Long Head of Biceps Tendon (LHBT) Instability Due to Biceps Pulley Lesion of the Shoulder: Arthro-MRI including “Functional” Images vs Arthroscopy (Station #1)

Silvia Mariani MD (Presenter): Nothing to Disclose, Alice La Marra MD: Nothing to Disclose, Emanuele Costantini MD: Nothing to Disclose, Francesco Arrigoni: Nothing to Disclose, Antonio Barile MD: Nothing to Disclose, Carlo Masciocchi MD: Nothing to Disclose

PURPOSE
To evaluate the added value of the internal and external rotation and abduction and external rotation (ABER) images during arthro-MRI in identifying the LHBT instability and the possible development of an antero-superior impingement (ASI).

METHOD AND MATERIALS
We retrospectively analyzed MRI exam of 70 patients who underwent arthro-MRI (1.5T) and arthroscopy within the following 7-45 days. Patients had clinical suspicion of biceps pulley lesions. The shoulder was studied (with dedicated coil) in neutral position, in internal and external rotation and ABER position in all patients.

RESULTS
Patients were divided in 4 groups (Habermayer classification) and evaluated for an unstable LHBT: 10 patients had superior gleno-humeral ligament (SGHL) tear (Type I), 16 patients SGHL and supraspinatus (SSP) tendon tears (Type II), 21 patients SGHL and subscapularis (SSC) tendon tears (Type III) and 23 patients SGHL, SSP and SSC tears (Type IV). At arthroscopy 2 patients were negative, 8 patients had Type I, 16 patients Type II, 19 patients Type III and 25 patients Type IV lesions. MRI internal and external rotation showed an initial anteromedial subluxation of the LHBT in 8 patients with Type II lesion and an anteromedial subluxation of the LHBT in all patients with Type III and Type IV lesions. ABER position showed gleno-humeral antero-superior malalignment in 14 cases. The dynamic tests during arthroscopy, confirmed LHBT instability and ASI features in patients with Type III and Type IV lesions and antero-superior malalignment only in 9 cases.

CONCLUSION
Only high grade lesions of the biceps pulley can be associated with LHBT instability and antero-superior gleno-humeral malalignment. MRI external and internal rotation led to a better identification of structures of the biceps pulley and the detection of LHBT instability could suggest the presence of ASI.

CLINICAL RELEVANCE/APPLICATION
“Functional” MRI images allow a dynamic evaluation of the LHBT and of the antero-superior aspect of the gleno-humeral joint; these structures often result unstable in presence of an ASI type III and type IV confirmed by arthroscopic dynamic tests.

Delaminated Tears of the Rotator Cuff: Prevalence, Characteristics and Diagnostic Accuracy on Indirect MR Arthrograph (Station #2)

Hye Jung Choo MD: Nothing to Disclose, Gi Won Shin MD (Presenter): Nothing to Disclose, Sun Joo Lee MD: Nothing to Disclose, Young Mi Park MD, PhD: Nothing to Disclose, Young Jun Cho: Nothing to Disclose, Seok Jin Choi: Nothing to Disclose

PURPOSE
The presence of delaminated tears of the rotator cuffs has been reported as a negative prognostic factor after rotator cuff repairs. However, there are a few radiologic reports about delaminated tears of the rotator cuff. In this study, the prevalence, characteristics, and diagnostic accuracy of delaminated tears at the supraspinatus-infraspinatus tendons (SST-IST) were evaluated on indirect MR arthrography.

METHOD AND MATERIALS
Indirect MR arthrography of 231 shoulders with tears at the SST-IST were included. On MR images, the delaminated tears at the SST-IST, defined as an intratendinous horizontal splitting between the articular and
bursal layers of the SST-IST and/or different degree of retraction between the two layers, were identified and classified into six types: articular-delaminated full-thickness tear, bursal-delaminated full-thickness tear, interstitial-delaminated full-thickness tear, articular-delaminated partial-thickness tear, bursal-delaminated partial-thickness tear and interstitial-delaminated partial-thickness tear. Other radiologic findings such as the presence of intramuscular cysts and footprint tears were evaluated. Based on the review of video records of 127 arthroscopic surgeries, the diagnostic accuracy of indirect MR imaging for the detection of the delaminated tears was determined.

RESULTS
On MR imaging, 56% (129/231) of shoulders with SST-IST tears had delaminated tears. Articular-delaminated full-thickness tears (n = 58) and articular-delaminated partial-thickness tears (n = 64) were the most common types. About 82% (36/44) of articular-delaminated full-thickness tears occurring at the SST were combined with articular-delaminated partial-thickness tears at the IST. SST-IST footprint tears and intramuscular cysts were significantly more common in the shoulders with delaminated tears (p = 0.007 and 0.01 respectively). The sensitivity and specificity of indirect MR arthrography for detection of delaminated tears were 93% and 95%, respectively.

CONCLUSION
On MR imaging, about half of the shoulders with SST-IST tears were combined with delaminated tears. The diagnostic accuracy of indirect MR arthrography for detection of delaminated tears was high.

CLINICAL RELEVANCE/APPLICATION
On MR imaging, about half of the shoulders with SST-IST tears were combined with delaminated tears. The diagnostic accuracy of indirect MR arthrography for detection of delaminated tears was high.

MKS353
Serial Ultrasonography after Arthroscopic Repair of Rotator Cuff Tear: Temporal Evolution of Sonographic Findings (Station #3)
Hye Jin Yoo MD (Presenter): Nothing to Disclose, Ja-Young Choi MD: Nothing to Disclose, Sung Hwan Hong MD: Nothing to Disclose, Yusuhn Kang MD: Nothing to Disclose, Jina Park MD: Nothing to Disclose, Ji Young Kim MD: Nothing to Disclose
PURPOSE
To evaluate the serial changes in the sonographic findings of repaired tendon after rotator cuff repair with serial ultrasound examinations

METHOD AND MATERIALS
Sixty five arthroscopically repaired rotator cuff tears (44 full-thickness tears, 21 partial-thickness tears) were retrospectively included in this study. Serial ultrasound examinations were performed at 5 weeks, 3 months, and 6 months after surgery. Sonographic findings of the repaired tendon were assessed in terms of presence of retear, tendon thickness, morphologic tendon characteristics, and vascularity, bursitis at each time point.

RESULTS
Four recurrent tears were occurred within 3 months of surgery. Postoperative tendon thickness decreased from 5 weeks to 6 months following surgery (r=-0.245; p=0.001). There were significant changes in the morphologic tendon characteristics including echotexture, fibrillar pattern, and surface irregularity of repaired tendon from 5 weeks to 6 months following surgery. The subacromial subdeltoid(SDAD) bursitis and vascularity of repaired tendon were also decreased postoperatively over time.

CONCLUSION
Serial ultrasound examinations after arthroscopic rotator cuff repair were useful to monitor the postoperative changes of repaired tendon. Morphologic appearances of repaired tendon and peritendinous soft tissue changes were improved over time and nearly normalized within 6 months of surgery.

CLINICAL RELEVANCE/APPLICATION
Serial ultrasonographic examinations can monitor the postoperative changes of repaired tendon and is recommended as a follow-up imaging modality in the early postoperative period after arthroscopic rotator cuff repair

MKS354
Ultra-high Field Analysis of Knee Cartilage in a Sheep Model by Means of Quantitative T2 Mapping Using 7T MRI and Histological Validation (Station #4)
Milena L. Pachowsky MD (Presenter): Nothing to Disclose, Siegried Trattnig MD : Nothing to Disclose, Kolja Gelse MD : Nothing to Disclose, Joachim Friske : Nothing to Disclose, Martin Brix : Nothing to Disclose, Goetz Hannes Welsch MD : Nothing to Disclose
PURPOSE
T2 mapping at 7T might help to understand the development of osteoarthritis (OA) and of integration processes
after cartilage repair procedures, i.e. autologous chondrocyte transplantation (ACT). Purpose of this study is to determine biochemical properties of cartilage in a sheep model, using biochemical MRI by means of quantitative T2-mapping and establish a histological validation.

METHOD AND MATERIALS

Three groups of sheep (healthy cartilage, n=30, a model of osteoarthritis (post meniscectomy), n=30, and sheep with cartilage defects at the femoral condyle treated by ACT, n=15) were examined. MR scans were achieved at 7T MR whole body system (Magnetoim, Siemens Healthcare, Erlangen, Germany) using a 28-channel transmit/receive knee array coil. T2 relaxation maps were measured by a sagittal multi-echo spin sequence. TR 5260ms; TE 12, 24, 36, 48, 60, and 72ms; FOV 145x145mm, 716x869 matrix size; BW 180 Hz/pixel, slice thickness 2mm; flip angle 145°. Semi-automatic region-of-interest analysis was performed. For stratification with regards to anatomical (collagen) structure, subregional analysis was done (deep - superficial cartilage layer). Results were compared to histological findings. Statistical analysis-of-variance was performed.

RESULTS

In healthy cartilage, T2 values averaged 41.92ms (SD 11.7) in the superficial layer and 32.69ms (SD 9.74) in the deep layer. OA showed results of 60.90ms (SD 14.34) in the superficial layer and 47.28ms (SD 13.54) in the deep layer. After ACT results averaged at 58.41ms (SD 14.34) in the superficial and 45.66 (SD 20.81) in the deep layer. Increase of T2 values between deep and superficial zone was highly significant in the group with healthy cartilage, significant in the OA model and the ACT group. OA and ACT group showed significantly higher values compared to healthy cartilage. Comparison between histological scoring and MR findings showed a significant correlation.

CONCLUSION

The sheep model shows differences between healthy cartilage, OA and cartilage repair sites in T2 mapping. Our new approach at 7T gives additional information about the imaging techniques of the ultra-structure of cartilage and provides one of the very few histological validations of T2 mapping in vitro.

CLINICAL RELEVANCE/APPLICATION

The presented study of T2 mapping in a sheep model and histological validation is an important approach towards establishing T2 mapping of articular cartilage in clinical application.

Diffusion Tensor Imaging, T2 Mapping, and Various Fat Suppression Imaging in Early State of Denervated Skeletal Muscle: Experimental Study in Rats (Station #5)

Dong-Ho Ha (Presenter): Nothing to Disclose, Hwan Tae Park : Nothing to Disclose, Sunseob Choi MD, PhD : Nothing to Disclose

PURPOSE

To simultaneously evaluate the sequential alteration of the DTI indices, T2 values and subjective visual signal intensity change on various fat suppression techniques in the early state of denervated skeletal muscle in the rat model.

METHOD AND MATERIALS

Institutional animal use and care committee approval was obtained. Complete neurotmesis of the sciatic nerve of 8 white rats was performed. We examined MR studies of the normal muscle and follow-up studies at 3 days, 1 week, and 2 weeks after surgery. FA, mADC and T2 values ware measured at the calf muscles. We also subjectively graded visual signal intensity change on CHESS, STIR and IDEAL imaging. Statistical significances were obtained.

RESULTS

FA values at 3 days (0.35±0.06, P=0.012), 1 week (0.29±0.04, P=0.017), 2 weeks (0.34±0.05, P=0.017) were significantly lower than that in control group (0.54±0.17). The mADC of the all follow up periods decreased, but statistically insignificant. T2 values began to increase at three days without statistical significance (34.08±1.42, P=0.069), significantly increased at 2 weeks (38.11±6.41, P=0.017) and marked increased at 2 weeks (46.53±5.17, P=0.012), compared with control group (32.71±1.33). Visual signal intensity changes were variously at 1 week and more prominent at 2 weeks. Grading the lesions was identical in all cases.

CONCLUSION

FA and T2 values will be effective parameters to observe the early state of denervated skeletal muscle.

CLINICAL RELEVANCE/APPLICATION

The calculation of FA and T2 value wiil be effective noninvasive methods for the evaluation of acute skeletal denervated muscle, even though it has various limitations. Fat suppression techniques did not affect the early detection of high signal abnormality on T2 weighted image and grading of lesion.

Tarsal Navicular Bone Size in Diabetics: Radiographic Assessment (Station #6)

Elie Harmouche (Presenter): Nothing to Disclose, Douglas D. Robertson MD, PhD : Nothing to Disclose, Geza Kogler PhD, DPhil : Nothing to Disclose, Minzhi Xing MD : Nothing to Disclose, Tharwat Mahmoud
PURPOSE

To test the anecdotal observation that isolated navicular collapse is associated with diabetes mellitus, we quantified the size of the tarsal navicular in subjects with and without diabetes and tested for association of size with age, height, weight, body mass index (BMI), gender, smoking, bone mineral density (BMD), duration and level of control of diabetes.

METHOD AND MATERIALS

Ankle radiographs of 200 patients (122 females; 78 males; mean age 58 years [27-89]), 100 with type II diabetes and 100 age-gender matched controls were selected and reviewed. The anteroposterior (AP) dimension of the mid navicular bone was measured from lateral radiographs. For standardization, the superoinferior (SI) dimension of the calcaneus was measured and the navicular-calcaneus ratio calculated. Statistical evaluation included independent sample t-tests and linear regression analyses.

RESULTS

Diabetic subjects had a significantly smaller navicular AP dimension and navicular-calcaneus ratio compared to controls (p=0.02 and p=0.0001, respectively). Age, gender, height and duration of diabetes had no association with the navicular-calcaneus ratio. Navicular-calcaneus ratio was inversely correlated with weight (p=0.01) and BMI (p<0.001) and directly correlated with smoking (p=0.04).

CONCLUSION

The navicular anteroposterior dimension is smaller in type II diabetic subjects compared to age-gender matched controls. We hypothesize that this is due to navicular collapse whose cause is multifactorial.

CLINICAL RELEVANCE/APPLICATION

This study associates diabetes with dimensional changes in the tarsal navicular and expands our knowledge of the effect diabetes on the bony foot.

Evaluation of a Simplified Version of the Rheumatoid Arthritis Magnetic Resonance Imaging Score (RAMRIS) Comprising 5 Joints (RAMRIS5) (Station #7)

Christoph Schleich (Presenter): Nothing to Disclose, Falk Roland Miese MD : Nothing to Disclose, Philipp Sewerin : Nothing to Disclose, Benedikt Ostendorf : Nothing to Disclose, Gerald Antoch MD : Speaker, Siemens Medical AG Speaker, Bayer AG Speaker, BTG International Ltd, Christian Buchbender : Nothing to Disclose

PURPOSE

Semi-quantitative measurement of inflammatory pathologies of the hand in magnetic resonance images (MRI) is a mandatory, but time-consuming task for MRI controlled studies in Rheumatoid Arthritis (RA). The objective of this study was to evaluate a simplified version of the Rheumatoid Arthritis Magnetic Resonance Imaging Score (RAMRIS) reduced to five joints of the hand (RAMRIS5).

METHOD AND MATERIALS

94 patients with rheumatoid arthritis (62 female, 32 male; age 59 ±12 years, range 25 - 83 years; disease duration 5 ±7.5 years) from the REMISSSION PLUS study cohort who had complete files on C-reactive protein (CRP) levels and Disease Activity Score of 28 joints (DAS28) and completed MRI of the clinical dominant hand at baseline and after one year under anti-rheumatic therapy (follow-up time 12.5 ± 3.5 months) in a dedicated extremity MRI scanner at 0.2T were included in this retrospective study. MR images were scored according the RAMRIS criteria by two readers in consensus. Spearman correlations of the RAMRIS sum-score, subscores for RAMRIS of the metacarpophalangeal joints (RAMRISMCP), wrist (RAMRISwrist) and a reduced score comprising the MCP 2 - 5 and the intercarpal joint were assessed. Additionally, Spearman correlations of MRI scores, CRP levels and DAS28 were calculated.

RESULTS

There was a strong correlation between RAMRIS5 and the RAMRIS sum-score for all patients (r =0.88, p<0.05) at baseline and follow up (r =0.83, p< 0.05). Among the subscores there was a good correlation between RAMRIS5 and RAMRISMCP (baseline: r=0.64, p<0.05; follow-up: r=0.74, p< 0.05) as well as between RAMRIS5 and RAMRISwrist (baseline: r=0.75, p< 0.05, follow-up: r = 0.63, p<0.05) at baseline and follow up. The correlation between RAMRIS5 and CRP (baseline: r=0.13, p<0.05; follow-up: r=0.03, p<0.05) or DAS28 (baseline: r=0.15, p<0.05; follow-up: 0.30, p<0.05) were weak, just like it was observed for regular RAMRIS (CRP baseline: r=0.18, p<0.05; follow-up: r=0.11, p<0.05; DAS28 baseline: r=0.21, p<0.05; follow-up: r=0.33, p< 0.05).

CONCLUSION

RAMRIS5, a modified shorter RAMRIS score based on five joints of the hand is a viable tool for semi-quantitative assessment and monitoring of joint damage in RA.

CLINICAL RELEVANCE/APPLICATION

RAMRIS5 can be used as a time and resource saving alternative for semi-quantitative description of
inflammatory joint changes and therapy monitoring in MRI-controlled studies in RA and for clinical therapy response assessment in RA.

MKE230

What’s In a Name? Review of Specialized Radiographic Views and Stress Radiography for Musculoskeletal Trauma (Station #8)

Chris R. Smith MD (Presenter): Nothing to Disclose, Robert J. Talbert MD: Nothing to Disclose, Sanjeev Bhalla MD: Nothing to Disclose, Michael V. Friedman MD: Nothing to Disclose, Travis J. Hillen MD: Consultant, Biomedical Systems Consultant, Vidacare Corporation, Jonathan Craig Baker MD: Research Consultant, Biomedical Systems

TEACHING POINTS

The standard radiographic series is not always sufficient to diagnose and characterize subtle musculoskeletal injuries. Specialized views and stress radiography help to detect and delineate subtle fractures, ligament injuries, and joint abnormalities. Radiologists should be familiar with these important but less common examinations, which yield valuable supplemental information that affects treatment decisions. Teaching Points: Review the limitations of the standard musculoskeletal radiographic examination and frequently missed injuries. Review important supplemental views, which are known by eponyms, and stress radiographic examinations. Review proper positioning and technique for each view, including important landmarks radiologists can use to assess the quality of the study. Understand key anatomy through 3D surface-rendered CT images. Review the additional clinical information each specialized study provides over the standard radiographic series through illustrative cases.

TABLE OF CONTENTS/OUTLINE

Review of commonly missed injuries
Specialized radiographic views and stress radiography
  • When to use each view
  • Patient positioning and technique
  • 3D surface-rendered CT images of anatomic landmarks
Cases illustrating clinical utility of each specialized study
Summary

MKE304

Ultrasound-guided Gadolinium Joint Injections for Magnetic Resonance Arthrography: A Step-by-Step Approach (Station #9)

Kimberly Ruth Gardner MD (Presenter): Nothing to Disclose, Brian Manfredi MD: Nothing to Disclose, Hsiu Su MD: Nothing to Disclose

TEACHING POINTS

At the conclusion of this presentation, the learner should be able to:
1. Recognize the advantages of ultrasound-guided over landmark-based or fluoroscopically-guided approaches to joint injection with gadolinium prior to arthrography.
2. Gain knowledge of pre-procedural considerations and contraindications.
3. Become familiar with the step-by-step procedure for ultrasound-guided gadolinium shoulder, elbow, wrist, hip and knee injections prior to magnetic resonance arthrography, including technical factors such as ultrasound probe selection and imaging parameters.

TABLE OF CONTENTS/OUTLINE

1. Introduction: The Increasing Role of Sonography in Musculoskeletal Diagnostics and Therapeutics
2. Advantages of Ultrasound-guided over Landmark-based or Fluoroscopically-guided Approaches
3. Pre-Procedural Considerations a) Clinical History b) Prior Imaging c) Current Medications and Allergies d) Contraindications
4. Technical Factors a) Probe Selection b) Imaging Parameters
7. Post-Procedure Considerations/Complications including suboptimal gadolinium injection

MKE128

MSK Imaging: Manifestations of Granulomatous Disease (Station #10)

Mariko Fitzgibbons MD (Presenter): Nothing to Disclose, Kira Chow MD: Nothing to Disclose, Sulabha Masih MD: Nothing to Disclose

TEACHING POINTS

1) Review the immunologic basis of granulomas 2) Review of the pathogens and immune processes leading to granuloma formation 3) Case-based review of musculoskeletal manifestations of granulomatous disease such as sarcoidosis, tuberculosis, coccidioidomycosis, and epidermal inclusion cysts.

TABLE OF CONTENTS/OUTLINE

Discussion will begin with the definition of a granuloma and a discussion of the types of granulomatous disease. This will be a case based presentation of various MSK granulomatous process. Imaging modalities: XR, US, PET/CT, CT, MRI 1) Sarcoidosis Bone marrow, soft tissue changes 2) Atypical Mycobacterial Septic arthritis 3) Tuberculosis Various manifestations including: Dactylitis, osteomyelitis, Pott's disease, soft tissue infections 4) Coccidioidomycosis Septic arthritis, lytic lesions 5) Epidermal inclusion cyst
MKE313  Dermatofibrosarcoma Protuberans, A Rare Skin Lesion That Radiologists Should Think about (Station #11)

Claudia Leticia Hernandez Mejia (Presenter): Nothing to Disclose, Jesus Jimenez Del Rio: Nothing to Disclose, Maria Isabel Fernandez Martinez: Nothing to Disclose, Angeles Ramirez Escobar: Nothing to Disclose, Maria Sanchez Perez: Nothing to Disclose, Johanna Marisol Silva MD: Nothing to Disclose

TEACHING POINTS

To review the dermatofibrosarcoma protuberance tumor and discuss its key radiological findings. To explain the role of radiology in the follow-up and gain awareness of skin lesions found in different imaging techniques.

TABLE OF CONTENTS/OUTLINE

When we come across a soft tissue mass identifying its origins (epidermis, dermis or hypodermis) can be of help. Also we have to consider the location within the body and the age of the patient in order to narrow down the differential diagnosis. Dermatofibrosarcoma protuberance (DFSP) is the most common mesenchymal superficial malignancy. It originates from the dermis. The peak age is between 20 and 40 years old. It affects more frequently men than women (not in our series) and is most commonly seen on the trunk. It can recur and rarely metastasizes. We will show its key feature image on MR, CT and ultrasonography with a series obtained at our institution. We reviewed 40 cases from January 1998 until March 2014. We found 20 males and 20 females (mean age 44 years, age range 22 to 71 years). Only 1 recurrence has been reported (9 years after the original lesion). It is important to have free margins after resections otherwise a recurrence could happen and long term follow up is needed. That is why we need to understand post treatment imaging changes and differentiate it from local recurrence.

MKE286  Maneuvering Around Metal: Total Joint Arthroplasty Imaging and MR Metal Suppression Sequences (Station #12)

Brett S. Talbot MD (Presenter): Nothing to Disclose, Eric P. Weinberg MD: Nothing to Disclose

TEACHING POINTS

The purpose of this educational exhibit is to:
1) Provide an overview of current metal suppression sequences, including a discussion of key concepts in the associated MR physics.
2) Demonstrate an extensive series of cases where metal suppression plays a key role in the diagnosis of total arthroplasty complications.
3) Place emphasis on specific findings in total knee and total hip arthroplasty on metal-suppressed MR imaging.

TABLE OF CONTENTS/OUTLINE

- Basic approaches to metal suppression such as metal artifact reduction sequence (MARS). - Discussion of more contemporary approaches including WARP (MARS with view angle tilting - VAT), SEMAC, and MAVRIC. - MR physics discussion including limitations (inability to perform fat saturation, possibility of increased imaging time). - Field strength comparison including degrees of susceptibility artifact at 1.5 and 3.0 T. Specific complications to be discussed include: Metallosis, Particle Disease, Infection (acute and chronic), Loosening, Tendon injury, Muscle injury.

MKE246  Evaluation of the Intraarticular Portion of the Biceps Brachii Tendon at the Shoulder with Ultrasound: Anatomy, Pathology and New Maneuver of Mick Jagger Position (Station #13)

Guillermo Andres Azulay MD: Nothing to Disclose, Patrick Omoumi MD (Presenter): Nothing to Disclose, Daniel Postan: Nothing to Disclose, Gabriel Hector Aguilar MD: Nothing to Disclose, Rafael Barousse MD: Nothing to Disclose, Ignacio Rossi: Nothing to Disclose, Ariel Gonzalez Nogales MD, PhD: Nothing to Disclose

TEACHING POINTS

It is essential to understand the dynamics of the intraarticular portion of the biceps tendon in relation to shoulder movement for the ultrasound examination. A maneuver in abduction and internal rotation (Mick Jagger position) can help to visualize the intraarticular portion of the biceps tendon and its pathology.

TABLE OF CONTENTS/OUTLINE

1. Anatomy: - Cadaveric study illustrating the anatomy of the intraarticular portion of the biceps tendon, the relationship between the tendon and its surrounding structures, the position of the technique in relationship to the shoulder movements. 2. Detailed ultrasound technique: - Description of the Mick Jagger position - Optimal acoustic window 3. Normal ultrasonographic aspects 4. Pathological ultrasonographic aspects

MKE018-b  Basic Principles and Applications of Dual Energy Computed Tomography (DECT) in Gout (hardcopy backboard)

Shima Aran MD (Presenter): Nothing to Disclose, Frank J. Simeone MD: Nothing to Disclose, Khalid Walid Shaqdan MD: Nothing to Disclose, Elmira Hassanzadeh MD: Nothing to Disclose, Efren Jesus Flores MD: Nothing to Disclose, Hani H. AbuJudeh MD, MBA: Research Grant, Bracco Group Consultant, RCG HealthCare Consulting Author, Oxford University Press

TEACHING POINTS

There are many exciting new applications for advanced imaging in gout. Dual energy CT (DECT) can
differentiate urate crystals from calcium by using specific attenuation characteristics and reveal even small occult tophaceous deposits. DECT can also be used for serial volumetric quantification of subclinical tophi to evaluate response to treatment. We plan to expose radiologists to a series of challenging cases to understand how this unique and clinically relevant modality can facilitate diagnosis and management of gout.

**TABLE OF CONTENTS/OUTLINE**

1. Physical principles of DE or spectral CT on basis of photoelectric and Compton interactions as well as material decomposition.  
2. Available techniques of DE data acquisition, for example, dual source CT scanners, fast kilovoltage switching and sandwich detector techniques.  
3. Image processing and reconstruction of DECT data.  
4. Clinical application of DECT for diagnosis and management of gout.  
5. Sample cases.  
6. Limitations of DECT in the musculoskeletal imaging such as the effects on image quality, artifacts and radiation dose.