Urologist learning curve has an impact on increasing probability of clinically significant cancer detection rate at mpMRI-TRUS fusion target biopsy: a prospective study in a single high volume institution

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INTRODUCTION & OBJECTIVES

Targeted fusion biopsy using multiparametric magnetic resonance imaging (mpMRI) and transrectal ultrasound (TRUS) learning curve (LC) has not been yet evaluated for large series of patients. We tested the hypothesis that urologist experience may improve clinically significant Pca (csPCa) detection rate of targeted mpMRI-US fusion biopsy

MATERIAL AND METHODS

- Overall 394 consecutive patients underwent mpMRI-US targeted (TB) and transrectal standard biopsy (SB) for suspicion of PCa at a single institution from April 2015 to September 2017.
- All the procedures were carried out by two urologists using the Bio-Jet® fusion system and software (D&K Technologies, Barum, Germany) while mpMRI studies were reported by different experienced radiologists.
- Biopsies were performed either in a transrectal or transperineal setting depending on the location of the primary lesion on the mpMRI .
- The cohort was divided into sestiles representing consecutive times during the study period.
- Targeted biopsy PCa detection rate (TB-CDR) and csCDR at TB were reported and stratified according to progression groups. Sensitivity, specificity and negative predictive value of MRI-US TB were calculated. Chi square for trend analyses were used to assess the statistical significance of CDR Linear regression analyses were performed to estimate the impact of LC on the ability to diagnose csPCa.

RESULTS

- Descriptive characteristics of the population are summarized in table 1. Median patient age was 65 yrs (R:32-86) and median PSA at biopsy
- Overall cancer detection rate (CDR) was 52.8% (n=208)
- Cancer detection rate at TB was 43.7% (n=172), of these patients 76% (n=130) had clinically significant PCa.
- Targeted biopsy CDR increased from 36.9 % (n=24) to 62.1 % (n=41) from group A to group F (p=0.001). Similarly, csCDR at TB increased significantly from group A (23.1%, n=15) to group F (44%, n=29) (p=0.001) .
- Sensitivity, specificity, NPV and PPV of TB in detecting csPCa was 75.6% , 93.2% , 83% and 90% respectively.
- At linear regression analyses, assessing learning curve impact, diagnostic accuracy of TB showed a significant trend on csCDR (R^2=0.03 p<0.001).

Tab1-Descriptive characteristics of the population

Age, yr Mean (Median) [Range]	64.8 (65) 32-86	Primary lesion PIRADS (%) PIRADS 3 PIRADS 4 PIRADS 5	98 (25) 237 (60) 59 (15)
BMI Mean (Median) [Range]	26 (25.8) 21-34	First biopsy (%) Repeat biopsy (%)	140 (35.5) 254 (64.5)
Total PSA (ng/ml) Mean (Median) [Range]	8.8 (7) 3.4-56	Transrectal (%) Transperineal (%)	203 (51.5) 191 (48.5)
Prostate volume (ml) Mean (Median) [Range]	70.8 (66) [19-207]	Nr of cores Mean (Median) [Range]	11.8 (15) 3-20
Primary lesion dimension (mm) Mean (Median) [Range]	12 (11) 4-50	Cancer Detection Rate (%) Clinically significant CDR (%) Targeted biopsy CDR (%) cs-CDR at targeted biopsy (%)	208 (52.8) 145 (36.8) 172 (44) 130 (33)

Tab2-Cancer detection rate stratified according to progression groups

	Group A	Group B	Group C	Group D	Group E	Group F	R^2	P
CDR	27/65 (41.5)	26/50 (40)	30/65(46.2)	43/66 (65.2)	21/50 (42)	46/66 (69.7)	0.03	<0.001
csCDR	18/65 (27.7)	12/50 (18.5)	25/65 (38.5)	32/66 (48.5)	19/50 (3)	31/66 (47)	0.02	0.001
Target biopsy CDR	24/49 (36.9)	22/50 (33.8)	23/65(35.4)	35/66 (53)	17/50 (34)	41/66 (62.1)	0.02	0.001
Target biopsy csCDR	15/49 (23)	12/50 (18.5)	22/65 (33.8)	27/66 (41)	17/50 (34)	29/66 (44)	0.03	0.001

CONCLUSION

Our findings suggested that the operator LC may have an impact on csCDR of TB in larger series. Consequently, mpMRI/US fusion biopsies appear to have "a steep learning curve", as the diagnostic accuracy of the procedure appears to progress over time even after a high number (>300) of procedures.