Role of Magnetic Resonance Imaging in Benign Prostatic hyperplasia & Prostatic Carcinoma

Essay
Submitted in Partial fulfillment
for the master degree of Radiodiagnosis

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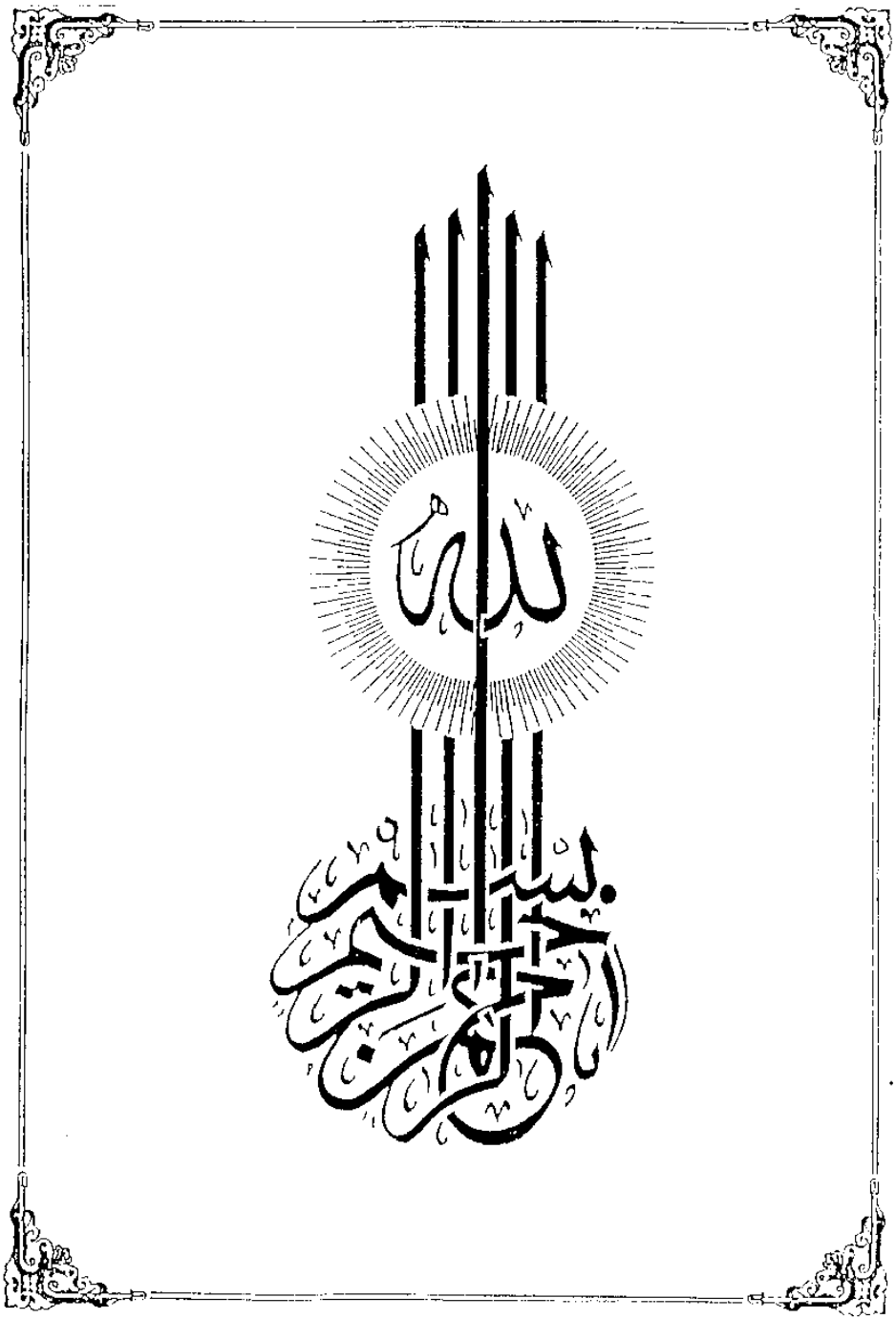
1991

بسم الله الرحمن الرحيم

{وقل رب زدني علما}

صدق الله العظيم



Acknowledgment

With great pleasure, I wish to express my sincere gratitude and appreciation to Prof Dr. Nawal Zakaria Head of Radiodiagnosis Department, Faculty of Medicine, Ain Shams University, for her generous help, patience, consideration, encouragement and careful review of all the details of this work. Her professional guidance and motherly help and kindness cannot be expressed in words.

I owe special gratitude to Dr. Wahid Hussein Tantawy, Lecturer of Radiodiagnosis, Faculty of Medicine, Ain Shams University, whose resourceful knowledge, close supervision and continuous advice were the best guide to me during the different stages of this work.

I must also express my greatly thankful to all my professors, colleagues and teaching staff at radiology department, Ain Shams University and at Maadi Armed Forces Hospital for their favorable assistance which led to the production of this work.

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Introduction

Introduction & Aim of Work

Prostatic diseases represent a significant health problem in elderly male population (Scardino, 1989).

It most commonly takes the form of benign prostatic hyperplasia or prostatic carcinoma.

Benign prostatic hyperplasia is almost *frequent* in elderly men, and prostatic carcinoma is arguably the most common cancer in men.

The diagnosis and management of benign prostatic hyperplasia and prostatic hyperplasia are difficult for radiologists and urologists (Schnall et al., 1990).

Both benign prostatic hyperplasia and cancer prostate can lead to an enlarged prostate and it is very difficult to distinguish these two entities by different imaging modalities. The application of computerized tomography (CT) and Ultrasound to the prostate was hoped to improve the ability to detect and stage prostate cancer.

However, although CT is useful for detecting distant metastasis, it offers little advantage over the rectal examination in the evaluation of the prostate itself. However, transrectal sonography suffers from poor imaging of the periprostatic structures and a limited field of view (Pontes et al., 1987).

In the past several years, magnetic resonance imaging has been shown to be of great value in imaging the pelvis. Its advantages derive from its multiplanar capability and high soft tissue contrast. These benefits are particularly significant in imaging of prostate and seminal vesicle.

Magnetic resonance imaging provides excellent visualization of the prostate and periprostatic anatomy in multiple planes. It is also useful in evaluating the reminder of the pelvis including lymph nodes and bony pelvis.

This makes magnetic resonance possibly the most powerful way to image the prostate (Schnall et al., 1990).

The aim of this study is to emphasize the role of magnetic resonance imaging of the prostate.

Anatomy of Prostate

Fig. 1: Prostate is situated between the rectum (R) and the anterior prostatic fat (F), abutted by the bladder (B) and the urogenital diaphragm (D) According to the lowsley lobar concept of anatomy, the prostate is divided into anterior (A), median (M), posterior (P), and the two lateral lobes. The seminal vesicles (S) are superior and posterior to the prostate (Quoted from Stark and Bradley, 1988).

Fig. 2: A Transverse section of a male pelvis at the level of the upper prostate gland. Pubic symphysis PS, Retropubic space of retius RpSR, Periprostatic venous plexus PPVP, Obturatot internus OI, Prostate P, Urethra/ prostatic UePr, Ejaculatory duct ED, Denovillier's fascia DF, Levator ani LA, Ischiorectal fossa IRF, Rectum R, Gluteus maximus GM.

(Quoted from Friedman et al., 1990)

Anatomy Of The Prostate

The prostate; is a firm, partly glandular, partly fibromuscular body, surrounding the beginning of the male urethra (Williams et al., 1989). This gland resembles a compressed, inverted cone approximately 3 cm from apex to base and 3.5 cm across the base (Romanes, 1977).

Being conical, the prostate presents:

a- Above; a base or vesicle aspect.

b- Below, an apex.

c- 4 surfaces, an anterior, posterior and two inferolateral surfaces (Williams et al., 1989).

A) ***The base***; is largely continuous with the neck of the bladder above through which the urethra enters near its anterior border (Williams et al., 1989).

B) ***The apex***: of the prostate projects inferiorly between the medial margins of the levator ani muscles and rests on the fascia of the urogenital diaphragm, which is continuous with the fascial sheath of the prostate. The urethra emerges

from the prostate, immediately antero-superior to the apex (fig. 1) (Romanes, 1977).

C) ***Surfaces***:

- The inferolateral surfaces: the convex inferolateral surfaces lie on the medial margins of the levator ani muscles. These two surfaces meet in the *rounded anterior surface* which lies behind the lower part of the pubic bone (Romanes, 1977); and is separated by the fat filled retropubic space of Retzius which is sometimes called the anterior prostatic fascia (Rifkin; 1990). (Fig. 2).

- The posterior surface: is nearly flat and separated from the anterior rectal wall by a narrow fascial plane; Denonvilliers fascia (Rifkin, 1990). Near its superior border is a depression where the two ejaculatory ducts penetrate dividing this surface into a superior and inferior larger part (Williams, 1989). The posterior wall of the prostatic urethra contains a rounded elevation called the seminal colliculus or verumontanum (Fig. 3) (Rifkin, 1990).

Fig. 3: A, Coronal section of a male pelvis at the level of the posterior bladder and prostatic urethra.
Urethra U, Pubic symphysis PS, Obturator internus OI, Prostate Pr, Levator ani LA, Urethra/ prostatic UePr, Ischiopubic ramus IPR, corpora cavernosa CC, Corpus spongiosum CS.

(Quoted from Friedman et al., 1990)

Fig. 4: Male pelvis, posterior view of isolated prostate Pr, vasdeferevs VD, seminal vesicles SV, ureter U.

(Quoted from Friedman et al., 1990)

The prostate can be divided into five imprecisely demarcated (Fig. 1) major lobes by their relationships to the prostatic urethra and the paired ejaculatory ducts which are formed by the union of paired fusiform seminal vesicles with vas deference extending through the prostate from the posterosuperior part of its base to open into the prostatic urethra on the seminal colliculus. The anterior lobe is anterior and the paired lateral lobes are lateral to the prostatic urethra. The posterior part of the prostate is divided by an obliquely coursing paired ejaculatory ducts into a relatively thin, shell like posterior lobe posterior tho the ejaculatory ducts and a median or middle lobe between the ejaculatory ducts and the prostatic urethra (Rifkin, 1990) (Fig. 4, 5)

The prostatic capsule: consists of parallel layers of fibromuscular tissue continuous. with and forming part of the stroma of the organ. The prostatic sheath or false capsule is formed anteriorly and laterally by periprostatic connective tissue derived from the pelvic fascia in which lies the prostatovesicle plexus of veins. Posteriorly, the sheath is formed by the avascular rectovesical fascia of Denonvillier. This fascia is of fair thickness and acts as an efficient barrier to the reciprocal spread of prostate or rectal malignant diseases (McVay, 1984).

Fig. 5: Coronal section immediatly posterior to the prostate gland demonstrating the urethra vas deferens, seminal vesicle and rectum relationships .
(Quoted from Friedman et al., 1990)