



**Scientific Sessions
and
Clinical Trials in Radiology
(B)**

Scientific session numbers are prefixed by SS.
Presentation numbers are prefixed
by the letter B.
Sessions and abstracts are listed
by days.

The Clinical Trials in Radiology sessions are listed at
the end of section B. (page 460)

Wednesday, March 2..... 163
Thursday, March 3 250
Friday, March 4..... 323
Saturday, March 5..... 359
Sunday, March 6 404

and poorly differentiated (4%, 1/25). Fuhrman grades were 4 (48%, 12/25), 3 (36%, 9/25), 2 (12%, 3/25), and unknown (4%, 1/25). For all of the three patients with Fuhrman grade 2, T-stage was T3a. Sarcomatoid differentiation was found in 32% (8/25). Although there was a single patient with positive surgical margin, peritoneal seeding occurred postoperatively in 76% (19/25). Median survival time and 1-year, 2-year, and 3-year overall survival rates were 13 months, 51%, 41%, and 31%, respectively.

Conclusion: Peritoneal seeding can occur in various subtypes of RCC with high Fuhrman grade (3-4), sarcomatoid differentiation, or T-stage \geq 3a. It appears to be related to poor prognosis.

B-1240 11:26

Diffusion-weighted MRI of the bladder as a biomarker for prediction of bladder cancer aggressiveness

L. Ponhold¹, S. Sevcenco², G. Heinz¹, P.A.T. Baltzer², ¹St. Pölten/AT, ²Vienna/AT

Purpose: Testing the utility of diffusion-weighted magnetic resonance imaging (DW-MRI) for bladder cancer (BCA) staging and grading.

Methods and Materials: 51 consecutive patients (median age = 64 y, range: 30-90y) with suspected BCA with or without gross haematuria received a 3-T DW-MRI before transurethral resection of the bladder. Parametric apparent diffusion coefficient (ADC) maps were automatically calculated from DW-MRI. ADC values (given in $\times 10^{-3}$ mm²/s) of bladder lesions were independently measured by 2 radiologists blinded to histopathology. Comparisons of ADC values with histopathologic features were performed using unpaired t tests. Diagnostic performance was calculated by means of receiver operating characteristics (ROC) statistics.

Results: We excluded 8 patients: 1 presenting with metastatic melanoma to the bladder, 1 who had an incomplete examination, and 6 without BCA. In the 43 remaining patients (median age = 68 y, range: 41-85 y), the ADC values were lower in high-grade (n = 19, ADC = 0.787) compared with low-grade (n = 24, ADC = 1.233) tumours (P < 0.0001) and in muscle-invasive tumours (n = 10, ADC = 0.759) compared with non-muscle-invasive tumours (n = 33, ADC = 1.120, P = 0.0004). The area under the ROC curve was 0.884 for prediction of muscle invasion and 0.906 for prediction of high grade by using ADC values. Rule-in ADC criteria for high-grade lesions and rule-out ADC criteria for muscle invasion were identified by ROC analysis.

Conclusion: ADC measurements obtained by DW-MRI are a promising imaging biomarker for prediction of BCA stage and grade providing high sensitivity and specificity.

B-1241 11:34

The value of chemical shift MRI in characterising adrenal incidentalomas found in routine contrast-enhanced CT

Y.-W. Wu, C. Tan; Singapore/SG (yiwei.wu@mohh.com.sg)

Purpose: This study aims to assess whether adrenal incidentalomas found in routine contrast-enhanced CT can be characterised using chemical-shift MRI rather than dedicated adrenal CT.

Methods and Materials: Between January 2010 and December 2014, 62 adrenal tumours (50 adenomas and 12 non-adenomas) underwent contrast-enhanced CT (CECT) in portal venous phase and chemical-shift MRI (CSMRI). Attenuation on portal venous phase CECT, adrenal-to-spleen chemical shift ratio (ASR) and signal-intensity index (SII) were obtained for each adrenal mass.

Results: The sensitivities and specificities for diagnosing adrenal adenoma using SII vs ASR were 84.0% (42/50) and 91.7% (11/12) vs 70.0% (35/50) and 100% (12/12). There was significant correlation between the adenoma attenuation on CECT and quantitative measurements on CSMRI. The sensitivity of SII in diagnosing adenomas decreased when the CECT attenuation increased. The sensitivities and specificities of SII were up to 96.3% (26/27) and 100% (7/7) for those measuring < 80 HU, but reduced to 69.6% (16/23) and 80.0% (4/5) for those \geq 80 HU.

Conclusion: CSMRI shows high diagnostic accuracy for adrenal incidentalomas measuring < 80 HU on CECT and is recommended as the first line study for lesion characterisation in order to reduce radiation exposure and risk of contrast reactions from the standard CT adrenal protocol.

B-1242 11:42

Radiological formula for differentiating between secreting and non secreting adrenal adenomas

C. Mosconi, V. Vicennati, D. Papadopoulos, R. Pasquali, R. Golfieri; Bologna/IT (papadopoulos.dmts@gmail.com)

Purpose: To find a correlation between radiological characteristics of adrenal adenomas and functional parameters to predict subclinical glucocorticoid secretion.

Methods and Materials: This retrospective study included 55 patients with adenomas, investigated through CT with adrenal protocol assessing diameters, HU values of the unenhanced and contrast enhanced phases (enhanced-E, and 15 min delayed enhanced-D). Patients underwent blood cortisol, ACTH, 24h urinary free cortisol evaluation and dexamethasone overnight suppression test (DST). Post-DST cortisol > 50 nmol/L identified subclinical cortisol secretion. We identified 28 subjects with typical non secreting adenomas (NSA), 9 with typical secreting adenoma (SA), 11 with atypical NSA and 7 with atypical SA.

Results: The post-DST cortisol was significantly and positively related to mass diameters. At univariate analysis the maximum, the minimum diameters and D were significantly related with the presence of SA or NSA; at multivariate analysis only the minimum diameter and E entered the stepwise regression. Only the minimum diameter and E emerged also at the multivariate stepwise regression between radiological parameters and post-DST cortisol. The radiological score to discriminate SAs versus NSAs resulted in $0.2034 \times$ minimum diameter + $0.0378 \times$ E. Diagnostic accuracy in differentiating SAs from NSAs was 86.0%, sensitivity 90.9% and specificity 71.8%, considering SA in patients having a score > 7.21 and NSA if < 7.16.

Conclusion: This is the first work showing relationship between radiological parameters and glucocorticoid secretion. We observed that to a better nodular pattern and a higher vascularisation of the lesion, a higher functional activity corresponded using a radiological predicting score.

10:30 - 12:00

Room G

Radiographers

SS 1814

Getting the radiation dose as low as possible

Moderators:

H. Ståhlbrandt; Eksjö/SE
F. Zarb; Msida/MT

K-31 10:30

Keynote lecture

P. Bezzina; Msida/MT

B-1243 10:39

Positioning for a conventional skyline patella projection: evaluation of torso position and its relationship with eye lens and thyroid dose

J. Li, K. Szczepura, A. Toote, A. England; Manchester/UK
(A.England@salford.ac.uk)

Purpose: Numerous techniques exist to acquire a skyline projections of the knee. Within these techniques it is common for the x-ray field to be directed towards the eyes and thyroid. The position of the torso may play a role in the dose received to these organs and this was investigated.

Methods and Materials: A full body adult anthropomorphic phantom was positioned supine for a conventional skyline projection, the torso at 90 degrees in relation to the hip joint. Data for surface skin dose was recorded using a solid state dosimeter at the level of the eyes and thyroid gland. The angle of the torso was then adjusted in 15 degree increments and the phantom was re-imaged. Dose measurements were recorded and this continued until the torso angle was 180 degrees.

Results: When moving from 90 degrees to 180 degrees the dose to the eyes and thyroid was shown to increase, peaking at 135 degrees for the eyes and 105 degrees for the thyroid and then fell. Dose differences ranged from 0.0 to 0.168 microGy for the lens of the eye and 0.0 to 1.3 microGy for the thyroid, between torso positions.

Conclusion: Torso position has been shown to effect the skin dose at the eye and thyroid levels during traditional skyline knee projections. Further work is needed to understand the effects of different exposure factors and also across a range of technique variations.

B-1244 10:47

The use of secondary lead rubber protection in paediatric extremity radiographic examinations

C. Bloomfield, A. England; Manchester/UK (A.England@salford.ac.uk)

Purpose: Although diagnostic X-ray examinations provide great benefits their use carries a small but not insignificant risk. For some radiographic examinations lead rubber shields are available to limit exposure. The use of lead rubber shields often varies between countries, departments, radiographers and can depend on the patient. The aim of this study was to evaluate the utility of a lead rubber shield in paediatric patients undergoing upper limb radiography.