Prostate random biopsy versus targeted biopsy

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Aims and objectives

The aim of our study was the retrospective evaluation of 70 Random Prostate Biopsies (RPB). 13/70 biopsies were performed with Target Fusion Imaging (TFI). The assessment of the different results between the two proceduress in percentage of positivity was also obtained. TFI with a minimum number of samples in terms of positivity is able to prove the same effectiveness of RPB if the biopsy procedure is anticipated by a multiparametric-Magnetic Resonance Imaging (mp-MRI) that allows the building of a prostatic lesions "mapping" with the option of choosing the most suspicious target for biopsy.

The current algorithm of the clinically suspected prostate malignancy diagnosis is based upon the Trans-Rectal Ultrasound (TRUS) RPB procedure with a number of cores ranging from 12 to 50 (so-called saturation biopsy) which is not free of complications they may arise in proportion to the number of taken withdrawals.

Various lab parameters are currently screened (PSA Ratio, PSA Density, PSA Velocity, Dosage of Pro-PSA); all of these lab values are useful but none is proved to show full reliability.

Since the PSA value has proved to be sensitive but not a specific diagnostic parameter for malignancy, prostate TRUS has also shown some limits for cancer detection considering that only 20% of the hypoechoic prostatic lesions are proven to be malignant.

The management of patients with variable PSA value, however, is not easy and very often the decision of the correct timing of the TRUS core biopsy is equivocal in particular when a PSA value rise does not match a Digital Rectal Examination (DRE) result.

The Gold Standard for the diagnosis and staging of the Prostatic Cancer (PC) is represented by the (mp-MRI) that, thanks to the integration of the anatomical and functional sequences (T2W-TSE, DWI and DCE), is able to achieve a high sensitivity (81%) and specificity (84%) rate.

Recently, thanks to TFI, the lesions highlighted by the mp-MRI scanning can be sampled by means of a targeted procedure.

Images for this section:

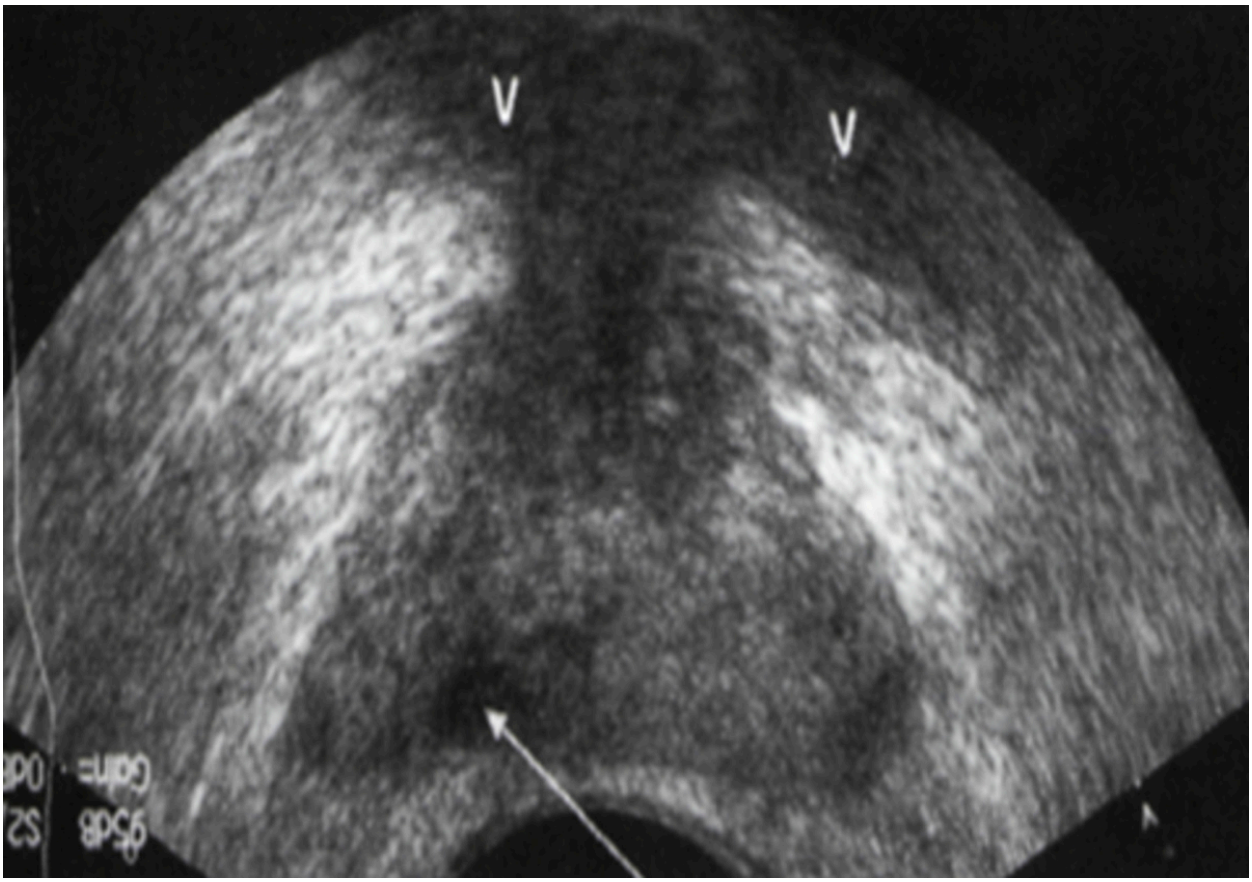

Fig. 1: TRUS axial view: detection of a lesion in the peripheral zone of right lobe.

Methods and materials

70 patients receiving biopsy with PSA value between 4.5 and 10 ng /ml with suspected PSA ratio, negative for Digital Rectal Examination (DRE) and Trans-Rectal Ultrasound (TR-US). From January 2016 to February 2017, a working group including the Urology Unit of the S. Eugenio Hospital ASL Roma 2 and the Diagnostic and Interventional Radiology Unit of S. Filippo Neri Hospital ASL Roma 1, performed 70 prostate biopsies in patients with clinical suspicion of Prostatic Cancer.

57/70 patients were evaluated with 12 randomized cores. 13/70 were selected with mpMRI targeted biopsy or fusion with 2/5 cores on index lesion with PIRADS score between 3 and 5 since in this group of patients the Random biopsy was not tolerable or at high risk of bleeding because all of them were on ASA drug therapy.

All 70 patients showed a PSA score between the value of 5 and 10, a Ratio of less than 20 and a negative DRE result.

MpMRI examinations was carried out with Philips Achieva 1.5 T scanner equipped with surface coil and high-resolution thin-layer sequences (3 mm thk.).The sequences used were as follows: T2W in axial, sagittal and coronal views; axial T2W fat-sat; DWI with b-value set at 0-500-1000 and ADC Maps; DCE-T1W fat sat and perfusion curve processing (Gadobenate dimeglumine 0.1 ml / Kg body weight).

After acquisition of all sequences the images were sent to a dedicated Workstation for Post Processing and display of perfusion data.

The suspected lesions of greater volume (Index Lesion according to PI-RADS V2) with PI-RADS score between 3 and 5 were considered the "Target" to be submitted to a FI targeted biopsy.

FI was carried out with Esaote My Lab - Twice Ultrasound scanner equipped with a Bi-planar probe and a suitable software for FI that allowed the "matching" of the two methods both using images in DICOM format. Between 3 and 5 cores of the lesion of interest were obtained by trans-perineal route with 18 G cutting needle and local anesthesia

Images for this section:

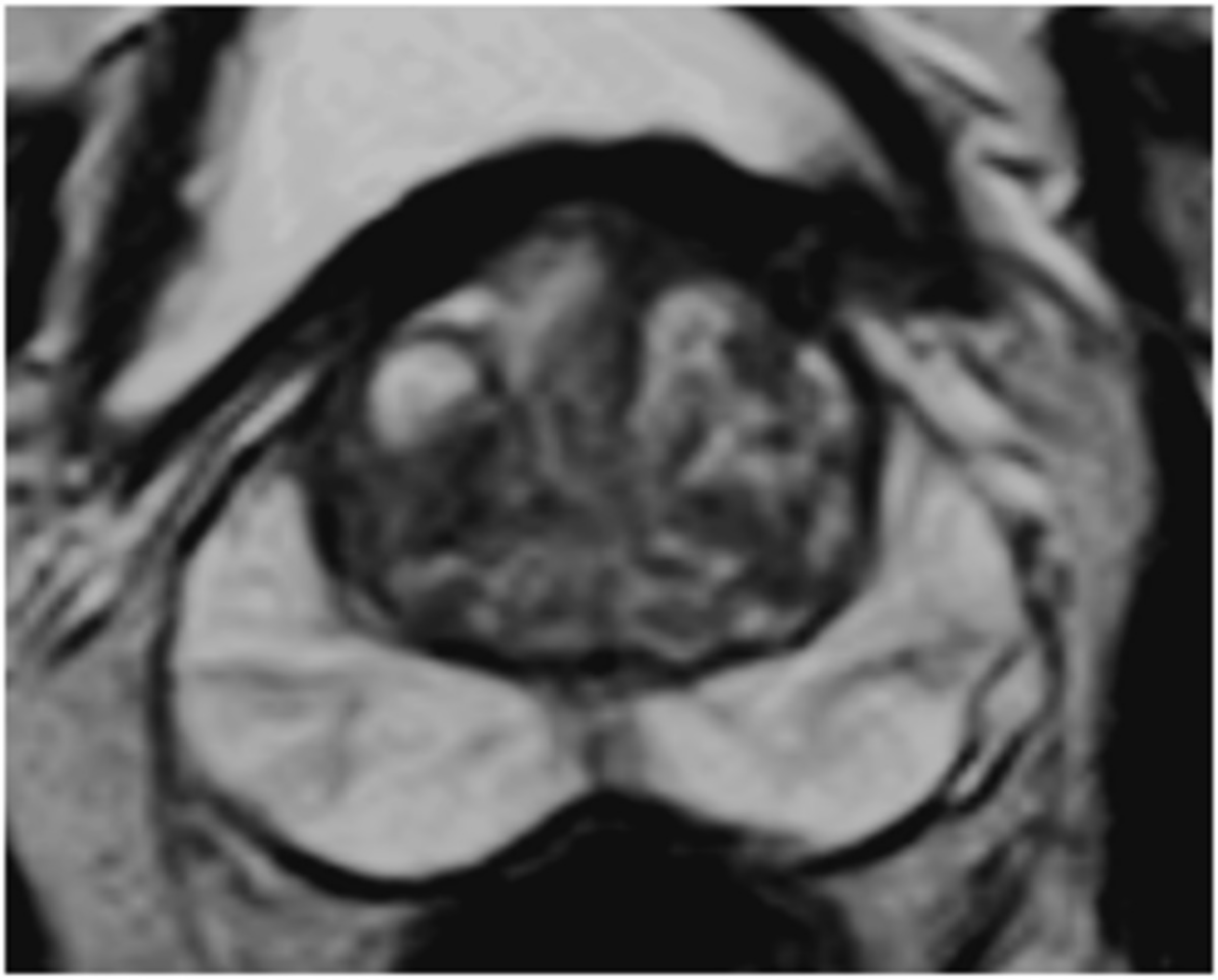

Fig. 2: T2W mp-MRI coronal view

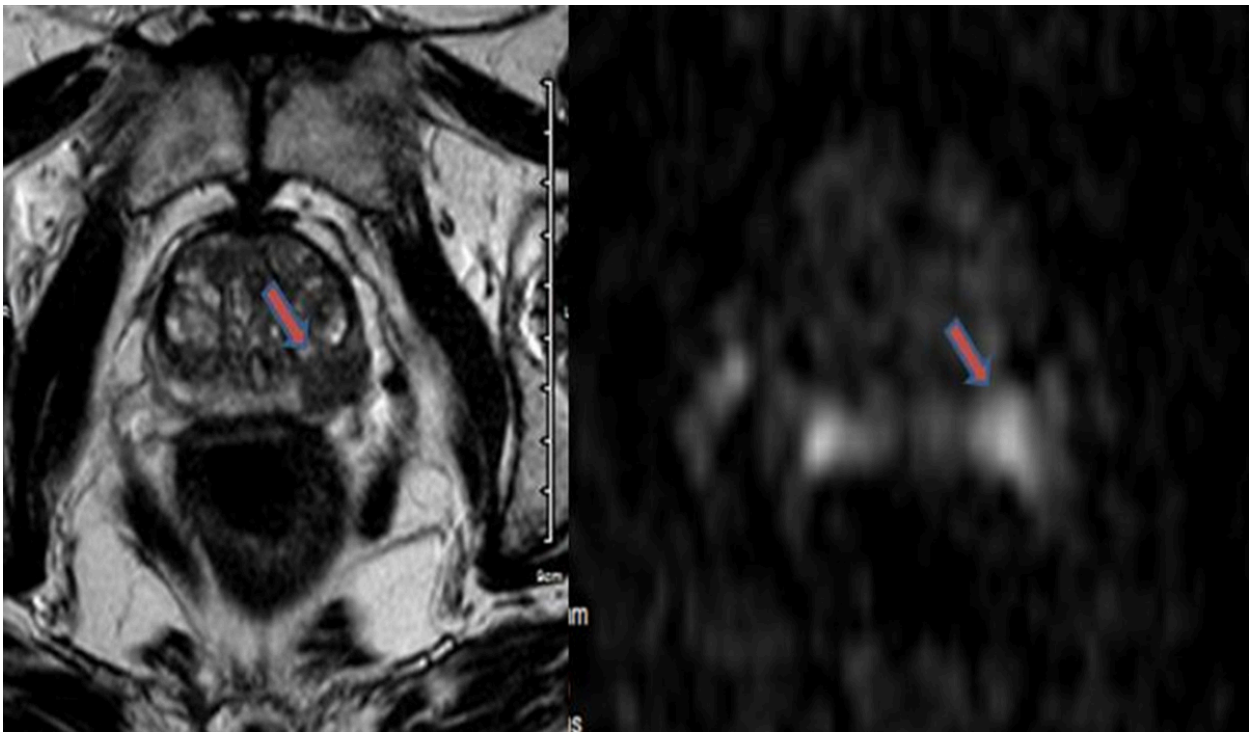

Fig. 3: T2 mp-MRI coronal view compared to DVI sequence.

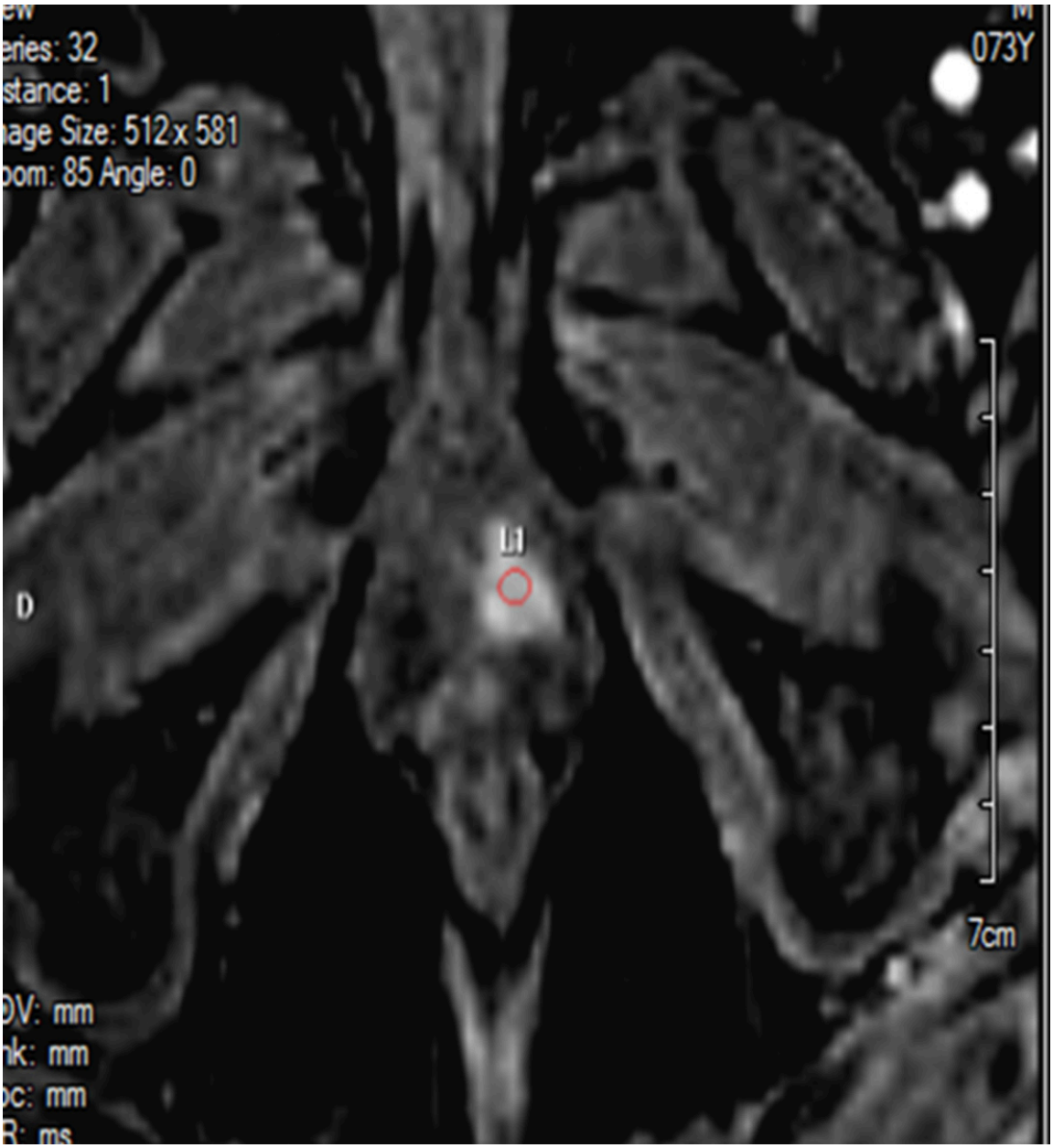

Fig. 4: T1W Fat Sat sequence: image of malignancy

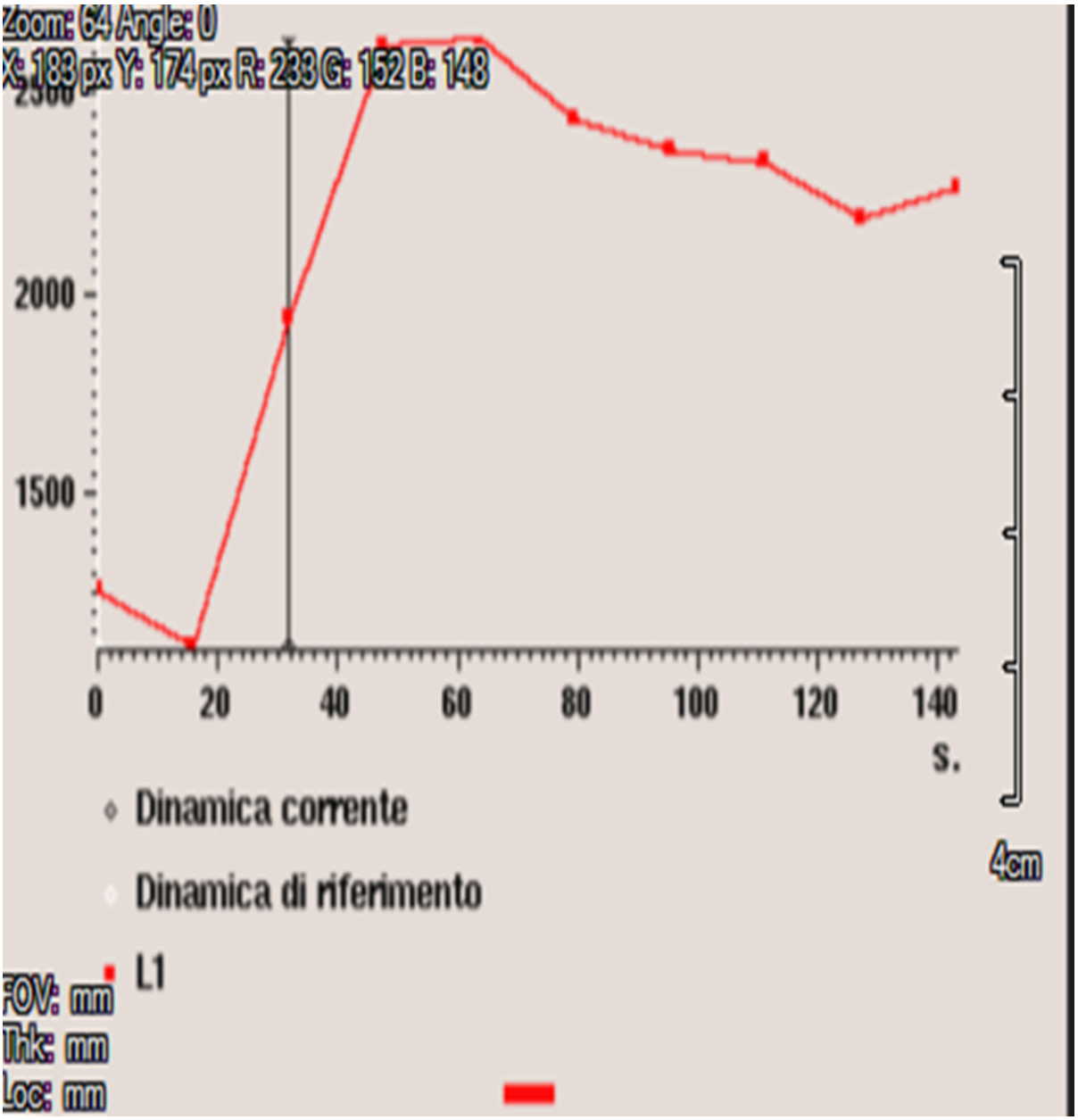

Fig. 5: DCE:Dynamic contrast media enhancement curve

Results

A total of 70 biopsies were obtained . 54 were positive (77.1%) and 16 negative (22.9%). 57/70 random biopsies were carried out : 44/57 positive (77.2%) and 13/57 negative (22.8%). 13/70 targeted biopsies performed: 10/13 were positive for prostate adenocarcinoma (76.9%); 3/13 were negative (chronic inflammation) (23.1%). In 6/13 patients pathology sampling revealed prostate adenocarcinoma with Gleason score 6 (3 + 3) and Gleason score 7 (4 + 3) in 4/13.

Conclusion

The percentage of positivity obtained with random biopsy (12 cores) was 77.2%. The diagnosis of prostate carcinoma obtained with fusion biopsy (4 cores) was positive in 76.9% and target lesions scanned with mpMRI. No major or minor complications were observed. The deviation between the two techniques was 0.3%. The difference between the two methods for diagnostic purposes seems to be meaningless However we should consider that the high number of cores obtained the high procedure related complications may appear (e.g: hematuria, infections, neuro-vascular bundle lesions).

Personal information

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