INTRODUCTION:

- EPE is an unfavourable prognostic factor on PCa progression & survival
- TNM staging system:

  T3a ➡ PCa with extension into periprostatic soft tissue

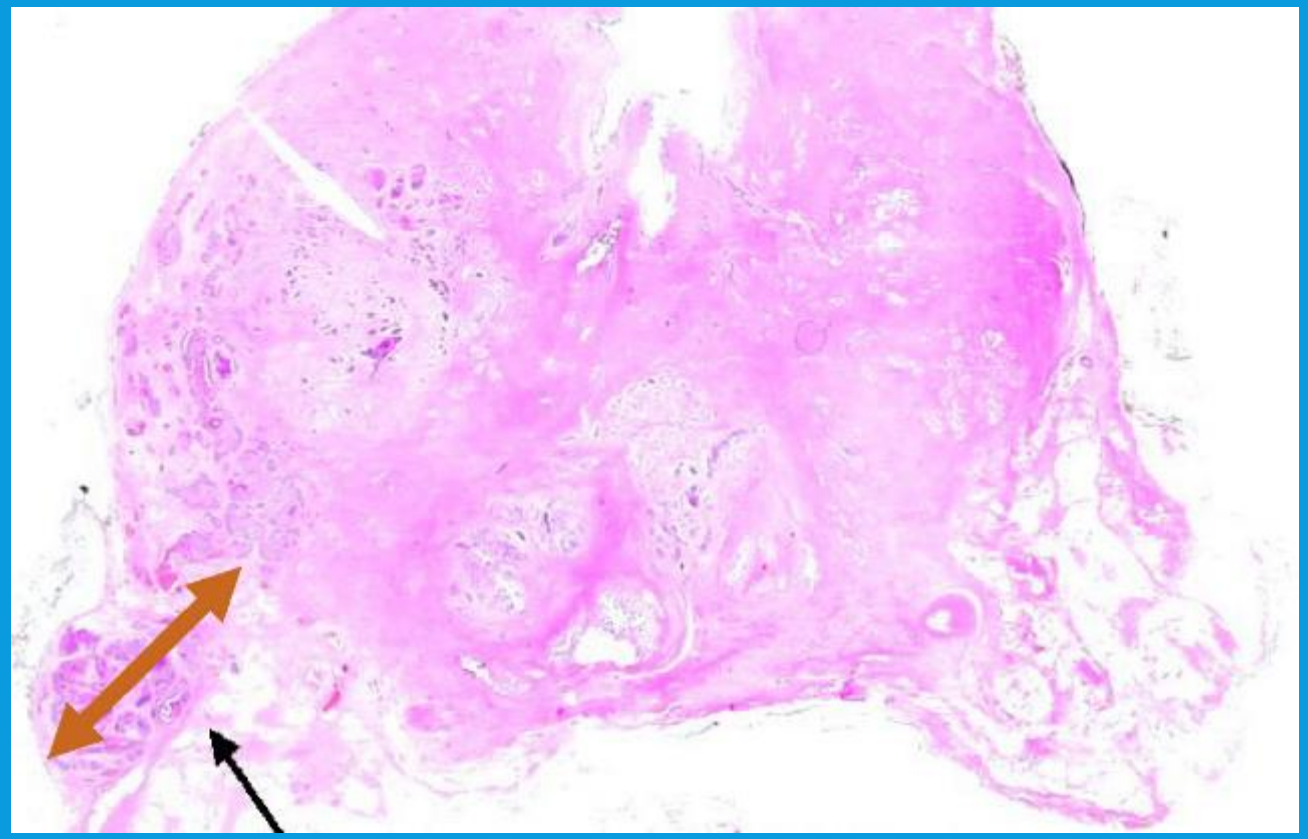
  (without further subclassification)
- The clinical outcomes of patients with EPE showed variations
- The degree of extraprostatic extension:

  Associated with the tumor prognosis & biochemical recurrence rates.

  Various methods have been described for quantifying & subclassifying

  There was no consensus on the optimal criteria

INTRODUCTION (RADIAL DISTANCE):



- The radial distance of EPE:
  - The distance of prostate tumor extension that is perpendicular to outer margin of the prostatic stroma
- Pathological radial distance (RD)
  - An independent indicator for prognosis & biochemical recurrence
- Quantifying the degree of EPE with RD is simplest and objective way.

INTRODUCTION (MP-MRI):

- Clinical staging of PCa;
- Digital rectal examination,
- Clinical nanograms (PSA & bx Gleason score) has limited accuracy on preoperative risk assessment of EPE
- Mp-MRI;
- Reference standard imaging modality
- The subjective assessment of EPE using prostate MRI ⬆ specificity but ⬇ sensitivity with poor interobserver agreement rates.

INTRODUCTION:

- Prostate MRI might have potential on determining pathological RD in true positive patients for EPE.
- To the best of our knowledge, the value of prostate MRI in determining the degree of EPE has not been established yet.
- The aim of this study is to evaluate the value of prostate MRI in the assessment of pathological RD in prostate cancer.

MATERIALS & METHODS (PATIENT SELECTION):

- Retrospective,
  - 106 patients with prostate cancer who underwent prostate MRI prior to RP between 2012-2017
- Inclusion criteria:
  - *Patients with satisfactory medical, pathological and imaging records,*
  - *The time interval between prostate Bx & Mp-MRI scanning > 6 weeks,*
  - *The time interval between Mp-MRI scanning & RP > 6 months*
- Exclusion criteria:
  - *Patients with preoperative hormonal or radiation therapy*

MATERIALS & METHODS (MRI SCANNING):

- 3T MRI scanner (Magnetom Skyra, Siemens Medical Solutions, Erlangen, Germany) & 16-channel phased array surface coil
- The Mp-MRI protocol included; tri-planar T2-WI, T1- WI, DCE-MRI & DWI with ADC map
- The imaging parameters of tri-planar (in axial, coronal and sagittal planes) T2W TSE:

PARAMETER	VALUE
TR/TE	3566–3631/100 msec
Matrix size	512 × 352
FOV	200 mm
Slice thickness	3 mm

MATERIALS & METHODS (PATHOLOGICAL ANALYSİS):

- The RP specimens were processed by an experienced genitourinary pathologists in accordance with the standard procedures recommended by the International Society of Urologic Pathology
- The index lesions were marked on 16-sector divided standardized prostate diagram by the urogenital pathologist who is blinded to any MRI interpretations.
- The following criteria have been used to describe index lesion;

1- Prostate tumors with extension to outher margin of prostatic stroma

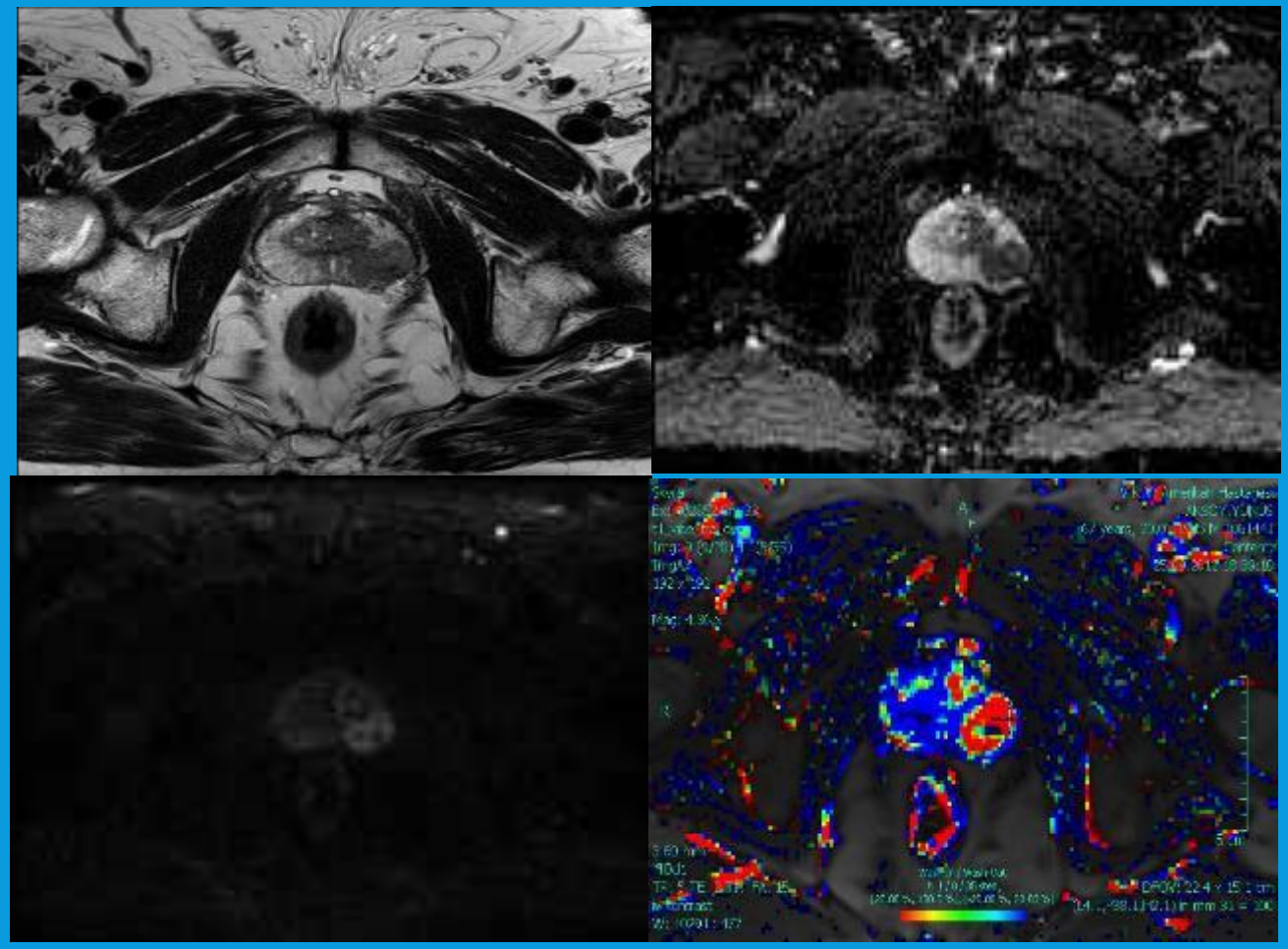
2- If, none of the tumor foci had extraprostatic extension, the tumor foci with the highest Gleason score

3- If the tumor foci have the same Gleason score, the lesion with maximum size

MATERIALS & METHODS (PATHOLOGICAL ANALYSIS):

- The volume, GS & the presence / absence of EPE
- The pathological RD of EPE was measured by using an ocular micrometer from the focus with maximum extension if multiple foci of EPE were exist on RP specimens.

IMAGE ANALYSIS AND MEASUREMENT OF MRI-DETERMINED RADIAL DISTANCE:

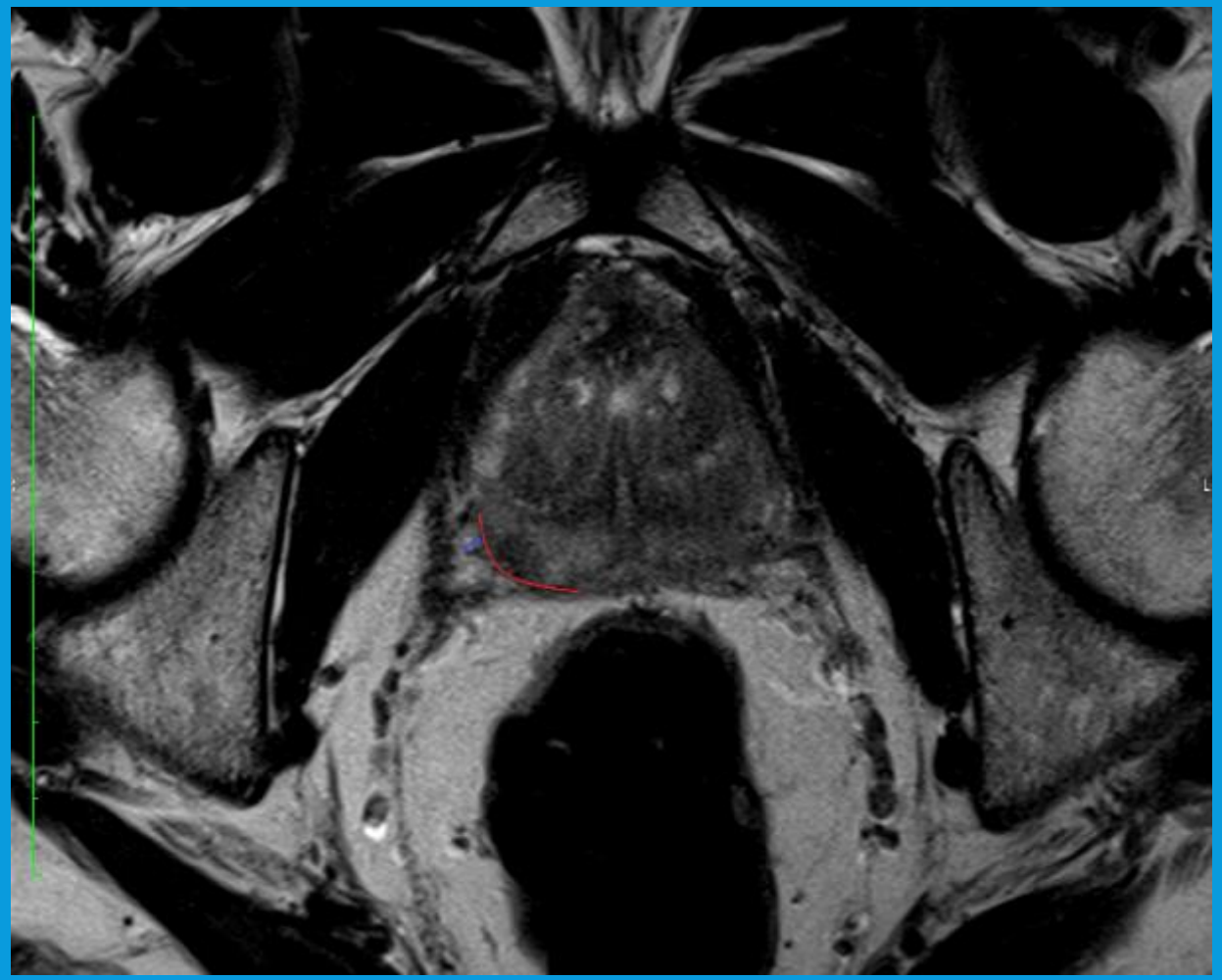


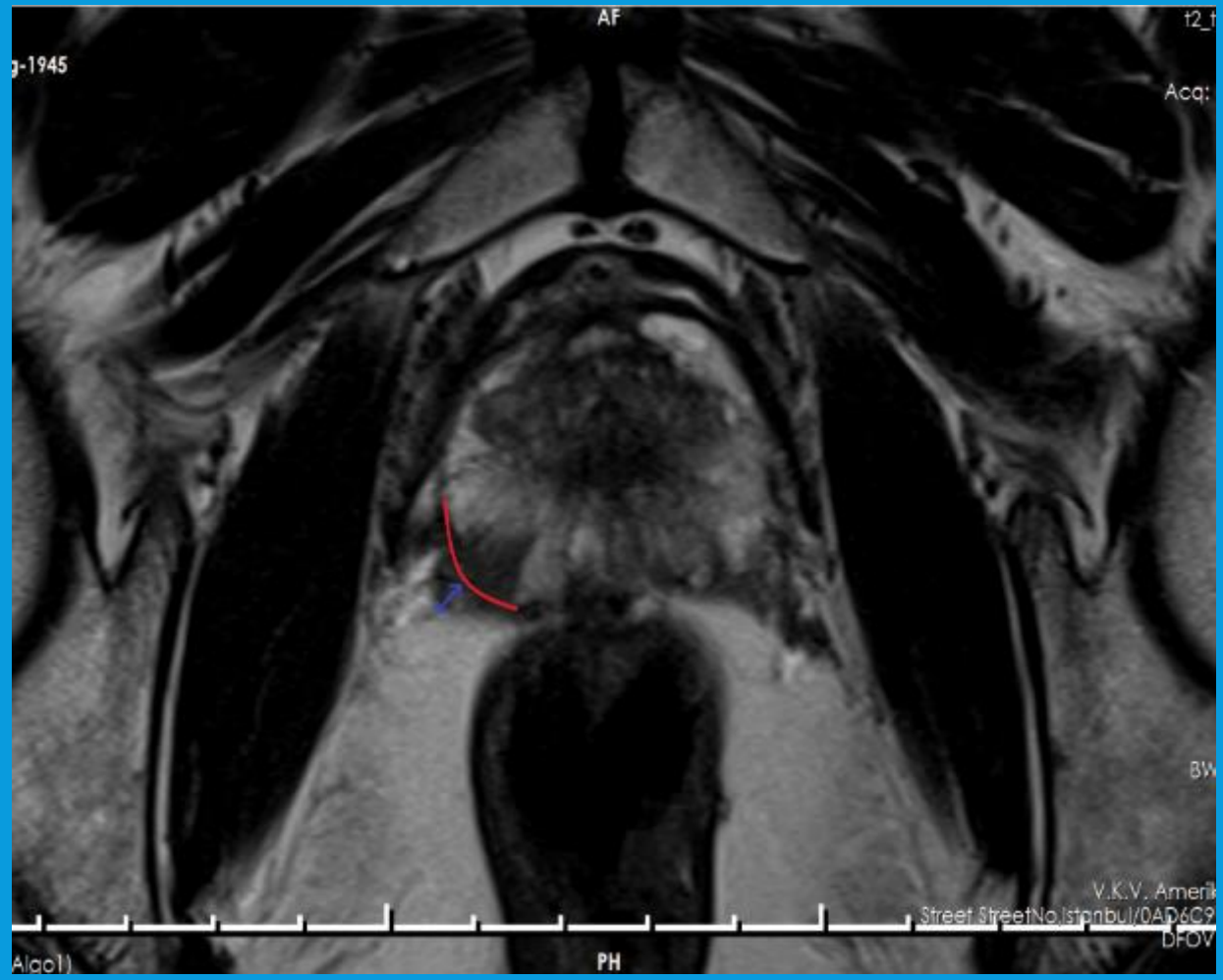
Two radiologist were independently evaluated the images.

The radiologists identified the dominant tumor as defined a mass like lesion that showed low signal intensity on T2WI and ADC map with or without early contrast enhancement

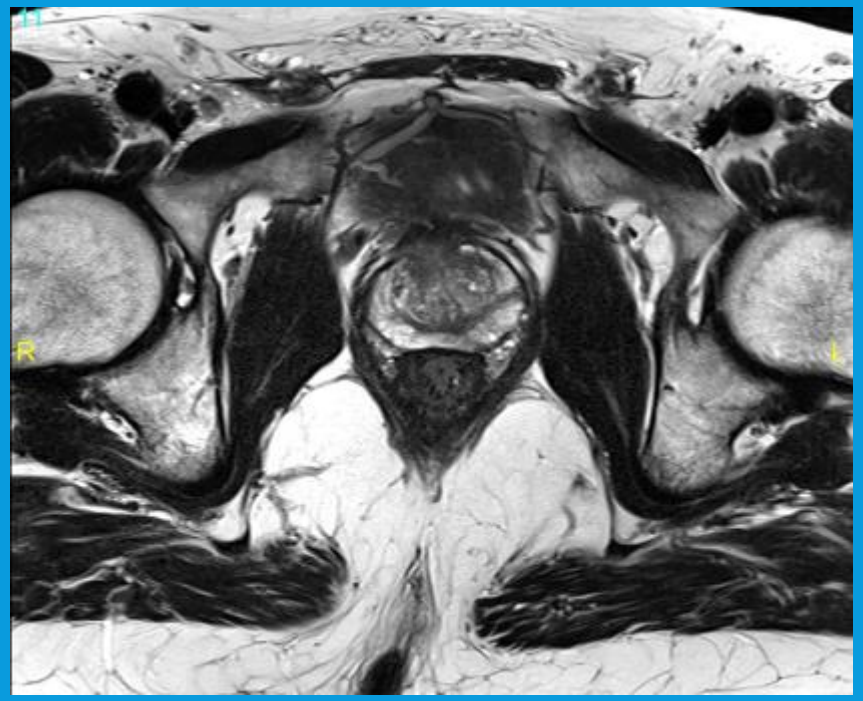
Dominant lesions were subjectively evaluated with a 5-point probability scale by using the modified PI-RADS criteria for assessment of EPE.

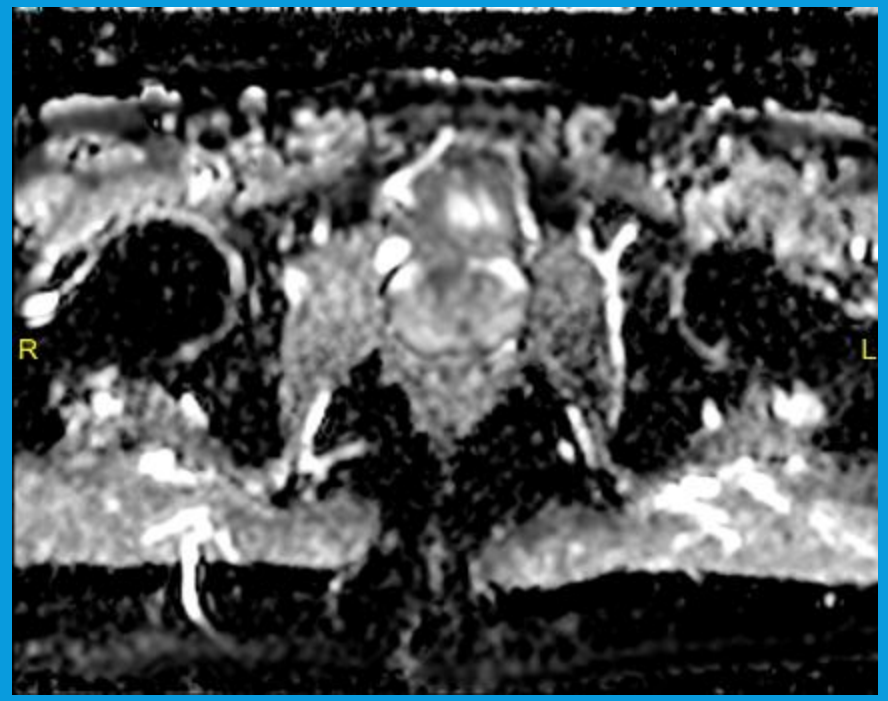
	Probability Scale	
LIKERT SCALE-1	EPE absent	If the normal tissue can be visualized between intact prostate capsule & tumor
LIKERT SCALE-2	EPE probably not present	If the tumor abuts prostate capsule
LIKERT SCALE-3	Equivocal for EPE	If the tumor abuts and cause irregularity on prostate capsule
LIKERT SCALE-4	EPE probably present	If tumor bulges, deforms and obscures the prostate capsule
LIKERT SCALE-5	EPE absolutly present	If gross, measurable tumor is detected

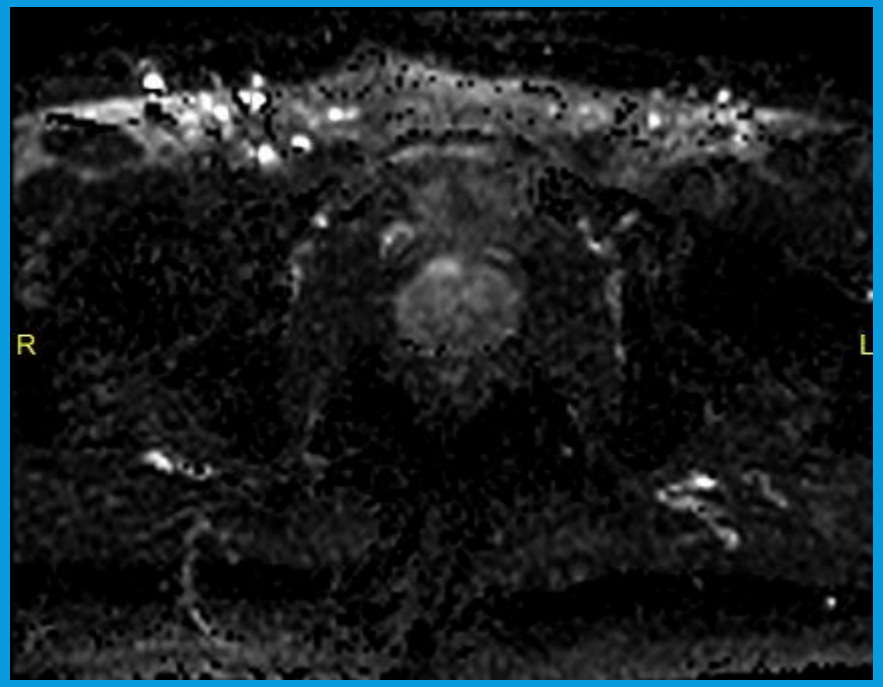


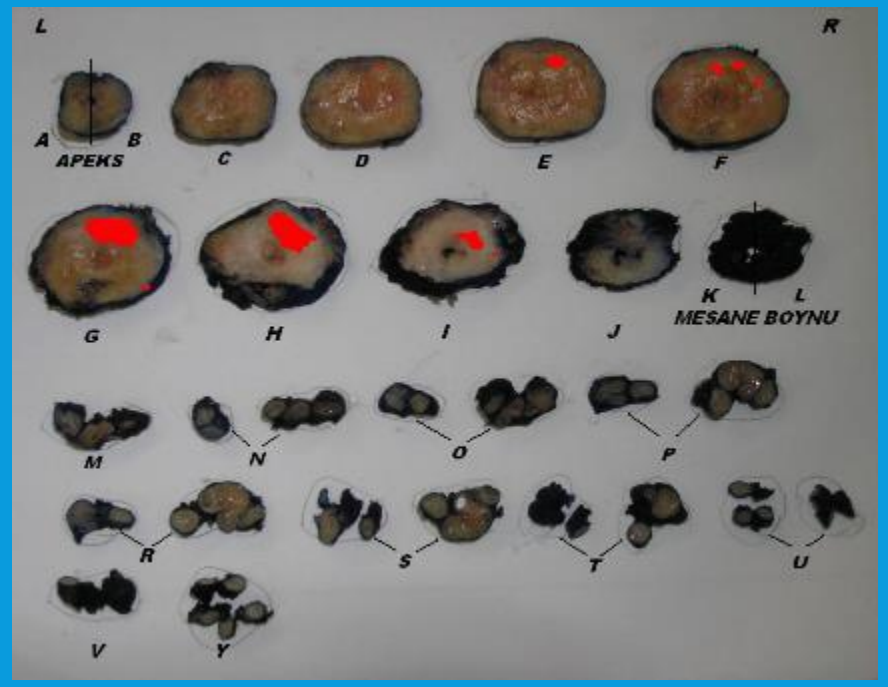


- Likert scale 4 and 5 presummed as positive for EPE.
- The radiologists measured the RD of EPE on T2WI for the patients considered as EPE (+)
- The RD measured perpendicular to outer margin of prostate.









- After the image evaluation, the location of index lesions and subjective EPE assesment were examined by using the RP specimes as referance standart.
- The results were classified under 4 categories: true-positive results, true-negative result, false positive results and false negative results

True Positive	The dominant tumor focus AND The presence of EPE have been correctly determined	
True Negative	The dominant tumor focus AND The absence of EPE have been correctly determined	
False Positive	The dominant tumor focus has been correctly determined AND Incorrectly suspected from presence of EPE	Incorrectly suspected from dominant tumor focus with the presence of EPE
False Negative	The dominant tumor focus have been correctly determined AND The presence of EPE could not be determined	The dominant tumor focus with the presence of EPE could not be determined

MATERIALS & METHODS (STATISTICAL ANALYSIS):

- Sensitivity, specificity, PPV & NPP (prostate MRI for assessment of EPE according to subjective analysis)
- The relationship between pathological RD & MRI-determined RD were calculated separately for patients with Likert scale of 4 and 5 by using ICC analysis.
- The relationship between pathological RD&MRI determined RD were calculated for the patients with true positive results by using ICC analysis.
- Cohen's kappa statistics was used to calculate the inter-rater reliability of the subjective EPE assesment with modified Likert scoring between readers.
- The inter-reader relability of RD were calculated between readers by using ICC

RESULTS (HISTOPATHOLOGICAL ANALYSIS)

- EPE (+) = 23.6%
- EPE (-) = 76.4 %
- The mean pathological RD of index lesion= 1.8 mm (ranged between 0.2 mm to 7 mm)
- The median pathological RD of index lesion = 1.1 mm

RESULTS

Prostate MRI for assessment of EPE according to subjective analysis

	Reader-1	Reader-2
Sensitivity	60.0%	53.3%
Specificity	86.8%	92.1%
PPV	64.3%	72.7%
NPV	84.6%	83.3%

RESULTS (MRI ANALYSIS)

- Cohen's Kappa statistics showed good inter-rater reliability with respect to the Likert scoring (ICC: 0.727)

	Reader-1	Reader-2
EPE absent or probably not present	%53.8	%55.6
EPE equivocal	%28.3	%24.5
EPE probably present	%11.3	%13.2
EPE absolutly present	%6.6	%6.6

RESULTS

	Reader-1	Reader-2
The mean MRI-determined RD	1.9 mm (ranged between 0.5 mm to 5.2 mm)	2.0 mm (ranged between 0.9 mm to 4.8 mm)
The median MRI-determined RD	1.9 mm	1.7 mm

- With respect to measurement of MRI determined RD ICC analysis showed good agreement between the readers for patients with true positive results (ICC=0.898)

RESULTS

- Between pathological RD &MRI determined RD

  Likert score-5 = good relability(single measure ICC = 0.820; reader-1,single measure ICC = 0.880; reader-2)

  Patients with true positive results=good relability (single measure ICC = 0.77; reader-1,single measure ICC = 0.73; reader-2).

  Likert score-4=poor relability(single measure ICC = 0.248; reader-1,single measure ICC = 0.404; reader-2)

CONCLUSION

- To the best of our knowledge we firstly examined the ability of prostate MRI in determening pathological RD.
- We suggested that prostate MRI shows promising results on determining pathological RD in patients with gross measurable tumor on EPE assesment.
- In conclusion, prostate MRI may have a potential for assessing the degree of EPE as a prognostic marker.