Role of Diffusion Tensor MRI at 3T: in Differentiation Between Central Gland Prostatic Cancer and Benign Prostatic Hyperplasia

Essay

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Ibrahim AbdulSalam Taher

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LIST OF ABBREVIATION

AAH	Atypical Adenomatous Hyperplasia
ADC	Apparent Diffusion Coefficient
ASSET	Array Spatial Sensitivity Encoding Technique
BPH	Benign Prostatic Hyperplasia
CG	Central Gland
CT	Computed Tomography
CZ	Central Zone
DRE	Digital Rectal Exam
DTI	Diffusion Tensor Imaging
DWI	Diffusion Weighted Imaging
ECE	Extra Capsular Extension
EPI	Echo-planar Imaging
ERC	Endo-Rectal Coil
FA	Fractional Anisotropy
FOV	Field of View
G	Gauss
GH	Glandular Hyperplasia
GS	Gleason Score
HIFU	High Intensity Focused Ultrasound
HPC1	Hereditary Prostate Cancer 1
KD	Kilo-Dalton
LN	Lymph Node
MR	Magnetic Resonance
MRI	Magnetic Resonance Imaging
MRS	MR Spectroscopy
PACS	Picture Archiving and Communication System

LIST OF ABBREVIATION

PCa	Prostate cancer
PCAP	Predisposing for Cancer of the Prostate
PCR	Polymerase Chain Reaction
PIN	Prostatic Intraepithelial Neoplasia
PSA	Prostate Specific Antigen
PSAD	Prostate Specific Antigen Density
PSAV	Prostate Specific Antigen Velocity
PZ	Peripheral Zone
RF	Radio-Frequency
ROI	Regions Of Interest
SE	Spin Echo
SH	Stromal Hyperplasia
SNR	Signal to Noise Ratio
SVI	Seminal Vesicle Invasion
T	Tesla
TE	Time Echo
TR	Time Repeated
TRUS	Trans-Rectal Ultra-Sonography
TSE	Turbo Spin Echo
TZ	Transitional Zone
US	Ultra-Sonography

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Introduction

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INTRODUCTION

Prostate cancer (PCa) is the fifth most common cancer worldwide and causes 6% of cancer deaths in men. Transrectal ultrasonography (TRUS)-guided prostate biopsy is accepted as the gold standard for diagnosis; however, the tumor detection rate remains unsatisfactory, and the procedure may furthermore be unpleasant to the patient **(Döpfert et al., 2011).**

Central gland (CG) carcinoma composes about 30% of all prostate cancers. Although CG carcinoma tends to have low Gleason scores and low pathologic stages, up to 16% of such cancers demonstrate progression if untreated. CG cancer is a cause of false-negative findings at transrectal ultrasono-graphically guided biopsy, and, if detected and localized accurately, CG cancer can potentially be sampled for biopsy or treated by using emerging image-guided biopsy procedures and focal therapy **(CK et al., 2007).**

Benign Prostatic Hyperplasia (BPH) appears to be associated with a state of hyperplasia of the stromal and epithelial compartments, with the enzyme 5AR2 having a key role in driving organ growth **(Bechis et al., 2014).**

MRI has been considered as an excellent technique for detection of prostatic carcinoma. High-spatial-resolution T2-weighted rapid acquisition with a small field of view, performed with endorectal and/or external body phased-array coils, is generally used to depict prostate anatomy. On T2-weighted images, prostate cancer appears as an area of low signal intensity within the