



بسم الله الرحمن الرحيم

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# **Role of MRI in diagnosis of prostate cancer and correlation of results with Trans rectal Ultrasound “TRUS” biopsy**

*Thesis*

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

لَسْبَحَانَكَ لَا عِلْمَ لَنَا  
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ  
الْعَلِيمُ الْعَظِيمُ

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## List Of Abbreviations

| <i>Abbr.</i> | <i>Full term</i>                                           |
|--------------|------------------------------------------------------------|
| 2D US        | two-dimension Ultrasound                                   |
| ADC          | Apparent Diffusion Coefficients                            |
| AFMS         | The anterior fibromuscular stroma                          |
| BBB          | blood-brain barrier                                        |
| BMI          | Body mass index                                            |
| CT           | computed tomography                                        |
| CZ           | central zone                                               |
| DCE-MRI      | dynamic contrast enhanced MRI                              |
| DWI          | diffusion weighted imaging                                 |
| EBRT         | external-beam radiation therapy                            |
| EPE          | extra-prostatic extension                                  |
| EPI          | Echo-planar imaging                                        |
| FSE          | Fast spin echo                                             |
| FNH          | Focal nodular hyperplasia                                  |
| GD           | Gradient echo                                              |
| IMRT         | Intensity-Modulated Radio-Therapy                          |
| LSN-MRI      | Lymphotrophic super paramagnetic nanoparticle-enhanced MRI |
| MPG          | Motion probing gradients                                   |
| MR           | magnetic resonance                                         |

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## *List of Abbreviations*

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|      |                                 |
|------|---------------------------------|
| MRS  | MR Spectroscopy                 |
| NPP  | Negative Predictive value       |
| NVBs | bilateral neurovascular bundles |
| PPV  | Positive predictive value       |
| PSA  | prostate-specific antigen       |
| PZ   | peripheral zone                 |
| RF   | Radiofrequency                  |
| ROI  | Regions of interest             |
| ROC  | Receiver's operating curve      |
| SD   | Standard deviation              |
| SNR  | Signal-to-noise ratio           |
| STIR | Short TI inversion recovery     |
| SV   | Seminal vesicle                 |
| TRUS | Trans rectal ultrasound         |
| TSE  | turbo spin-echo                 |
| TR   | Time of repetition              |
| TE   | Time of echo                    |
| TZ   | transitional zone               |
| U    | urethra                         |
| V    | verumontanum                    |

## INTRODUCTION

The prostate is an exocrine gland composed of both glandular and non-glandular tissue. It is encircling the neck of bladder and urethra with the apex located above the urogenital diaphragm and the broad base below the bladder. *(Kim B. & Kim C.K, 2013).*

Worldwide, diseases of Prostate gland are responsible for significant morbidity and mortality among adult males. Most frequently encountered diseases affecting prostate are Prostatitis, Benign prostatic hyperplasia and Prostatic cancer. *(Hafiz Muhammad Aslam, et al ,2013).*

Prostate cancer is one of the most common malignancies in elderly men and it is one of the leading causes of cancer-related mortality. *(Zidan S, et al,2015).*

By 1990, Trans rectal ultrasound (TRUS) has emerged as the best imaging modality of the prostate .Its use led to an improved understanding and demonstration of intra glandular anatomy. For long time, TRUS is used screening, diagnosis and monitoring of benign disease, prostatic cancer and for guiding biopsy from the suspicious lesions. *(Kammermeir, 1991).*

The implementation of multi parametric MRI (mpMRI) into a screening program currently seems to be the most promising technique to improve the early detection of clinically significant PC.( *Pieter J., et al ,2016*).

Recently, great interest has been shown in mpMRI, which combines anatomic T2-weighted (T2W) imaging and T1Wwith MR spectroscopic imaging (MRSI), diffusion-weighted imaging (DWI) and/or dynamic contrast-enhanced MRI (DCE-MRI).( *Sciarra, et al, 2011*).

The combination of anatomic, biologic and functional dynamic information offered by mpMRI improve many aspects of PC management. There is a real need for clinicians to base therapeutic decisions not only on predictive methods and nomograms that include PSA, digital rectal examination (DRE) findings, and TRUS biopsy findings, but also on imaging.( *Sciarra, et al, 2011*).

## **AIM OF THE WORK**

The aim of this study is to role out diagnostic efficiency of MRI with different parameters in evaluating the prostatic tumors in form of differentiation of benign from malignant prostatic lesions.