303: Increased Yield of Cancer Detection with EMRI/US Guide Fused Biopsy in Patients with Previous Negative Biopsy.

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significantly lower than that of other patients (0.117). The PCD in the low risk, intermediate and high risk groups in D'amico's risk stratification were 0.075, 0.096 and 0.115, with significant differences among these groups. On prediction of OCD patients, the area under the ROC curve of PCD (0.682) was higher than that of Partin tables (0.623). In multivariate analysis, PCD was the strongest predictor of OCD patients in all variables.($p<0.01$)

CONCLUSIONS: PCD that is a new concept is a simple and significant parameter for predicting pretreatment stage of prostate cancer, and may be useful in the choice of treatment option.

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DOES D'AMICO RISK STRATIFICATION CORRELATE WITH DEGREE OF SUSPICION OF PROSTATE CANCER ON MULTI-PARAMETRIC MAGNETIC RESONANCE IMAGING (MRI)?

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INTRODUCTION AND OBJECTIVES: Recent publications have investigated the correlation of MRI and the index of suspicion of prostate cancer. We sought to determine if there is a correlation between using our platform which consists of multi-parametric MR imaging and US fusion guided biopsies with the D'Amico risk stratification?

METHODS: Patients and lesions were stratified by D'Amico Risk stratification taking into account Gleason score and PSA at time of Biopsy. 101 patients underwent a multi-parametric MR imaging of the prostate which consisted of a T2, dynamic contrast enhanced (DCE), diffusion weighted images (DWI), and proton spectroscopy images in patients with suspicion or diagnosis of prostate cancer. All lesions were then identified and graded by number of modalities positive: low (<2), mod (3) and high (4) suspicion by a single radiologist. An electromagnetic field (EM) generator (Northern Digital Inc., Canada) was placed above the pelvis which allows for real-time tracking of a custom made biopsy probe with an embedded miniature electromagnetic tracking sensor (Traxtal Inc., A Philips Healthcare Company, Canada) incorporated into the needle guide (Civco Inc, IA). A 2D prostate sweep is performed manually to render a 3D ultrasound image that is then registered and fused to the pre-operative prostate MR images and assigned targets for biopsy. The protocol included a standard 12 core biopsy combined with MRI/US fusion biopsy of the suspicious MR targeted lesions utilizing EM tracking.

RESULTS: 90.1% (91/101) were clinical T1c with a mean age was 62.7 + 8.3 years with a median PSA 5.8, and 56/101 (55.4%) patients were positive for cancer on a protocol biopsy. Two Chi-squared analysis resulted in a statistical significant correlation between the MR suspicion and D'Amico Risk stratification for patients and MR lesions positive for cancer($p<0.05$), (Table 1).

CONCLUSIONS: The multi-parametric MR assessment of patients with positive lesion for prostate cancer resulted in a statistically significant correlation with the D'Amico risk stratification. This data may give insight into which patients may be eligible active surveillance, with interval imaging assessment of the lesion, obviating the need for multiple biopsies and the associated morbidity while following these patients long term.

D'Amico Risk Stratification
(PSA + Gleason Score (Biopsy))

MR Suspicion		Low	Intermediate	High	Patients	Lesions
Low	Patients	11	2	1	14	
	Lesions	16	2	4		22
Moderate	Patients	10	14	1	25	
	Lesions	10	12	3		25
High	Patients	2	6	9	17	
	Lesions	3	7	16		26
				Total	56	73

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INCREASED YIELD OF CANCER DETECTION WITH EMRI/US GUIDED FUSED BIOPSY IN PATIENTS WITH PREVIOUS NEGATIVE BIOPSY

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INTRODUCTION AND OBJECTIVES: Repeat prostate biopsy in patients that had a previously negative biopsy has yielded cancer in as low as 13% of men. Saturation biopsy has increased the yield as a repeat biopsy technique to 34%. The technology associated with Endorectal Coil Multi-Parametric Magnetic Resonance Imaging (eMRI) on a 3 Tesla magnet yields a high signal to noise ratio imaging modality that may be used to localize prostate cancer and guide directed biopsies accordingly. We use a novel platform that registers and fuses real-time trans-rectal ultrasound images with previously obtained MR images. We review our database to determine the yield of our eMRI guided fused biopsy protocol to detect prostate cancer in patients that had a previous negative standard biopsy.

METHODS: A T3 eMRI is performed pre-operatively. T2 weighted, dynamic contrast enhanced, diffusion weighted, and spectroscopy images were obtained and interpreted. Prostate lesions suspicious for cancer were scored. A traditional 12 core TRUS prostate biopsy is then performed. Prostate US images were then fused to the eMRI images. Biopsies of eMRI targeted lesions were performed using a custom probe with spatial tracking of the biopsy needle by an electromagnetic field (Traxtal Technologies Inc,Canada and Phillips Corporation, Netherlands). We reviewed our database of 101 patients that had an eMRI biopsy and determined those that had a previous standard biopsy. 65 patients met these criteria. They were then evaluated as to outcomes on their eMRI guided fused biopsy and its correlation with previous standard biopsy results.

RESULTS: Of the 65 patients in our study that had a previous biopsy, 29 were negative and 36 were positive. Of those that were previously negative, 13/29 (48%) were diagnosed with prostate cancer by our methods.

CONCLUSIONS: eMRI guided sono fused biopsies increase the yield of prostate cancer detection in patients with a previously negative biopsy. This increased yield of 48% vs 34% in repeat saturation biopsy patients represents patients that either may not have been detected or that have had a delay in prostate cancer detection using traditional biopsy criteria and methods.

Table 1

Prior Bx	PATIENT WITH CANCER		Total
	N0	Yes	
Negative	16	13	29
Positive	12	24	36
Total	28	37	65

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DOES BMI "DILUTE" THE PREDICTIVE PROPERTY OF PSA FOR TUMOR VOLUME AT RADICAL PROSTATECTOMY?

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INTRODUCTION AND OBJECTIVES: Stage migration with the widespread use of PSA screening has been well documented, but an exact association between PSA and tumor volume is questionable. Additionally, the effect of obesity on serum PSA levels may cause a relative hemodilution and account for the decreased predictive ability of PSA for tumor volume in the modern era. We evaluated the effect of body mass index (BMI) as it relates to the predictive value of preoperative PSA for tumor volume at radical prostatectomy (RP).

METHODS: Using our RP registry, we identified 14,293 patients who underwent RP for prostate cancer between 1987 and 2007 and had a documented BMI at the time of surgery. Using routine clinicopathologic variables, we examined the relationship between BMI, preoperative PSA, and tumor volume at RP. A multivariate analysis was completed.

RESULTS: Over the study period there was a significant increase in the BMI of men undergoing RP ($p<0.0001$). Elevated BMI was associated with increased pathologic Gleason score ($p<0.001$), increased tumor volume ($p<0.001$), and decreased prostate size ($p<0.001$). Preoperative PSA was significantly correlated with tumor volume ($p<0.001$). There was no correlation between BMI and preoperative PSA ($p=0.3940$). On multivariate analysis when controlling for BMI, preoperative PSA remains a significant predictor of tumor volume ($p=0.0032$). There was also no statistically significant interaction between preoperative PSA and BMI in the prediction of tumor volume ($p=0.5650$).

CONCLUSIONS: The predictive ability of PSA for tumor volume is not affected by BMI. This supports the growing evidence that PSA hemodilution may not be a clinically significant factor in predicting pathologic outcomes. There does not appear to be a need to correct the serum PSA in relation to BMI when used in preoperative prediction models. Furthermore, hemodilution in the obese population undergoing radical prostatectomy does not account for the weaker association between PSA and tumor volume in the modern era.

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TRANSPERINEAL PROSTATE BIOPSY IMPROVES GLEASON SCORE CONCORDANCE BETWEEN BIOPSY AND PROSTATECTOMY SPECIMENS

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INTRODUCTION AND OBJECTIVES: To identify the preoperative variables which affect Gleason score (GS) concordance between biopsy and prostatectomy specimens. The impact of prostate biopsy approach, transrectal or transperineal, on GS concordance remains to be evaluated.

METHODS: Patients with clinically localized (cT1c-3) prostate cancer who underwent radical prostatectomy without preoperative hormonal therapy between 1997 and 2005 were enrolled onto the Clinicopathological Research Group for Localized Prostate Cancer registry. Two central uropathologists (K.K. and T.S.) reviewed both biopsy and RP specimens of 2313 patients from 74 institutes in Japan. A total of 388 patients (17%) were diagnosed with transperineal prostate biopsy. GS in each patient was assigned according to the 2005 International Society of Urological Pathology consensus and categorized into four groups as 5-6, 3+4, 4+3 and 8-10. We evaluated the association between clinicopathological variables and GS concordance.

RESULTS: Exact GS concordance between biopsy and prostatectomy specimens were observed in 1461 (63%) patients, while 537 (23%) and 315 (14%) were upgraded and downgraded in prostatectomy specimens. In univariate analysis, the number of total cores, the number of positive cores, total cancer length, maximum percent of cancer in any core and biopsy approach significantly correlated with GS concordance ($p<0.05$ for all). Patients with transperineal biopsy had significantly higher GS concordance rate than those with transrectal biopsy (70% vs. 61%; $p=0.001$). In multivariate analysis, the number of positive cores (hazard ratio 1.1; $p=<0.001$) and biopsy approach (transperineal vs. transrectal; hazard ratio 1.4; $p=0.006$) were the significant predictors for exact GS concordance between biopsy and prostatectomy specimens.

CONCLUSIONS: This is the first study to demonstrate that transperineal prostate biopsy shows better GS concordance between biopsy and prostatectomy specimens than transrectal prostate biopsy.

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CONCORDANCE OF PREOPERATIVE PROSTATE ENDORECTAL MRI WITH RADICAL RETROPUBIC PROSTATECTOMY SPECIMENS

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INTRODUCTION AND OBJECTIVES: In patients with prostate cancer, accurate radiographic staging would have obvious clinical utility. Endorectal MRI (ER-MRI) can identify areas suspicious for prostate cancer but the accuracy is not yet fully known. Since 2003, we have routinely obtained ER-MRI in prostate cancer patients with factors suspicious for local extension (Gleason grade $\geq$4+3, PSA $>$10, abnormal rectal exam, or extensive biopsy core involvement.) The objective of the study was to evaluate the accuracy of ER-MRI compared to the subsequent radical retroputic prostatectomy (RRP) specimen.

METHODS: We reviewed 309 open RRP cases performed from 2003 to 2008 to identify patients with a preoperative ER-MRI. Findings of extracapsular extension (ECE), seminal vesicle involvement (SV), and lymphadenopathy (LAD) were compared to subsequent findings on RRP pathology specimens.

RESULTS: 94 men (median age: 61 years, range 48 to 72) with a mean PSA of 9.3 ng/mL (range 1.3 to 35) had a preoperative ER-MRI. Indication for ER-MRI included: Gleason grade $\geq$4+3 in 34%, PSA $>$10 in 18%, abnormal rectal exam in 13%, extensive core involvement in 14%, or combination of factors in 21%. No tumor was seen on ER-MRI in 9 men (10%). Of 94 ER-MRI, 4 showed SV involvement and 11 had ECE. Lymph nodes were pathologically positive in 10 men, none of which were abnormal on ER-MRI (RRP was aborted in 3 patients due to positive nodes while 7 had RRP as focus of metastatic disease was small). For men with ECE on ER-MRI, pathology showed ECE in only 3 of 11 (27%). In those without ECE on ER-MRI, RRP specimen showed ECE in 36% of those with capsular bulge and 19% of those without. Accuracy of ER-MRI compared to pathology post-RRP for ECE and SV involvement is shown in the table.

CONCLUSIONS: Endorectal MRI in the evaluation of prostate cancer was moderately accurate for SV involvement, inaccurate for ECE, and insensitive for metastatic lymph node involvement.