was substantial (kappa=0.5639 for rater 1 and kappa=0.6988 for rater 2. Substantial agreement between raters was also found with kappa=0.6092 and 0.6435 for CTV and MRV. Overall, there is substantial agreement between CTV and MRV as well as between raters. However, modality- and rater-agreement range from poor to almost perfect when assessed by cerebral sinovenous structures- are higher for thrombosis of the deep cerebral venous system.

Conclusions: Overall, there is substantial agreement between CTV and MRV as well as between raters. However, level of agreement varies with the location of thrombosis.

UTILITY OF BOTH LATERAL AND ANTERIOR-POSTERIOR SPINE RADIOGRAPHS FOR THE EVALUATION OF DISCITIS IN YOUNG CHILDREN

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Purpose: The aim of the present study is to determine the utility of anterior-posterior and lateral radiographs of the spine versus dedicated lateral-view radiography in the initial evaluation of young children with suspected of having spinal infection.

Materials and Methods: Two expert pediatric radiologists blindly and independently reviewed the lateral and anterior-posterior spinal radiographs of 40 young children discharged from a tertiary pediatric medical center with a diagnosis of discitis over a 10-year period. For each radiologist, there was an interval of 2 weeks between reviews to avoid bias. Findings were compared to the official report of the radiograph findings which included lateral and anterior-posterior views at the patient's initial evaluation. In all cases, the diagnosis at the initial evaluation was based on the same AP and lateral views) of every patient, all of whom which were diagnosed by one of three expert pediatric radiologists at the initial presentation.

Results: According to the official radiograph report, 27 patients (68%) had radiographic abnormalities compatible with discitis. On reassessment, pathological findings of discitis were identified by reviewer 1 in 29 patients (72.5%) in the lateral view and 20 patients (50%) in the anterior-posterior view, and by reviewer 2, in 30 patients (75%) and 21 patients (52.5%), Inter-rater agreement was good (kappa=0.52).

Conclusions: Anterior-posterior radiographs of the spine do not provide additional information to lateral radiographs in children undergoing evaluation for suspected discitis. Their omission from the work-up can spare patients exposure to unnecessary radiation and lower health-care costs.

REDUCTION OF NON INDICATED VCUG EXAMINATIONS IN CHILDREN BY AN INTERVENTION PROGRAM

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Background: VCUG (voiding cystourethrography) is one of the most uncomfortable radiologic procedures performed in children, and involves pelvic and genital exposure to ionizing radiation. Recent guidelines of the American Academy of Pediatrics have changed the indications for VCUG in the evaluation of urinary tract infection. The purpose of our study was to examine the ability to reduce the number of VCUG examinations by implementation of an intervention program targeted at screening the requisitions according to the new guidelines.

Materials and Methods: After the publication of the new guidelines, a multidisciplinary team composed of nephrologists, urologists and radiologists, formulated revised indications for VCUG in children with UTI. The requisitions for VCUG were reviewed by an appointed radiologist, who approved or declined the examination according to the agreed criteria. In our study we retrieved retrospectively all the requisitions for VCUG during one year. The requisitions were reviewed for demographic data and indication for the examination. Data on all the imaging examinations (VCUG, US and Nuclear Medicine) were collected, if available. The patients were divided in 2 groups: those whose VCUG was approved and those who were declined. The clinical follow up of the children who did not undergo the examination was noted. The parameters of the 2 groups were compared.

Results: 151 children underwent VCUG from 1.4.2011 until 30.3.2012. Twenty three, 19 girls and 4 boys, were referred for the investigation of UTI. The mean age was 4.8 years, (1 month to 19 years). VUR was seen in 11 children (grade 1 in 3, grade 2 and 3, 4 of each). Enlargement of the renal pelvis by US was present in one patient (out of 5 examinations). The declined group comprised 44 children, 13 boys and 31 girls, with a mean age of 3.7 years (1 months to 15 years). US was performed in all but 2 children, in 13 some degree of enlargement was seen.
Follow up for at least 15 months was available in 23 patients, 10 eventually underwent VCUG. In 3, VUR was shown (grade 2,3,and 4). None suffered from additional UTI's.

Conclusions: The number of VCUG's referred for the investigation of UTI can be reduced to 1/3 of the demand, by implementation of the revised indications. Follow up was available in 52% of declined VCUGs, and suggested that indeed the examination was not indicated.

COMPARISON OF LOW DOSE CHEST CT WITH CHEST CR IN DIAGNOSIS AND MANAGEMENT OF PEDIATRIC PULMONARY TUBERCULOSIS

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Purpose: Currently diagnosis of Pulmonary Tuberculosis (Tb) is based on medical history, physical examination, specific tests for Tb infection and chest computerized radiography (CR). Vast number of infected children remains undiagnosed, thus creating a reservoir for future adult disease. Diagnosis of Lung Tb in children is complex can be easily missed and chest CR does not exclude all cases of active Tb. Our purpose was to compare low dose Chest CT and chest CR in children following a course of medical treatment.

Materials and Method: Between January 2008 and December 2012, 61/295 children in the State Tuberculosis hospital of Latvia with clinical and laboratory signs of Tb underwent low dose Chest CT (80 kV, 90 mAs, CTDIvol (mGy) 0.68, DLP (mGy-cm) 23.12) and CR following a course of specific Anti Tuberculosis treatment. The inclusion criteria for the study were laboratory and clinical improvement. Two certified chest radiologists (EK and AO) retrospectively, independently and blindly compared chest CR and CT findings.

Results: 61/295 (21 %) had significantly improved bacteriology and clinical picture following the initial treatment. Comparison of radiological findings between CR and CT was performed in the following parameters Chest CR vs. CT findings were as following: air space consolidation 24 (39%) / 29 (47%), nodular lesions 16(26%) / 22(36%), lymphadenopathy 9(15%) / 25(41%), pleural effusion 9(15%) / 9(15%), cavitations with parenchymal lesions 7(11%) / 11(18%), Ghon complex 4(6%) / 13(21%), calcified lymph nodes 2(3%) / 17(28%) respectively. Cavitations with parenchymal lesions were observed in 11/61(18%) on CT only. It was possible to avoid unnecessary treatment based on CT findings.

Conclusions: Low dose CT can improve management of pulmonary Tb thus avoiding unnecessary and possibly harmful antibiotic treatment in children. Low dose chest CT is valuable and safe tool in diagnosis and management of Tb in high risk pediatric population.

DISCREPANCY BETWEEN ULTRASOUND AND FETAL MRI OCCIPITOFRONTAL AND BIPARIETRAL DIAMETERS MEASUREMENTS

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Objective: To evaluate the extent of agreement between ultrasound (US) and fetal head magnetic resonance imaging (feMRI) head biometry in US-suspected microcephalic fetuses.

Materials and Methods: This was a retrospective analysis of 60 sequential feMRI scans obtained between 2011-2013 following US-suspected microcephalic fetuses[head circumference ≤2 standard deviations (SD) (2.5th percentile)] w/ wo severe intrauterine growth retardation [IUGR: estimated fetal weight ≤2 SD]. Inclusion criteria were single fetus and <21 days between performance of US and feMRI. Biparietal diameter (BPD) and occipitofrontal diameter (OFD) results were converted to percentiles and SDs by Chervenak and Hadlocknormograms for US and compared to Garelnormograms for feMRI. US measurements of BPDs were recorded for 58/60 scans, while OFDs were recorded in 35/60 scans.

Results: BPD values were ≤2.5th percentile in one case (1.7%) according to feMRI compared to 49cases (84.5%) according to Hadlocknormogram or 52 cases (91.4%) according to Chervenaknormogram for US (P<0.0001). OFD measurements on feMRI were ≤2.5th percentile in one case (2.9%) compared to 9cases (28.6%) for US (P<0.004). Anatomical findings were abnormal in five cases. The average BPD percentiles between US (Chervenak and Hadlock) and MRI differed significantly (P<0.0001), but not the OFD percentiles. There was no correlation between US-measured skull biometry and feMRI-measured brain biometry.

Conclusions: The discrepancy between US and feMRI findings in fetal head biometric assessment indicates that the diagnosis of microcephaly by US alone is insufficient and should be validated by feMRI before a final diagnosis is established and consultations with the parents are held.

REDUCED ADC VALUES IN PCR-PROVEN CMV-INFECTED FETAL BRAIN

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Purpose: To evaluate apparent diffusion coefficient (ADC) values in distinct areas of the cytomegalovirus (CMV)-infected fetal brain.

Materials and methods: A retrospective analysis was performed between 2008-2012 on 18 sequential fetal head magnetic resonance imaging (feMRI) scans of PCR-proven (amniotic fluid or newborn urine) CMV-infected fetuses. Average gestational age (GA) at the time of infection was 19+8 weeks (5 fetuses at 1st trimester and 13 fetuses at 2nd trimester). Maternal age at time of infection was 30.5±4 years. Average GA at feMRI scanning was 32±1 weeks, and average gap between infection and feMRI scanning was 18.5±9 weeks. The analyzed areas were the frontal, parietal, temporal and occipital lobes, basal ganglia (BG), thalamus, pons and cerebellum. ADC values of each side of the anatomical site (except the pons) were assessed and averaged by a GE workstation. The results were compared to 35 normal feMRIs matched to the same GA of 30-33 weeks.

Results: ADC values were significantly reduced at the frontal ($p<0.005$), parietal ($p<0.009$) and temporal ($p<0.05$) lobes but not at the occipital lobe ($p=0.09$), BG ($p=0.35$), thalamus ($p=0.11$), pons ($p=0.16$) and cerebellum ($p=0.42$). Autopsies of two terminated pregnancy fetal brains revealed diffuse microgliosis in both and intranuclear inclusion bodies in one.

Conclusions: CMV infection of the fetal brain results in a significant reduction of ADC values of the frontal, parietal and temporal lobes, but not the occipital lobe, BG, cerebellum and pons. Evidence of diffuse microgliosis in 2 autopsies suggests that the reduction of ADC values may be due to increased cellularity.

EXPANDING YOUR RADIOLOGY PACS INTO A ENTERPRISE IMAGING SYSTEM

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Purpose: Growing PACS into the Enterprise, Who controls the PACS? How do you tackle the integration of Cardiology or address Imaging and workflow challenges? How to efficiently take control of all your Modalities and remove standalone islands? In this session you will learn how to leverage your current investment while successfully providing a robust Enterprise Imaging solution to enable seamless sharing of required images between various clinical users.

Materials and Methods: The crux of Montefiores IT success is not the MIS ownership of clinical systems but the seamless partnership between IT and the clinical departments. We have adopted a MATRIX MODEL between MIS and the clinical departments working closely with the departments and its leadership allows MIS to implement and support complex cross departmental projects that benefit the entire organization and dissolve silos. In this model MIS is the glue that bonds the clinical departments together.

Results: Today the need to share clinical images throughout the enterprise goes beyond ROI and the ability to share a modality between Radiology, Cardiology and Radiation Oncology. The need exists to facilitate the close collaboration demanded by the clinical departments in order to deliver superior patient care. Delivering a functional imaging repository where all clinical images can be easily shared cross specialties is the Montefiore vision and reality.

Conclusions: Changes in philosophy, management and operations are essential for the successful deployment of multimedia clinical systems such as the Enterprise PACS. The key element in successful clinical information system deployment and management is communication and trust. This approach benefits the clinical department and the organization as a whole. With Cardiology well on its way it is now time to focus on Pathology, Ophthalmology, Dental etc.

ADVANCED VOLUMETRIC IMAGING AS AN EVERYDAY AUXILIARY TOOL FOR THE EVALUATION OF NERVOUS SYSTEM TUMORS

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Background: Today, nervous system tumor size estimation is routinely done using a linear measurement. These measurements are inaccurate, with error percentage ranging up to 50%. Volumetric measurements are rapidly becoming the standard of care in central and peripheral nervous tumors. We have developed and now routinely use a novel method for the volumetric assessment of nervous system tumors in NF1 patients and in sporadic tumors.

Aims: We aim to assimilate two novel methods of semi-automated volumetric measurements into routine care and follow up of patients with nervous system tumors. We have used these methods in to follow up of children and adults with OPG, vestibular schwannomas (VS), posterior fossa tumors and PN.

Results: We have successfully implemented these methods into routine clinical care of these patients. A total of more than 100 patients are followed volumetrically, 45 with OPG, 15 with whole body MRI for PN, and 40 with VS and other types of brain tumors. In OPG this tool was used to estimate the effect of chemotherapy on the sub-components of the tumor. In PN we have validated the inter and intra observer variability.

Conclusions: Neurofibromatosis patients with OPG and PN can be followed volumetrically with success. Sub-segmentation of OPG may aid in assessing treatment efficacy. Disease burden assessment using whole body MRI and volumetric measurements for PN is possible. These methods are now in development for other types of brain tumors, and may aid in clinical decision-making and patient care in both NF1 and non-NF1 patients with nervous system tumors.

FOUR DIMENSIONAL CT FOR LOCALIZATION OF OCCULT PARATHYROID ADENOMAS IN 20 PATIENTS WITH PRIMARY HYPERPARATHYROIDISM

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Background: Four-dimensional parathyroid CT scan (4DCT) is a promising relatively new parathyroid imaging technique that provides both functional and highly detailed anatomic information about parathyroid tumors.

Purpose: The aim of this study is to assess the accuracy of 4DCT in the preoperative detection of parathyroid adenomas in patients with primary hyperparathyroidism (PHPT) and a history of failed surgery or unsuccessful localization on standard imaging such as 99mTc-sestamibi (MIBI) scanning and Ultrasonography.

Materials and Methods: Twenty patients with PHPT underwent 4DCT in our institute (between March 2012 and May 2013). An initial unenhanced scan was obtained. This scan was followed by an IV contrast injection of 120 mL of nonionic contrast material at 4 mL/s. Scanning was then repeated at 30, 60, and 90 seconds after the initiation of IV contrast administration. Blinded review (to the other imaging modalities) of the 4DCT examinations was performed for the presence and location of a suspected parathyroid adenoma or adenomas. At the time of the study, 19 patients underwent surgical exploration after 4DCT.

Results: Of the 19 patients, 4DCT accurately localized 95% of abnormal glands found at operation (18/19). All patients had solitary parathyroid adenomas. On 4DCT, parathyroid adenomas showed characteristic rapid enhancement in 18/19 patients (95%). At operation, cystic parathyroid adenoma was found in one patient. In this patient, 4DCT was negative for parathyroid adenoma. When used to localize parathyroid adenomas to the correct quadrant of the neck, the sensitivity of 4DCT was significantly higher than sestamibi imaging and ultrasonography. Level II lymph nodes identified in some patients showed significantly less enhancement at 30 and 60 seconds compared with surgically proven adenomas.

Conclusions: Four-dimensional CT is an accurate second-line diagnostic technique in the detection of parathyroid lesions. Parathyroid adenomas are hypervascular lesions and can usually be differentiated from adjacent cervical or mediastinal lymph nodes.

PAIRED, LOW AND HIGH KV, CONVENTIONAL POLYCHROMATIC NON-ENHANCED HEAD CT IN THE SAME PATIENTS – IMAGE QUALITY ANALYSIS

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Purpose: To determine whether low energy, 80kV, polychromatic, non-enhanced head CT has better image quality than standard high energy, 120kV, scans performed on the same patients.

Materials and Methods: Retrospective comparison and image quality analysis was made between non-enhanced head CT scans performed at 80kV and at 120kV between June 2006 and November 2012. 30 consecutive scans performed at both energy settings, at different times, were included in the study. We evaluated the cerebral hemispheres by measuring the gray and white matter signal (HU), noise (sd) and contrast to noise ratio per dose (CNRD). The posterior fossa was evaluated using PFAI (posterior fossa artifact index). To evaluate whether time effected changes, a control group of 10 patients who had two scans performed at 120kV over a period of 1.5±1.2 years was selected. Data were analyzed using paired t-test.

Results: At 80kV, average signal was 33.9±3.5HU for gray matter and 22.5±3.1HU for white matter; whereas at 120kV, average signal was 29±4.6HU and 21.6±4.6HU for gray and white matter, respectively ($p<0.0001$ for GM and $p=0.11$ for WM). At 80kV noise was 3±0.6 for gray matter and 2.8±0.6 for white matter, whereas at 120kV noise was 2.7±0.6 and 2.6±0.5 for gray and white matter, respectively ($p=0.0001$ for GM and 0.00001 for WM). CNRD at 80kV was 4±1.2 and at 120kV was 2.8±1 ($p<0.00001$). The control group did not demonstrate any change in the CNRD. The PFAI was 5.7±1.5 for 80kV and 4.9±1.1 for 120kV ($P=0.003$).

Conclusions: When performed at identical CTDIvol, conventional polychromatic, non-enhanced head CT at 80kV results in improved CNRD compared to scans performed at 120kV. Although a minimal increase in noise and PFAI was noted in the 80kV scans, improved image quality is attainable on commercially available CT scanners.

DYNAMIC CTA ON NEURO-ANGIOGRAPHY THE OTTAWA HOSPITAL EXPERIENCE

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Objective: To demonstrate the value of dynamic CTA in different neuro vascular pathologies.

Materials and Methods: From January 2009 to December 2012, 1269 adult patients with acute neurological symptoms underwent dynamic CTA. The exam included non enhanced CT scan of the brain followed by dynamic CTA. IV bolus injection of 40 cc non ionic contrast was used to obtain perfusion studies and post-processing imaging including 4D time resolved images in coronal and sagittal planes. Dynamic CT angiogram was performed in a 320-row volume CT scanner (Aquilion ONETM). This system utilizes 320 ultra high-resolution detector rows (0.5 mm in width) to image the entire brain in a single gantry rotation. Dynamic CTA is a non-invasive technique to acquire a time series of bone subtracted or unsubtracted CT angiogram images of the whole brain, thus removing timing uncertainties found in typical static CT angiogram images. This approach also provides temporal flow information. The single volume acquisition takes 1 second resulting in a temporal resolution of 1 /sec. By manipulating the raw data improved temporal resolution up to 5 /sec is possible. The data acquisition of whole brain volumes at sequential time points starts at 7 sec from the time of contrast injection. This volume uses 300 mA 80 kV and is used as a mask for subtraction. The other volumes are acquired at 100 mA 80 kV. In the arterial phase (10 to 35 sec), whole brain volumes are acquired every 2 sec. In the venous phase (40 to 60 sec) volumes are acquired at 5 sec interval.

Results: 755 patients with acute stroke, 429 patients with non traumatic subarachnoid hemorrhage, 85 patients with spontaneous intraparenchymal bleeding. On Stroke patients we were able to identify abnormal areas of perfusion, penumbra as well the site of arterial occlusion on intracranial vessels form large to small caliber, i.e., ICA or Vertebral artery to M3 branches. On patients with AVM or AVF we were able to identify dynamically the efferent and afferent vessels as well aneurysms associated to the vascular malformation. On patients with intraparenchymal bleed related to hypertension or coagulopathies it was possible to identify the presence or absence of the spot sign, predicting value for possible hemorrhage progression. Other acute neurovascular pathologies were clearly identified such as traumatic or spontaneous vascular dissection, Moya-Moya, etc.

Conclusions: Dynamic CTA is a very useful method which allows rapid and accurate diagnosis in cases of acute neuro vascular diseases.

CHARACTERIZATION OF CHANGES IN CT DENSITY, AT LOW AND HIGH ENERGY, OF COMMONLY IMAGED ANATOMIC STRUCTURES, IN CLINICAL HEAD CT SCANS AND IN A PHANTOM

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Purpose: To characterize and compare the changes occurring in the measured density, at 80 kv and 120 kv, of anatomic structures in clinical CT studies of the head and in a phantom.

Materials and Methods: The study included 30 matched consecutive patients who had undergone non-enhanced head ct scans on a brilliance 64 slice ct (philips, andover, MA) at two energies. IRB approval was obtained and informed consent was waived. Examinations were performed at 120kv (445 mas, ctdivol 59mgy) and, on a separate occasion, at 80kv (1200 mas, ctdivol 46mgy). Low kv studies were performed as a quality initiative to decrease radiation dose. Regions of Interest (ROIS) were defined in the gray matter (gm), white matter (wm), ocular lens, vitreous body, buccal fat and blood and hounsfield units (HU) values of each structure were measured in both scans. A 17 cm plastic phantom filled with h2o was used for measuring packed cells (PC), fresh frozen plasma (FFP), and a protein solution (PROGYM) at the two energies. Data were analyzed using a paired t-test.

Results: Gray matter density significantly increased from 29±4.6 hu at 120 kv to 33.9±3.5 at 80 kv ($p<0.00001$). buccal fat significantly decreased from -103.2±12.8 hu at 120kv to -124.7±14 at 80kv ($p<0.00001$). The remaining structures/substances showed no statistically significant density changes between scans at the two energy levels ($p>0.1$). Specifically, at 80kv, wm, ocular lens, vitreous, blood (in clinical studies), pc, ffp and protein solution (in phantom) measured 22.5±3.1, 63.6±11.9, 1.5±4.4, 42±6.1, 67.2±4.1, 22.6±3.2 and 19.6±4.5 hu, respectively, while at 120kv measured 21.6±4.6, 64.9±11.9, 3±5.1, 41.8±7.7, 68.7±3.5, 23.7±3.4 and 21.2±4.4 hu, respectively.

Conclusions: Only gray matter and fat show significant changes in density at lower energy levels, serving as a potential method of detecting pathology in these tissues.

THE CLINICAL SIGNIFICANCE OF EPENDYMAL ENHANCMENT ON PRESENTATION IN PATIENTS WITH MALIGNANAT GLIOMA

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Background: Glioblastoma multiforme (GBM) accounts for about 20% of glial neoplasms and is the most common primary malignancy of the central nervous system (CNS) in adults. The tumor is very aggressive and has an average life expectancy of less than 1 year, therefore it's important to identify prognostic factors that can influence the treatment strategy. Traditionally it is accepted that ependymal enhancement caries a bad prognosis, nevertheless with new treatment modalities, this belief should be re-evaluated.

Materials and Methods: Retrospective identification of patients between the years 2005-2011 that met the following criteria: (1) Had histologic diagnosis of GBM (2) Had contrast enhanced pre-treatment MRI and (3) were treated in Neuro-oncology Unit at Rambam. Patients were divided into 3 groups based on the MRI pattern of ependymal enhancement, whether it was present, absent or undetermined. The three groups were compared on the following parameters: Demographic data, Type of surgery, Type of Complementary treatment, Recurrence and overall survival. Comparisons were analyzed statistically with T-test, Chi-square and the final analyze with COX regression model, the Survival curves were drawn using Kaplan-Meyer model.

Results: 165 patients were enrolled in the study, 67(40.6%) had ependymal enhancment, 70(42.4%) didn't and in 28 (17%) patients it was undetermined. Most of the patients underwent surgery (70%) and radiotherapy with concomitant Temozolonide (92%). There was no significant statistical difference between the groups in the parameters of progression free survival and overall survival (40.3% of the ependymal enhancement died within a year compare to 32.9% in the no-enhancement group and 50% in the undetermined group). Even in context of average and median survival there was no significant statistical difference.

Conclusions: This study shows that ependymal enhancement on MRI in patients with malignant glioma is not a bad prognostic factor.

PRELIMINARY RESULTS OF FLOW DIVERSION DEVICE (SILK STENT) IN THE TREATMENT OF INTRACRANIAL ANEURYSMS IN FIFTEEN SUBJECTS: MEDIUM AND LONG TERM FOLLOW UP

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Background: Treated intracranial aneurysms have an approximately 30% rate of recanalization. In the last years, many technical advances, such as the balloon remodelling technique and stent assisted coils, have improved the results obtainable with endovascular treatment. A new generation of stents has recently been introduced: the flow diversion devices. They have been especially developed for the treatment of giant, fusiform or wide-neck aneurysms. Flow diverters reduce intra-aneurismal blood flow and eventually thrombosis of the aneurysm is achieved. The SILK stent is a self-expandable flexible stent with low porosity; it was approved for clinical use in Europe in 2007.
The aim of our study is to analyze the preliminary results at medium and long term follow up of our experience with SILK stent in a series of fifteen consecutive cases.

Materials and Methods: The use of SILK stent as flow diverter was introduced at our Department of Neuroradiology in April 2009. Since then, a series of 15 patients with a total of 16 intracranial aneurysms were treated endovascularly using SILK stents. Thirteen patients were female and 2 were male, with a mean age at treatment of 53.7 years (range between 42 and 63 years of age).
There were 13 aneurysms located in the anterior circulation, 2 in the basilar artery and 1 in the vertebral artery. Thirteen of these aneurysms were saccular and 3 were dissecting.
Neuroradiological follow up (DSA, CTA (320 row scanner, Toshiba Aquilion ONE) or MRI/A) was available for all patients at three months (100%), ten patients (66.7%) at one year and seven patients (46.7%) at 2 years.

Results: Twelve patients were treated using one SILK stent; of these, in one patient one SILK stent treated two aneurysms. In 4 patients two SILK stent were required in a telescopic fashion. In 5 subjects coils were used in addition to the SILK stent.
The mean duration of follow up was 15.2 months (s.d. 7.9). Reduction of flow within the aneurysm was achieved and visualized in all 15 patients (100%) at the immediate post treatment angiography. Complete occlusion of the aneurysm was observed in 12 cases at their latest neuroradiological study (12/15; 80%). In the remaining three patients (13.3%) a residual flow in the aneurysm was still observed at their latest follow up exam (two at 24 months follow up, one at 8 months follow up).

Conclusions: In our three years experience of SILK Stent use, a total of 15 patients and 16 aneurysms were treated at our Institution. Our data showed good results in terms of complete occlusion of the aneurysms, which was achieved and maintained in 80% of cases as of their latest follow up study.

TRAUMATIC SPINE FINDINGS IN POST MORTEM VIRTUAL AUTOPSY

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Purpose: Examine spinal traumatic findings in post mortem Virtual Autopsy (Virtopsy).

Materials and Methods: During 2011-2012, in conjuncture with the National Centre for Forensic Medicine, 200 post mortem Virtual Autopsy examinations were performed. These cases are involved in a pilot program examining the utility of Virtual Autopsy in Israel. The examinations included trauma and non trauma related deaths. All underwent full body Forensic Protocol CT. All cases with traumatic spinal findings were collected and analyzed.

Results: 34 cases of traumatic spine injury were found (17%). Of those 33 showed spinal fractures and 1 case showed suspected cord injury without fracture. There were 12 (35%) cases of transected cord and 3 (9%) cases of suspected cord damage without transaction. Of those, 17(50%), 24(71%), 14(41%), 7 (21%), showed cervical, thorax, lumbar and sacral findings respectively. Twelve (12) cases (35%) showed cord transection with another 3 (9%) cases of only suspected cord damage. Examining the number of regions involved, 11 (32%) cases showed one region, while 17(50%), 3 (9%), and 2 (6%) cases showed two, three and four regions involved respectively. In descending order of frequency of cases, we found vertebral body, transverse process , spinous process, laminae and crush fractures with a frequency of 26 (76%) , 17 (50%), 16 (47%), 13 (38%) and 10 (29%) respectively.

Conclusions: Virtopsy is a useful tool for imaging of post mortem spine fracture and injury.

DIRECTIONAL DIFFUSIVITY COMPARED FOR DIFFERING CERVICAL CORD WHITE MATTER AREAS IN NORMAL AND RRMS PATIENTS

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Purpose: To evaluate the DTI parameters of the cervical cord white matter in non MS patients and relapsing-remitting multiple sclerosis (RRMS) patients with normal appearing cervical spinal cord white matter (NAWM). The focus is on comparing different areas of the cord.

Materials and Methods: There were 10 RRMS and 7 control patients. DTI of the cervical spine was performed. DTI values were measured at the level of C2-C3 in different cord areas with anterior, lateral and posterior spinal cord ROIs. DTI values were compared between the different cord areas. The values were also compared between NAWM and control patients per area.

Results: DTI values significantly differed between the three areas for almost all the metrics. The relationship between metrics of differing locations per population is similar for both NAWM and control cases. The comparison between control cases and NAWM, treating the spinal tracts as a single unit, showed significant changes in λ1, λ2, ADC and Radial diffusivity. These differences between groups are not significant for each area compared.

Conclusions: With a growing body of research relating to NAWM DTI metrics, the metrics of the spinal cord areas need be evaluated separately based on anatomic location.

THE VALUE OF 99M-TC-SESTAMIBI SPECT/CT IN ASSESSMENT OF PARATHYROID ADENOMA – WHAT DO WE NEED MORE?

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Background: Preoperative localization of parathyroid adenomas is required for minimally invasive parathyroidectomy. Current modalities for parathyroid adenoma localization include US, 4DCT, MRI, SPECT and SPECT-CT.
The objective of this study was to evaluate the accuracy of 99m-Tc–sestamibi SPECT with Low Dose CT, using SYMBIA hybrid SPECT-CT camera (Siemens), for localization of parathyroid pathology.

Materials and Methods: One hundred and twenty eight patients (83 female, 45 male) mean age 57 (Range 23-82) underwent surgery for hyperparathyroidism in our medical center. All patients underwent SPECT/Low Dose CT with 5 mCi of 99m-Tc–sestamibi that was given on surgery day in order to facilitate adenoma detection using Intra-operative Gamma-Probe. Imaging protocol included planar images at 10 minutes and SPECT with low dose CT at 60 minutes post injection. Imaging interpretation was compared to surgery and final pathologic reports.

Results: SPECT-CT scan was positive in 127 of 128 patients (99%). The adenoma in the false negative case was very small and weighted less than 0.1 gram, which is below the camera resolution.
In 122 of the 127 positive scans there was exact localization of 109 single adenomas, 8 double adenomas and four glands hyperplasia in 5 patients. In the remaining 5 positive scans, 2 patients were found to have double adenoma instead of the reported single adenoma, and 3 were reported as doubled adenoma but were found to have single adenoma on surgery.

Conclusions: In view of the high accuracy of 99m-Tc–sestamibi hybrid imaging using SPECT with Low Dose CT it is suggested to consider this modality as the first imaging of choice for detection of parathyroid pathology. The combination of functional scan with the anatomical localization of low dose CT contributed to precise localization. Therefore, only in rare cases other investigative modalities like venous sampling, MRI, and 4DCT are needed.

INTRODUCING VIRTOPSY INTO A COUNTRY RELIGIOUSLY OPPOSED TO AUTOPSY

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Purpose: To evaluate accomplishments and challenges in introducing virtopsy to the pediatric forensic post mortem examination. This in a country (Israel) requiring family consent, with religious opposition from most of the population (Jewish, Muslim, Christian and Druze) to autopsies.

Materials and Methods: Data was collected regarding pediatric (under 18y) cases from the National Center of Forensic Medicine in Israel during the 18 month period after introducing post mortem imaging (Group A). The data was compared to the previous 18 months (Group B). The examined parameters were cases submitted, those examined, autopsied or imaged depending on family consent.

Results: There were 68 cases in group A, 57 in group B. Out of all cases consent to autopsy was similar (A=56% vs. B=54%). Of all cases in group A, consent for imaging was 31%. Of those imaged, 77% underwent autopsy. Of those examined externally only, 16% consented to imaging. For 7% of total cases in group A, estimation of cause of death was based on virtopsy alone.

Conclusions: In a country with high religious opposition to post mortem Forensic procedure, there are challenges to making virtopsy an integral part of the pediatric forensic post mortem protocol. At this point those consenting to the performance of autopsies are more likely to agree to imaging. Even with the difficulties, there was an immediate increase of 7% of cases where a possible cause of death would not otherwise be given. Further effort is needed to increase acceptance of post mortem imaging. Virtopsy does not breach religious doctrine in Israel, and might partially substitute autopsy.

EVALUATION OF A NOVEL FULLY AUTOMATED SOFTWARE FOR OSTEOPOROSIS DETECTION IN MDCT SCANS PERFORMED FOR OTHER INDICATIONS

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Purpose: Osteoporosis is a common condition of bone mass loss that increases the risk of significant fractures and may lead to disability, morbidity and mortality. While Dual-energy X-ray absorptiometry (DXA) scan is considered the gold standard for diagnosing osteoporosis, the compliance for this test is low and many patients are undiagnosed. Osteoporosis may also be detected in CT scans which include the lumbar spine; however, the findings are commonly overlooked by radiologists. A novel software was recently developed for fully automated segmentation of vertebral bodies in abdominal multi detector CT (MDCT) scans, enabling measurement of mean density in Hounsfield Units (HU) and phantomless bone mineral density (BMD). In this study we compare the results of the software analysis with DXA results. To the best of our knowledge no other fully automated software, for detection of osteoporosis in CT scans, was reported.

Materials and Methods: In this retrospective study, approved by the institutional Helsinki committee, we evaluated the data of consecutive adult patients who had PET/CT and DXA scans within one year. Patients with conditions or on drugs affecting bone density were excluded. The CT components of the PET/CT scans were unenhanced and had a slice thickness of 2.5 mm. For each scan the software placed volumetric regions of interest within vertebral bodies L1-4 and measured mean density in HU and BMD in mg/cc. Calibration was performed using fat and muscle tissue in the vicinity of the spinous processes. The analysis required 3-4 minutes per scan. The results were compared with total spine DXA T-scores.

Results: Study population: 32 patients (27F, 5M), age range 43-74y, (mean: 60.4+/-8.1y). Seven patients had a normal BMD and 25 had osteopenia or osteoporosis per DXA. Phantomless CT scan analysis using 120 mg/cc as the differentiating threshold between normal and abnormal BMD (in accordance with ACR guidelines), resulted in sensitivity 80% and specificity 86%. A threshold of 130 mg/cc resulted in sensitivity of 100% and specificity of 86%. Density analysis in HU using thresholds of 160HU, 130HU, &100HU resulted in specificities/ sensitivities as follows: 80%/86%, 44%/86%, & 8%/100% respectively. ROC analysis of BMD and density produced nearly identical results: AUC=0.94±0.08.

Conclusions: A novel fully automated screening methodology for osteoporosis, using abdominal MDCT scans performed for other indications, demonstrated high diagnostic accuracy. This method may be useful for early detection of osteoporosis and prevention of fractures and their devastating consequences in patients who would be otherwise undiagnosed.

CONVENTIONAL BODY CT IMAGES RECONSTRUCTED FROM DUAL-ENERGY DATASETS BY NOVEL DUAL-LAYER SPECTRAL DETECTOR CT – ANALYSIS OF DIAGNOSTIC QUALITY

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Purpose: Besides the ability to analyze spectral data, dual-energy CT (DECT) can also generate conventional images integrating data from both energies. This study evaluates the diagnostic quality of conventional body CT images reconstructed from a prototype of a novel spectral detector CT scanner.

Materials and Methods: DECT data acquired with a novel spectral detector CT (SDCT) prototype (Philips Healthcare, Cleveland, OH, USA) uses a single X-ray beam that is separated into two specific energy data sets at the detector level. The two images obtained at different energies can be combined to reconstruct a single image which includes the information from both spectral images and represents a conventional CT image. Conventional body CT image datasets of 42 patients (11 females, 31 males) were reconstructed from SDCT data after obtaining an IRB approval and consent forms. Acquisition parameters were 120 kVp and 59-259 mAs, selected to deliver a radiation dose comparable to routine CT protocols in our Medical Center. Three qualified radiologists reviewed the images for overall diagnostic quality and completed clinical evaluation forms ranking image quality between 1 and 5, where 1 is “extremely poor”, 2 is “poor”, 3 is “adequate”, 4 is “good”, and 5 is “excellent”. For scores of 1–2, a detailed description was provided. The one sample proportion test was applied.

Results: All studies presented as conventional CT images were diagnostic. For 30 patients (71.4%) the conventional images were ranked as excellent, for 6 patients they were ranked as good (14.3%) and for 2 patients (4.8%), as adequate. These ranks described the image quality with a confidence level of 95%. For 4 of the patients (9.5%), the conventional image quality was assigned scores of 1–2 due to metal artifacts (2 studies, 4.8%) or improper patient positioning (2 studies. 4.8%).

Conclusions: A novel spectral detector CT generated conventional images with diagnostic quality comparable to those reconstructed from single energy scans, and with comparable radiation dose. In 90.5% of the cases, the image quality was ranked as excellent, good, or adequate, while the remaining 9.5% were assigned low scores due to metal artifacts or improper patient positioning.

DOES RETROSPECTIVE IMAGE ANALYSIS WITH SPECTRAL DETECTOR DUAL-ENERGY CT HAVE POTENTIAL ADDED CLINICAL VALUE?

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Background: In existing tube-based dual-energy CT (DECT) systems, dual-energy protocols must be prescribed prior to data acquisition to select a protocol with two tube voltages or operation of two tubes at different kV. In contrast, spectral detector CT (SDCT) enables retrospective reconstruction and analysis of data obtained from a single CT acquisition with no requirement to plan a dual-energy protocol in advance. The purpose of this research was to assess the potential clinical value of retrospective dual-energy reconstruction features in cases where dual-energy analysis did not appear to be indicated prior to the study.

Materials and Methods: 43 patients were scanned with a novel SDCT prototype (Philips Healthcare, Cleveland, OH, USA). All examinations were performed with IRB approval and informed consent. Patients for whom there was clear clinical indication for spectral analysis prior to SDCT were excluded. In the remaining cases, two radiologists who are experienced with spectral CT study interpretation reviewed, in consensus, both conventional CT images and reconstructed spectral images to determine whether there was added clinical information from spectral analysis. The percentage of cases in which spectral analysis unexpectedly provided information that could assist in the diagnosis was calculated.

Results: 8 of the 43 cases (18.6%) were excluded from the study because clinical history of the patients indicated a request for a dual-energy protocol (suspicion of pulmonary embolus [4 patients], kidney stones [2 patients], insulinoma [1 patient], or hepatic cell carcinoma [1 patient]). In the remaining 35 patients (81.4%), dual-energy reconstruction was not indicated from the referral. Retrospective analysis showed that in 11 of these 35 patients (31.4%), spectral reconstruction improved visualization of clinically significant incidental findings. Low KeV virtual mono-energetic images with improved contrast-to-noise aided in the detection of pancreatic cyst (3 patients), in the visualization of pelvic DVT (2 patients) and in the detection of an abdominal aortic aneurysm (1 patient). Artifact reduction in higher KeV mono-energetic images improved visualization in cases with metal implants (3 patients). Comparison of virtual non-enhanced images with contrast CT assisted in the diagnosis of adrenal adenoma (2 patients). Overall, SDCT aided in achieving a diagnosis in 19/43 patients (44.2%).

Conclusions: Retrospective spectral image reconstruction and analysis may frequently offer clinical advantage in cases where DECT is not indicated based on clinical history.

IMPROVED IMAGE QUALITY OF VIRTUAL MONO-ENERGETIC IMAGES GENERATED AT 120 KVP BY A NOVEL SPECTRAL-DETECTOR CT (SDCT) PROTOTYPE

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Background: Dual-energy CT enables both analyses of spectral data and virtual mono-energetic images. This study evaluates the diagnostic value of abdominal virtual mono-energetic images generated with a single spectral-detector CT (SDCT) acquisition at 120 kVp in comparison with "conventional" CT images.

Materials and Methods: This study includes data for 30 patients (6 females, 24 males, mean age 59 years) who underwent SDCT of the chest-abdomen-pelvis (CAP) from 10/15/2012–2/15/2013 on a novel SDCT prototype (Philips Healthcare, Cleveland, OH, USA). Examinations were performed with IRB approval and informed consent from all patients. The SDCT acquisition parameters were 120 kVp and 59–259 mAs, which match routine parameters for CAP examinations on an MSCT scanner (iCT, 256-slice, Philips Healthcare) in our Medical Center. For each SDCT study, "conventional" CT images, comparable to those obtained by a standard MSCT system, are generated along with virtual mono-energetic images in the range of 40 keV to 140 keV. Mono-energetic image datasets were displayed at 65 keV, so that HU values from ROIs in the aorta, cortical bone, liver, and retroperitoneal fat most closely approximated values for counterpart ROIs in conventional SDCT. Two qualified radiologists assessed, in consensus, the overall diagnostic value of the mono-energetic and conventional images with regard to image artifacts and image contrast. A 4-level scale (1= mono-energetic image is worse, 2=equivalent, 3=better, 4=markedly better) was used, where scores 3–4 indicated a relative reduction in image artifacts or enhanced image contrast of the mono-energetic image. The one sample proportion test was applied.

Results: All reconstructed mono-energetic SDCT images at 65 keV were diagnostic. Compared to conventional SDCT images, the mono-energetic images were ranked as markedly better for 25 patients (83.3%), better for 3 (10%), and equivalent for 2 (6.7%), with a confidence level of 95%. Differences between mean HU values for ROIs of the 65 keV virtual mono-energetic images and conventional SDCT images at 120 kVp were 5.3±1.3 HU in the aorta, 21±3.0 HU in cortical bone, 6.2±1.2 HU in the liver and 6.0±2.2 HU in fat ($p>0.1$).

Conclusions: In most cases, novel Mono-energetic abdominal CT images derived from SDCT data demonstrated a markedly improved image quality with enhanced image contrast and artifact suppression compared with the "conventional" SDCT images.

SIMULTANEOUS BENEFITS OF SPECTRAL ANALYSIS AND AUTOMATIC DOSE REDUCTION WITH SPECTRAL DETECTOR CT TECHNOLOGY

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Background: Dose modulation reduces tube current according to patient size and cross-sectional slice diameter. For dual-energy CT (DECT) systems based on two X-ray tubes producing different energies or on energy-switching in one tube, the effectiveness of dose modulation is limited. Spectral-detector CT (SDCT) technology enables effective dose modulation since a single X-ray beam is separated into its spectral components by innovative dual-layer detectors, and not by the tube. The purpose of this study was to evaluate the feasibility of dose reduction in an SDCT prototype.

Materials and Methods: The study included 37 patients (9 females, 28 males, with a mean age 56.6 years) who underwent SDCT of the chest, abdomen, and/or pelvis on a novel SDCT prototype (Philips Healthcare, Cleveland, OH, USA). Examinations were performed with IRB approval and informed consent from all patients. The SDCT scanning parameters were 120 kVp and mAs ranging from a value of 59 to 259. Patient dose parameters (dose length product [DLP], CT dose index [CTDIVOL]) and estimated dose savings (EDS) for each patient were analyzed. The significance of dose reduction with the use of the various SDCT protocols was assessed by one-sided t-test with unequal variances.

Results: Three scanning protocols were used. 11 patients were scanned with an abdomen/pelvis protocol, 14 with chest/abdomen/pelvis (CAP) protocol, and 12 with a chest protocol. The estimated dose saving was highest for patients undergoing chest scans (22.4%), with an average DLP value of 363.6 mGy • cm and CTDIVOL of 11.36 mGy. For CAP scans the ESD was slightly lower (21.4%), with average DLP of 786.1 mGy • cm and CTDIVOL of 13.2 mGy, while for abdomen-pelvis scans the ESD was the lowest (14.8%) with DLP of 807.0 mGy • cm and CTDIVOL of 14.9 mGy. The estimated values of dose saving were significantly higher for chest scans and CAP scans compared to abdomen-pelvis scans ($p<0.05$ and $p<0.04$, respectively).

Conclusions: SDCT substantially reduces patient dose by the use of tube current modulation with the full benefits of spectral analysis.

Design of a Patient and Structure Specific 3D-Print Treatment Planning Phantom for Radiation Therapy of Prostate Cancer

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Background: To maximize the benefit of increasingly accurate external radiation therapy tools, such as Cyberknife, intensity modulated radiation therapy (IMRT), and protonbeam therapy detailed prostate phantoms delineating the prostate, cancer, and radiosensitive structures are needed in order to improve radiation treatment plans and to reduce adverse effects like incontinence or impotence. To meet this clinical demand, a patient specific radiation treatment (RT)/dosimetry quality assurance (QA) phantom was designed to establish individualized treatment plans by dosimetric measurement of actual radiation dose to tumor and clinically relevant structures.

Evaluation: Based on a patient's MR images and segmentations delineating clinically relevant intra- and peri-prostatic structures like index lesion, neurovascular bundles, seminal vesicles, urethra, penile bulb, etc., a physical 3D-plastic model is printed and dosimetric cartridges are inserted. Dosimeters can be placed in clinically relevant locations such as tumor, neurovascular bundles, etc., according to individual MR findings. The patient specific, 3D-print prostate model is placed into a pelvic phantom composed of human bone encased in a Plexiglas body with Hounsfield units equivalent to soft tissue. This phantom is then used for individualized treatment planning. Dosimeter inserts and removable cartridges have been designed to hold multiple nanoDot (Landauer, Inc.) singlepoint radiation measurement sensors. The exact location and number of the dosimeters within the 3D prostate model can be easily modified.

Discussion: Current RT/dosimetric phantoms used for QA and treatment planning in prostate RT do not take into account patient specific anatomy including clinically relevant and radiosensitive structures within and around the prostate as well as the exact location and volume of the cancer. Herein we present a novel 3D prostate phantom based on patient specific MR findings, including all clinical relevant structures.

Conclusions: This patient specific 3D RT/dosimetric phantom enables more accurate, personalized, and structure specifictreatment planning and dosimetric studies for radiation therapy of prostate cancer.

ENHANCING THE TOOLBOX OF MEDICAL STUDENTS WITH BASIC ULTRASOUND SKILLS USING THE "FLIPPED CLASSROOM" APPROACH

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Ultrasound is gradually getting into the clinician's toolbox, becoming a natural extension of the traditional physical examination. Exposing medical students to ultrasound may ensure its optimal use by them as doctors, while strengthening their accumulating medical knowledge. More and more medical schools incorporate ultrasound education into their curricula in various programs, where the beginning of the clinical years seems to be a good timing for acquiring such skills.

Purpose: Investigating the impact of integrating a training tutorial of basic ultrasound skills, during the first clinical clerkship of medical students in the internal medicine departments, using the "flipped classroom" pedagogical approach.

Materials and Methods: A prospective study has been conducted during the internal medicine clerkship of fourth year medical students of the Technion Rappaport faculty of medicine (spring 2013). The study group was comprised of 16 students from one university hospital whereas a group of 16 students from another university hospital served as the control group. A website for basic ultrasound skills was developed in the Technion virtual learning environment, where the students could find video lectures and practical video guides with interactive feedback exercises. Both knowledge test and an attitude questionnaire were taken by the students of both groups at the beginning and at the end of the clinical clerkship. Based on the "flipped classroom" approach, the study group was encouraged to work through the online contents in their free time, as a preparation to a couple of supervised hands-on workshops in the ultrasound unit. The hands-on sessions were video-recorded and analyzed. Personal interviews were taken at the end of the clinical clerkship. Data were analyzed both quantitatively and qualitatively.

Results: Students in the study group significantly improved their achievements in the knowledge questionnaires (unpaired one-sided t-test with p-value of 0.0008), while no statistically significant change was found in the control group. All the students in the study group expressed great satisfaction from their basic ultrasound experience. Their attitude towards the utilization of ultrasound as a valuable clinical tool has changed, so as their confidence in their ability to utilize it. Students from both groups emphasized the importance of integrating ultrasound education into the curriculum of the clinical years.

Conclusions: Providing basic ultrasound skills to medical students at the very beginning of their clinical experience is both feasible and effective. Students who accepted the challenge of the "flipped classroom" learning model benefited more from the practical experience and expressed their positive attitudes towards this non-traditional teaching approach.

A MULTI-DESCIPLINARY DEPARTMENTAL PROCESS FOR SHORTENING THE TIME BETWEEN ORDERING OF CT AND US EXAMINATIONS FOR ER IN HOSPITALIZED PATIENTS AND THE AVAILABILITY OF WRITTEN REPORTS

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Background: Quality of care and diagnosis are integral to recent rapid technological developments in imaging, and timely delivery of radiology reports to the referring physicians is mandatory. We have decided to 'think out of the box' and implement a process of change in the organizational culture, in order to improve the service we are providing. The purpose of the current study was to shorten the time between ordering of CT and US examinations and the availability of written reports for Emergency Department patients and in-patients to up to 24 hours.

Materials and Methods: Between January and May 2013, a multidisciplinary working group operated in the CT and US units. Each group included a radiologist, a radiographer and a medical secretary, and was supported by a project manager from the hospital's Department of Informatics Systems and two engineers from Intel Corporation. The working process in each of the groups included observation and mapping of workflow, data analysis and creation of action plans. In order to achieve the goal of shortening of the reporting time, our department decided to make a transition to a paperless working environment. Weekly feedback was provided to the working groups pertaining to achievement of goals. The process was characterized by an atmosphere of partnership, openness and positive thinking.

Results: Progress was observed as soon as the early stages of the process with shortening of CT reporting time by 50% and US reporting time by 33%. Continued improvement was noted in the later stages. A byproduct of the project was standardization of work processes and improved efficiency. As a result of the success of the current project, it was decided to make a transition to a paperless working environment in the entire department by the end of 2013.

Conclusions: We have succeeded to considerably shorten CT and US reporting time for ER and hospitalized patients within a relatively short period by implementing a paperless working environment. The implications of the process went far beyond the aims of the current project, and will affect the entire department. We have shown that a significant change can be accomplished with minimal resources by interdisciplinary teamwork. The greatest achievement of the project was strengthening of the sense of partnership, pride and organizational commitment.

COMMUNICATION OF RADIOLOGY REPORTS TO PATIENTS: DO THEY UNDERSTAND THE RESULTS?

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Purpose: In recent years communicating radiology reports to patients directly through an internet portal is becoming more popular. Patients log into a portal with a personal password and can view the radiology report and less and less hear the results from their doctor. On one hand patients are more involved in their medical condition but on the other hand there are concerns among referring physicians that patients will not understand the significance of the results and might not return for further follow-up and treatment. The purpose of this study was to investigate whether patients understand the significance of the reports, and whether they return to the referring physician after receiving the reports directly.

Materials and Methods: A telephone survey was conducted with 201 patients who had an abnormal CT or MRI between July and August 2012. Patients were asked whether they received their reports, whether the results were normal or abnormal and whether they returned to the referring physician after receiving the report.

Results: One hundred and eighty three patients of 201 with abnormal results received the radiology reports. Only 20/183 received the results from a doctor. Seventy one answered that the results were normal. 33/183 did not return to the doctor after receiving the reports directly

Conclusions: Most patients receive radiology reports directly. However, almost half misunderstand the significance of the results and not infrequently do not return to the doctor for further follow-up and treatment. Thus, in addition to delivery of the reports to patients, results should be communicated with the doctor.

THE ACCURACY OF CARDIAC MRI IN DIFFERENTIATING BETWEEN INTRA CARDIAC TUMOR AND THROMBUS

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Purpose: To evaluate the accuracy of Cardiac MRI in differentiating between intra cardiac tumor and thrombus.

Materials and Methods: The data of all cardiac imaging in our institution between 2004 and 2013 was reviewed, retrospectively. All patients who were referred for evaluation of intra-cardiac thrombus versus intra-cardiac tumor were included. MRI sequences included T2W, Fast Cine and T1W before and after Gadolinium (Gd) injection, first pass and delayed enhancement sequences. Positive findings were characterized by the various MRI sequences and were reported as tumor or thrombus. The MRI results were correlated with pathological reports, clinical and echocardiography follow up which served as the gold standard. MRI characteristics for each case were recorded. Accuracy, sensitivity, negative predictive volume (NPV) and positive predictive volume (PPV) of Cardiac MRI for differentiating between tumor and thrombus was calculated.

Results: 201 patients were referred for the evaluation of thrombus versus tumor. Positive findings and clinical correlation were found for 60 patients, and were included in the study group. Definitive diagnosis was found in 44 tumors and 16 thrombi.

Cardiac MRI detected 43 out of 44 tumors (sensitivity 97%). The PPV was 97% and the NPV is 92%. The accuracy of cardiac MRI for differentiating an intra cardiac tumor from thrombus was 96%.

Cardiac MRI detected 12 out of 16 thromboses (sensitivity 75%), PPV is 92% and NPV is 80%. Three of the four "missed" thrombi were less than 1 cm in size and one was a calcified thrombi. The accuracy of cardiac MRI for thrombus is 91%.

Conclusions: Cardiac MRI is highly accurate in differentiating intra cardiac tumors and thrombi. It can be used reliably for the diagnosis of intra cardiac tumors, with high sensitivity, PPV and NPV. However, the accuracy of Cardiac MRI is lower when the suspected lesion's size is less than 1cm with only moderate sensitivity and NPV.

CORONARY LESIONS: COMPARISON OF CORONARY CT ANGIOGRAPHY LESION LENGTH AND INSERTED CORONARY STENT LENGTH

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Background: Coronary stent insertion during catheterization should bypass the diseased segment, ideally from a proximal healthy segment to a more distal non-diseased segment. This encompasses the concept of stenting from health to health.
Coronary CT angiography (CCTA) is a volumetric modality allowing accurate definition of the atherosclerotic plaque and adjacent healthy segments. The aim of this study was to determine whether coronary stenting in real world using standard techniques fulfils the concept of "health to health".

Materials and Methods: The study comprised 29 consecutive patients presenting with acute chest-pain who underwent coronary stenting for significant stenosis in 36 lesions which were diagnosed by CCTA (64-256 slice multi-detector scanner). For each lesion the distance between the proximal and distal non-diseased segments was measured on CCTA (“health to health”), and compared with the stent length. A consensus between two radiologists measuring curved and straight multi-planar reconstructions was obtained.

Results: Average patient age was 55 year (range 34-74); 76% were males. Drug eluting and bare metal stents were positioned in 28 and 8 lesions respectively. The "health to health" distance was equal, greater or smaller than the stent length in 3(8%), 15 (42%) and 18 (50%) of lesions, respectively. Average difference between CCTA "health to health" distance and stent length was -1±8 mm [range (-34) - (10)].

Conclusions: CCTA lesion was longer than stent length in 42% of the lesions. The clinical relevance of this finding is to be further investigated in future studies, correlating this finding with incidences of stent thrombosis and re-stenosis.

COMPARISON OF LV MASS AS DERIVED BY ECHOCARDIOGRAPHY AND CARDIAC CT AS A FUNCTION OF AGE

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Background: Increased left ventricular mass as measured on echocardiography (ECHO) has been shown to be an independent risk factor for cardiovascular morbidity and mortality. Increased LV mass is frequently reported in elderly patients on ECHO studies, but MRI and autopsy studies have noted that LV mass is unchanged with age. Older patients frequently exhibit discrete upper septal hypertrophy which may interfere with accurate measurement of LV mass. The objective of this study was to evaluate the correlation between LV mass measurement on echocardiographic and CT studies as a function of age, to further elucidate this discrepancy.

Materials and Methods: The institutional database was reviewed and subjects who underwent cardiac CT and echocardiography, which were performed within 6 months of each other, were identified. Echocardiographic measurements of LV mass were performed in accordance with ASE guidelines. Gated CT studies were acquired on a Philips 64 slice or 256 slice CT scanner using standard protocols. LV mass was calculated using software from the Philips Intellispace Portal Comprehensive Cardiac Package (Philips 2010).

Results: 78 subjects of whom 39 were under 65 years of age, and 39 who were over 65 were identified and included in the study. LV mass averaged 165.2gm on CT and 179.5gm on ECHO ($R= 0.6913$, $p<0.0001$). LV mass in patients under 65 averaged 170.9gm on CT and 160.1gm on ECHO ($R=0.8418$, $p<0.0001$) and in patients over 65 averaged 159.1gm on CT and 199.9gm on ECHO ($R=0.7385$, $p<0.0001$). Bland-Altman analysis of younger patients demonstrated a mean difference of +10.8 gm, compared to -40.7 gm in older patients. When ECHO calculations of LV mass were made from the mid septum rather than the proximal septum, the difference between ECHO and CT derived masses became insignificant.

Conclusions: LV mass in older patients is consistently overestimated by ECHO when compared to CT, possibly due to measurement of proximal septal wall thickness which is generally increased in these patients. Standard measurement of LV mass by ECHO in subjects over the age of 65 should include measurements performed at the level of the mid-septum only. The prognostic significance of increased LV mass assessed by ECHO in elderly patients may reflect cardiac remodeling rather than a true increase in LV mass.

SINGLE CENTER RANDOMIZED CONTROLLED STUDY FOR THE EVALUATION OF THE COST-EFFECTIVENESS OF CORONARY CT ANGIOGRAPHY IN THE CHEST PAIN UNIT – INTERIM ANALYSIS

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Background: The ROMICAT-II trial and others have shown that coronary CT angiography (CCTA) improves clinical decision making of patients with low to intermediate risk for acute coronary syndrome, However, it results in increased downstream testing and no decrease in cost of care. The primary endpoints of the current study are to evaluate the cost-effectiveness of CCTA during index hospitalization and at 6 months, and to evaluate the influence of CCTA on patient decision making in the chest pain unit. The secondary endpoint is to compare the number of coronary catheterizations and interventions in both arms.

Materials and Methods: The study is ongoing and designed to recruit 200 patients. Patients aged 30-65 years old without known coronary disease, who were admitted to the chest pain unit with no ECG changes and two negative troponins, but who needed further evaluation according to the treating physicians, were randomized to CCTA Vs standard evaluation. Patients were followed up for 6 months for acute coronary syndrome, number of workup tests (stress test, CCTA, echo and catheterization), and ER re-admissions.

Results: 43 patients were enrolled between October and December 2012. 23 patients underwent CCTA and 20 standard evaluations. There were no significant differences between the two groups. 4 patients in the CCTA arm and 3 in the control arm underwent invasive coronary angiography. Of the 4 patients who underwent coronary angiography in the CCTA arm, 2 had angioplasty, and of the 3 patients in the control arm, 1 underwent coronary bypass surgery. At three months follow-up, 1/11 patients in the CCTA arm 7/11 in the control arm underwent further non-invasive testing. The number of non-invasive tests performed was 1 and 11 in the CCTA and control arms, respectively.

Conclusions: In this interim analysis, CCTA has not led to increased number of coronary angiographies in comparison to standard evaluation for chest pain. At three months, the number of patients who had additional non-invasive work-up and the number of further tests in the CCTA group was significantly lower than in the standard evaluation group.

CARDIAC COMPUTED TOMOGRAPHY FOR PREDICTING LEFT ATRIAL APPENDAGE OCCLUDER DEVICE SIZE

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Background: Atrial fibrillation (AF) may cause thromboembolic stroke. The left atrial appendage (LAA) is the thrombi source in more than 90% of strokes. Several devices have been developed to occlude the LAA. Inaccurate LAA orifice sizing may lead to utilization of more than one device per procedure, or inadequate LAA occlusion.
The purpose of this study was to assess the contribution of cardiac Computed Tomography (CCT) measurements for LAA device sizing with.

Materials and Methods: All subjects underwent ECG gated CT scans prior to LAA closure device insertion. CCT scans were performed using a 256-slice scanner with retrospective electrocardiographic gating and IV contrast administration.
Assessed parameters included: LAA maximal and minimal diameters (mm), LAA depth (mm). These values were compared with final implanted device size. Echocardiographic follow up at six weeks was performed in order to document the presence of regurgitation, as evidence for incomplete LAA occlusion.

Results: This study cohort included 22 chronic AF patients (9 males, average age 76 years). Two procedures failed, the maximal LAA diameter was 39 mm in both. The total number of devices used was 24 in 20 patients (1.2 devices per patient). Mean maximal CCT and minimal diameters were 27±5 and 22±5 mm respectively. Mean LAA depth was 22±4 mm. Mean device size was 24±4. Good correlation was found between maximal CCT diameter and device size (Pearson correlation=0.45; p=0.04). No correlation was found between minimal LAA diameter, LAA depth and device size (Pearson correlation=-0.0.08; p=0.7 and -0.02;p=0.9, respectively). LAA diameter >30 mm (N=5) was associated with adverse device sizing (N=5); procedure failure (2/5) and incomplete LAA occlusion (2/5) with regurgitation on echocardiographic follow up.

Conclusions: Maximal CCT demonstrated good correlation with LAA occluder size. LAA maximal diameter > 30 mm was predictive of unfavorable procedure outcome including procedure failure and incomplete LAA occlusion in 80%.
Thus, CCT should be considered as an important adjunct modality for device sizing, potentially reducing incomplete LAA occlusion or avoiding procedures in LAA's with large ostia which might fail. Larger studies are required in order to verify the role of CCT in LAA evaluation prior to occlude insertion.

CARDIAC MRI (CMR) FOR CORONARY IMAGING IN PEDIATRIC PATIENTS - INITIAL EXPERIENCE

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Background: Coronary artery imaging in the pediatric population, is usually performed for the evaluation of coronary origin and course or for demonstrating coronary aneurysms. Available modalities for coronary artery evaluation in the pediatric population include: echocardiography, coronary catheterization, coronary CT angiography and MRI. Echocardiography might be limited by a poor acoustic window, while both catheterization and CCTA are related to non-negligible exposure to ionizing radiation and the administration of iodinated IV contrast. Cardiac MRI (CMR) allows coronary artery demonstration without the penalty of radiation exposure or IV contrast administration. The purpose of the current study was to present the initial experience in coronary imaging utilizing MRI at the Sheba medical center.

Materials and Methods: A retrospective analysis of imaging data was performed (October 2010 July 2013). The study cohort included 29 patients. Clinical indications included coronary artery origin and course demonstration (N=27) and follow up post Kawaski disease for coronary aneurysms evaluation (N=2) Twenty six were patients suspected for coronary anomalous origin, three patients with post Kawaski disease. Study cohort characteristics: average age 6 years (range: 9 month to 18 years), mean weight: 26 Kg (range 9 kg-75 kg). CMR scans were performed utilizing a 1.5 T scanner (Signa HDxt LCC BRM, Ver 15M4A SP4 (N=5) OPTIMA MR450W, ver DV23.1 M4 (N=24)). All scans were performed using a dedicated 8 channel cardiac coil. Cardiac sequences included: 3D fat saturated steady state free precession optimized for whole-heart coverage with 3D respiratory navigator and double inversion recovery (when images were not sufficient, or additional information was needed). In all cases no IV contrast was administered. Scan length: average 10 minutes (range 7-20 minutes).

Results: The study cohort included 29 scans. Normal coronary course and origin was demonstrated in 25 patients (25/27). One patient (1/27) was found with anomalous origin of the left coronary from the right coronary sinus. Diagnostic quality was achieved in 28/29 scans, 1/29 scans was un interposable due to non synchronized respiration. Coronary aneurysms were documented in 2 patients referred for follow up post Kawasaki disease (2/2).

Conclusions: CMR allows diagnostic information in can be used for evaluation of the coronary arteries, in specific in the pediatric population. CMR allows demonstration of coronary artery course and origin as well as the presence of coronary aneurysms. CMR should be considered as the imaging modality of choice for coronary evaluation in the pediatric population, especially in the light of no exposure to ionizing radiation or IV contrast administration.

THE BLIND SPOT OF THE HIP MR ARTHROGRAPHY: LIGAMENTUM TERES INJURY

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Purpose: The recognition of lesions of the ligamentum teres has increased substantially among orthopedic surgeons due to the increasing use of hip arthroscopy. The ligament is now recognized as an important hip stabilizer. Ligamentum teres abnormality is considered as the third most common cause of hip pain among athletes and is obsereved in 4%–15% of hip arthroscopies. Despite the emerging "popularity" of this ligament, there is still under-diagnosis of this entity on MR arthrography and paucity of radiologic literature. This has motivated us to describe abnormalities of ligamentum teres in MR arthrograms with surgical correlation.

Materials and Methods: 5 preoperative hip arthrograms of 5 patients that underwent hip arthroscopy in which a ligamentum teres pathology was diagnosed were included. The MR studies were evaluated by 2 fellowship trained musculoskeletal radiologists for: ligamentous continuity, homogeneity of thickness and signal, regularity of the margins, presence of high signal on T1 weighted images. The abnormalities were categorized to complete tear (discontinuity), partial tear (inhomogeneity or attenuation) and degenerative tear (irregular margins and thickening). The reviewers also evaluated for the presence of intra-articular pathologies including labral tears, chondral defects and femoroacetabular impingement. The original reports were reviewed for interpretation of ligamentum teres injury and for the other intra-articular pathologies.

Results: In all studies the reviewers clearly observed an abnormal ligamentum teres: in 2 patients complete tears are detected , in 2 patients partial tears and in 1 patient degenerative tear are noted. All patients had an intra-articular pathology. In none of the reports a ligamentum terez pathology was mentioned. For the other intra-articular pathologies there was a 100% correlation between the reports, the reviewer's evaluation and the surgical findings.

Conclusions: Ligamentum teres tears are easily missed on hip MR arthrograms although in a retrospective dedicated review they are clearly seen. The concomitant intra-articular pathologies in additions to low awareness of this entity and its important clinical implications are likely responsible for this under-diagnosis.

ATYPICAL FEMORAL FRACTURES-RADIOLOGICAL EVALUATION AND BIPHOSPHONATE EXPOSURE: A TWO CENTER EXPERIENCE

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Purpose: The evidence suggests that prolonged bisphosphonate (BP) treatment predisposes to atypical fractures (AF), but causality remains to be determined. Addressing whether a causal relationship exists begins with case identification, which requires radiological adjudication. However, many trials based case findings on coded diagnoses. We investigated the feasibility of case findings by the coding system and the reproducibility of radiological evaluations in two hospitals in Israel. BP exposure of AF patients was compared to a control group with supratrochanteric fractures.

Materials and Methods: Diagnostic databases from 2007–2010 were reviewed. Admission X-rays of patients were examined in two steps by two radiologists. Fractures were classified as atypical or not atypical according to published criteria. A 2:1 control group was created. Ambulatory drug acquisition was reviewed.

Results: Of the 198 patients who fulfilled the search criteria, 38 were classified by initial radiological opinion as AF. Subsequent radiological opinion judged 16 as not atypical. From the AF patients, 80 % were exposed to BP. Of those, 81 % continued to receive BP treatment for 2.4 years after AF. Only one AF patient was discharged with suspected AF diagnosis. In a control group, 27 % were exposed to BP prior to fracture ($p < 0.001$).

Conclusions: Thorough radiological revision is mandatory for proper classification of AF, and even when performed, significant inconsistency in interpretation persists. Conclusions drawn from trials based solely on coded diagnoses lead to significant bias. BP exposure was significantly higher in the AF group. Caregiver unawareness of this entity leads to improper management.

ATYPICAL FEMORAL FRACTURES – THICK CORTEX HYPOTHESIS CHALLENGED

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Background: Atypical femoral fractures (AF) have drawn much attention during the last years. There has been extensive research aimed at determining a possible connection to prolonged bisphosphonate use and the distinctive morphologic pattern of AF has been discussed. Some have suggested that AF are accompanied by a thick femoral cortex and a correlation between the magnitude of cortical thickening and the length of bisphosphonate exposure has been reported. During the last year, several investigators have challenged the concept of shaft cortical thickening. We looked at cortical width of patients with AF, compared to typical shaft fractures, in a retrospective cohort of patients with subtrochanteric fractures.

Materials and Methods: A computerized database of discharge diagnoses from January 2007 to June 2012 was reviewed. ICD-9 diagnoses compatible with fracture location below femoral neck were chosen. Patients younger than 50 years and those with major trauma were excluded. Admission femoral X-rays of patients with suitable fracture location were examined by a senior radiologist (AN). The fractures were classified as atypical or not-atypical according to the published criteria. The total femoral diameter and the lateral and medial cortex width were measured 15 cm below the highest point of the greater trochanter. A multivariate model adjusted for age and BP length of exposure was built.

Results: One thousand eight hundred and fourteen patients were admitted with femoral fractures. Among the thirty seven femoral fracture X-rays suitable for measurements, we found thirteen AF and twenty four typical subtrochanteric. The ratio of lateral cortical width/total femoral shaft width (LC/TFS) did not differ between the groups and were 0.247+0.051 and 0.240+0.047, respectively ($p=0.66$). No difference in shaft cortical thickening was found after multivariate analysis. BP exposure was documented in the 91 % of AF, compared to 19 % of NA fracture patients ($p<0.0001$). Median length of BP exposure was significantly longer in the AF group.

Discussion: Our data shows that patients with AF do not have a thicker cortex, when compared to typical subtrochanteric fracture patients. Since two other recently published reports on the subject did not support the cortical thickening hypothesis, this premise should be re-thought. This study further strengthened the relationship between BP exposure and AF.

IS CONTRAST MATERIAL NEEDED FOR RELIABLE MRI SCORING OF SYNOVITIS OF THE HAND IN PATIENTS WITH RHEUMATOID ARTHRITIS? A SYSTEMATIC COMPARISON AT FOUR DIFFERENT MRI FIELD STRENGTHS

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Objective: To explore if the reliability of synovitis assessment is influenced by contrast enhancement, different MRI field strengths (0.23/0.6/1.5/3.0T), coil types and image resolutions in RA patients and healthy controls.

Materials and Methods: 41 RA patients and 12 healthy controls underwent 7 MRI including short tau inversion recovery (STIR) and T1-weighted (T1w)-sequences on 4 different MRI-units with different field strengths (0.23T, 0.6T, 1.5T, and 3.0T) and coils (flex coils and dedicated phased-array extremity coils) within 24 hours. A coronal post-contrast T1w sequence obtained at 1.5T was the gold standard reference. Images were scored according to the OMERACT Rheumatoid Arthritis MRI Score (RAMRIS) by an experienced reader blinded to MRI sequence and coil type. Intrareader reliability was evaluated on a subset of 15 patients and 3 controls.

Results: Fair to good agreement (ICC=0.38-0.72) was seen between different STIR protocols and the gold standard reference. The best agreement was found using the 1.5T unit with extremity coil and small voxel size. The accuracy for presence/absence of synovitis was moderate-very high (per patient: 0.80-1.0, per joint: 0.63-0.85), whereas exact agreements on scores were moderate (0.50-0.66). Intrareader agreement on presence/absence of synovitis was high (0.87-1.0), while moderate-high on exact scores.

Conclusions: Unenhanced MRI using STIR sequences is only moderately reliable for assessing synovitis in RA metacarpophalangeal and wrist joints, when contrast-enhanced MRI is considered the gold standard reference. Contrast injection, field strength and coil type influence synovitis assessment, and should be considered before performing MRI in clinical trials and practice.

POSTERS

UNEXPECTED IMAGING FEATURES WITH CLINICAL IMPACT ON ROUTINE POST CONTRAST CT OF THE HEAD IN THE SUSPECTED STROKE SETTING

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Purpose: Post contrast CT (PCCT) after an angiography was added in 2012 as a part of the routine protocol. This is in cases of suspected stroke that are planned for tPA administration. Our purpose is to present a number of cases where unexpected findings were seen in the PCCT that had clinical impact.

Materials and Methods: In cases of stroke where tPA is considered, our imaging protocol includes NCCT, 3 m"m and 1 m"m reconstructed, angiography from the level of the aorta and a PCCT (2 minutes after IV contrast).
There were seven cases presenting with unexpected findings in the PCCT that had clinical impact.

Results: In one case, only in the PCCT were we able to differentiate between an M1 occlusion and an ICA dissection. In two cases, veno-occlusive disease was diagnosed, rather than arterial occlusion. In two cases, late contrast extravasation into a bleeding focus was seen. This finding led to more immediate and more aggressive treatment of the anti-coagulability state. In one cases, due to brain edema, a bleeding arterial aneurism was only seen in the late PCCT stage. In one case, it was possible to differentiate an acute midbrain infarct from posterior-fossa artifacts.

Conclusions: There is an accepted benefit to PCCT in the acute stroke setting in showing the core infarct. In addition, PCCT can present unexpected diagnoses with impact on treatment and prognosis.

THE PERI-RENAL SPACE – UNUSUAL SITE OF PRIMARY LESIONS

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Background: We present rare pathologic conditions occurring in the peri-renal space. We shall emphasize the importance and accuracy of imaging methods, including CT & Ultrasound in making theses rare diagnoses.

Materials and Methods: During the last 5 years we encountered various rare conditions originated in the peri-renal space. All cases were confirmed histologically.

Results: Case 1: Retroperitoneal Liposarcoma – This is a sub type of liposarcoma, a malignant tumor of mesenchymal origin that may arise in any fat-containing region of the body.

Case 2: Retroperitoneal Lipoma - Is a benign tumor retroperitoneal space composed of adipose tissue (body fat).

Case 3: Perinephric Extramedullary Hematopoiesis (EMH) - EMH occurs in hemoglobinopathies, hemolytic anemias, leukemias, lymphomas, myelofibrosis, or skeletal metastases. The most common sites are the liver, the spleen, and the paraspinal regions of thorax. A rtare site is the retroperitoneal space. Other unusual sites include thymus, heart, lungs, mediastinum, gastrointestinal tract, and lymph nodes.

Case 4: Perinephric Xanthogranulomatosis – This is an idiopathic rare entity in which lipid-laden histiocytes may deposit in various locations in the body.

Case 5: Erdheim Chester Disease – This is a rare form of non-Langerhans cell histiocytosis of unknown origin, belonging to the category of acquired overload histiocytosis.

Case 6: Thyroidization of the kidney – The microscopic appearance of an "end stage kidney" is similar regardless of the cause, which is why a biopsy in a patient with chronic renal failure yields little useful information. The cortex is fibrotic, the glomeruli are sclerotic, there are scattered chronic inflammatory cell infiltrates, and the arteries are thickened. Tubules are often dilated and filled with pink casts, thus providing an appearance of "thyroidization.

Conclusions: The goal of this presentation is to make radiologists aware of the variety of pathologic conditions that may occur in the perirenal space.

CLOVES SYNDROME: A RECENTLY DESCRIBED SYNDROME OF VASCULAR AND MUSCULOSKELETAL ANOMALIES

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CLOVES (Congenital Lipomatous Overgrowth, Vascular anomalies, Epidermal nevi, and Skeletal abnormalities) syndrome is a recently described congenital disorder. Affected children present with fatty truncal masses, multiple vascular anomalies, skin manifestations, as well as scoliosis and other skeletal abnormalities.123

CLOVES syndrome is a relatively rare, however, increasingly recognized disorder. Many children previously diagnosed with Capillary-Lymphatic-Venous Malformation (Klippel-Trenaunay syndrome) would now be more appropriately characterized as CLOVES patients.

The presentation will focus on typical clinical and radiologic manifestations of CLOVES syndrome with illustrative case presentations. We will also focus on some of the inherent potential complications, such as life-threatening pulmonary emboli,4 and on their endovascular management.

THE PHYSICS OF THE PROSTATE GLAND

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The application of well known principles of classical fluid dynamics and hydraulics explains the causes of prostate enlargement and the eventual development of prostate cancer. Erect posture in humans promotes gradual failure of the valves in the internal spermatic veins (ISV). In the upright posture, in the absence of normally functioning valves, elevated venous pressures are propagated from the ISV's into the pelvic venous plexi (application of Bernoulli's Principle of communicating vessels). The elevated pressures drive active (free) testosterone, in extremely high concentrations, via the Santorini venous plexus directly into the prostate gland. The high testosterone levels accelerate prostate cell growth, resulting in BPH. Percutaneous sclerotherapy of the ISV's, bilaterally, including their numerous retroperitoneal collaterals, eliminates back-flow of FT via the venous drainage system from the testes to the prostate. The treatment results in significant reduction of prostate volume and symptoms.

ENDOVASCULAR STENT-GRAFT FOR PSEUDOANEURYSMS OF THE ABDOMINAL AORTA CAUSED BY SALMONELLA

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We describe the 2 cases of endovascular treatment for patients with mycotic aneurysm of the abdominal aorta caused by Salmonella. Endovascular grafting combined with antibiotic therapy in abdominal mycotic aneurysms may represent an alternative to conventional surgery in patients with high operative risk.

Despite improvements in both standard of living and level of healthcare, mycotic aortic aneurysms continue to present a considerable diagnostic and therapeutic challenge. Classically, mycotic aneurysms develop as a result of arterial wall breakdown by invading microorganisms from either the lumen, via the intima, or from outside via the vasa vasorum. They may also result from direct extension of a focus of infection. The most common location is the infrarenal aorta, as in our patients.
The predominant organisms are Staphylococcus aureus, Streptococcus. However, in the twentieth century Salmonella predominated.
Multi-detector computer tomography (CT) with intravenous contrast is the preferred imaging modality, allowing accurate diagnosis, biopsy and treatment planning.
The traditional management of mycotic aortic aneurysms is open surgical resection of the abdominal aorta with extra anatomic bypass in combination with antibiotic therapy.
Our patients were admitted to our hospital, with complaints of backache, chills and abdominal pain. One patient had undergone true-cut biopsy due to the retroperitoneal mass. Relevant laboratory results showed a leukocytosis and increase a C-reactive protein. Laboratory cultures were positive for Salmonella. Intravenous therapy with AB was started.
Abdominal computed tomographic (CT) scan with intravenous contrast was performed; it showed an infrarenal pseudoaneurysm with a very irregular aortic wall suspicious of contained rupture. In addition, a small air pocket was identified on the left side of the abdominal aortic wall; the air pocket was surrounded by mild fatty infiltrations.
Age and debilitated condition of the patient precluded surgery. Decision was made to treat by endovascular exclusion of the aneurysm, and endovascular stentgrafting was performed.
Clinical and CT follow up showed complete exclusion of the pseudoaneurysms.
There were no postoperative complications. The patients are well at long term follow-up.

IMAGINE

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The presentation is a collection assembled from CT, X-ray and ultrasound images .

We tried to spice up the routine interpretation of these exams by adding an imaginative dimension, looking at the visual images from another point of view. Even from the most trivial or gloomy images, various characters are brought to life.

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CONGENITAL ABSENCE OF SPLENIC ARTERY COINCIDENT WITH PORTAL VEIN THROMBOSIS AND RENAL INFARCTION

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Congenital absence of splenic artery is a very rare condition; it was reported only in a few cases worldwide, with only one case of coincident absence of the splenic vein. To the best of our knowledge absence of splenic artery coincident with portal vein thrombosis and kidney infarction has not been reported.

Here we report about a case of the absence of splenic artery in a 52 years old man who presented with left abdominal pain. CT examination revealed left renal infarction, not seen in 3 months ago previous CT exam done for portal vein thrombosis. In both CTA exams done within three months period the CT exams revealed absence of splenic artery, with spleen getting its blood supply by tortuous collaterals from the right gastro-epiploic artery.

Previous history revealed that this man suffered from an old myocardial infarction 10 years ago, he suffered from deep vein thrombosis (DVT) and pulmonary embolism (PE) 14 years ago, and therefore coagulation blood tests was done that was normal except for 5,10-Methylenetetrahydrofolate Reductase (MTHFR) mutation.
No previous history of splenic artery thrombosis or splenic artery intervention was known. No residual or rudimentary splenic artery was seen in its normal origin from the celiac trunk, therefore we suppose that the absence of the splenic artery was congenital in origin.

This entity of congenital absence of splenic artery may be a causative agent in upper gastrointestinal bleeding, that's why it is important and essential to diagnose and report it.
I herein report this rare case and review previously reported cases.

UNUSUAL BULLET MIGRATION WITHIN THE VENOUS SYSTEM - A CASE REPORT

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Introduction: Reports of bullet migrating in the vascular system are anecdotal. Bullet migration within the vascular system requires entry through the vessel wall leaving the contralateral wall intact. Such embolization is life threatening if the bullet ends within a pulmonary artery4 or inside the heart.
Successful endovascular management has been reported in some cases5.
In some cases, when the patient is asymptomatic, conservative management is adopted. In our case, as endovascular approach carried a high risk, the bullet was removed in open surgery.
We report a case of a 77 year old patient who sustained a gunshot to the left shoulder. The bullet entered the left subclavian vein moving freely from the subclavian vein into the brachiocephalic vein through the SVC going into the right atrium and out to the IVC lodging in the right common iliac vein. About one hour later the bullet was noted to migrate to the suprahepatic IVC where it remained until removed by vascular surgeons.The patient remained asymptomatic the whole time.

The case report: Our patient, a 77 year old man, who was caught in the line of fire, sustained a gunshot wound to the left shoulder. Physical examination revealed an entry wound but no exit wound. As the injury was at the level of the upper chest, a CTA of the chest and upper abdomen was requested. The CTA revealed a hematoma inferior to the clavicula but no active bleeding (Fig 3 and 4). The surview did not show any evidence of foreign body (Fig 2). The bullet was nowhere to find. A chest x-ray taken 30 minutes prior to that CTA showed no sign of the bullet too (Fig 1). In an effort to find the bullet, an abdominal x-ray was taken 30 minutes following the CTA. That x-ray revealed a whole bullet, 0.38cm in diameter, in an orientation paralleling the common iliac vein or artery (Fig 5). In order to rule out any unseen injuries to abdominal organs and to better assess the area where the bullet had been seen, another CTA of the abdomen and pelvis was performed about an hour later. That CTA revealed that the bullet has dislodged and moved up the IVC lodging in the suprahepatic part of the IVC (Fig 6). No further hematomas or any signs of injury were noted in the abdomen or pelvis (Fig 7).
The patient remained asymptomatic the whole time not fully understanding the commotion around him. The patient was transferred to another hospital for management by open vascular surgery as endovascular management was deemed as high risk.
The 0.38 bullet was recovered from the IVC and the patient recovered without significant complications.

Discussion: The reported incidence of bullet embolization is 0.3%. A bullet embolus should be suspected when an entry wound is found without an exit wound and when the location of the bullet does not correlate with the signs of injury on the CT image. In such cases, the CTA should cover the neck, chest, abdomen and pelvis as the bullet can cover a large distance from the entry site.
According to the literature 80% of bullet emboli are arterial so venous bullet emboli are quite rare. In our case, the bullet moved initially with the help of gravity until it reached the right common iliac vein but then it moved against gravity and with the direction of venous flow towards the heart. The shape of the bullet, gravity, direction of flow, patient position, respiratory and muscular movement all influence migration of the bullet. Management of bullet emboli within the venous vascular system includes open thoracotomy, endovascular extraction and conservative management.

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

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Background: To evaluate the efficacy of "Ipsilateral Opposite Side Aspiration", a new method to overcome resistant pneumothorax after failure of a simple aspiration. The patient position is reversed (from prone to supine or vice versa) and the aspiration repeated.

Materials and Methods: Between January 1, 2010 and April 3, 2012, 129 consecutive CT-guided percutaneous needle biopsies of lung nodules were performed in 127 patients (75 men, 52 women; mean age 67.8 years; range 26-88 years). Two patients underwent repeat biopsies. The mean lesion diameter was 38 mm (range 8-110 mm). Core biopsy and FNA were performed in 126 procedures; in 3 cases, only FNA was performed. In the cases with symptomatic minimal pneumothorax and in all patients with pneumothorax >10 mm, immediate, simple manual aspiration was performed. Ipsilateral opposite side aspiration was performed when simple aspiration failed.

Results: Among 129 CT-guided biopsies, pneumothorax was detected by CT in 54 (42%); 51 (39%) during the biopsy. Delayed pneumothorax occurred in 2 patients (1.55%). Manual aspiration to treat pneumothorax was performed in 27 (21%) of 129 procedures. Simple aspiration was successful in 20 (74%) of these 27 cases. Ipsilateral opposite side aspiration was accomplished in the remaining 7 (26%) and was successful in 6 (86%). Two (1.55%) of 129 procedures required chest tube placement.

Conclusions: Immediate, simple, percutaneous aspiration of iatrogenic pneumothorax was successful in 74% of patients needing treatment. Our proposed new method of ipsilateral opposite side aspiration offers a solution for patients who remain with resistant pneumothorax after simple aspiration.

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