TRANSRECTAL ULTRASONOGRAPHY VERSUS MAGNETIC RESONANCE IMAGING IN PROSTATIC LESIONS

Essay

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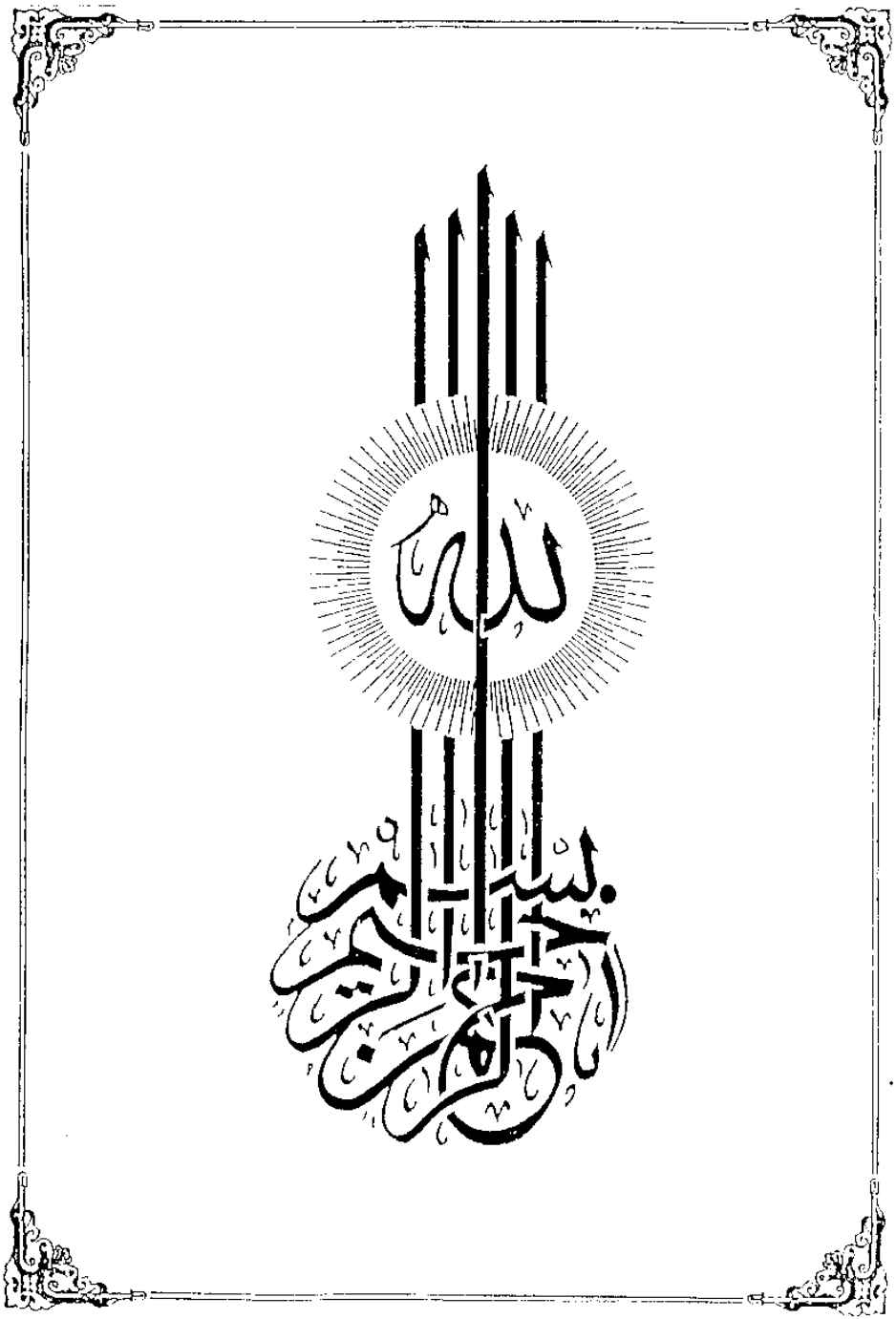

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INTRODUCTION AND AIM OF THE WORK

Transrectal ultrasonography is very sensitive in detection of direct extracapsular spread and staging.

Magnetic resonance imaging is extremely useful for detection of prostatic lesions, especially detecting tumors in situ as well as tumor invasion. more over, magnetic resonance imaging is safe considering radiological hazards.

The aim of this study is to get a comparison considering the role of transrectal ultrasonogrophy versus magnetic resonance imaging in diagnosis of various prostatic lesions.

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).

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).

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. Obturator 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)

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 surfaces* 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 vermontanum (Rifkin, 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 to the ejaculatory ducts and a median or middle lobe between the ejaculatory ducts and the prostatic urethra (Rifkin, 1990).

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 of rectal malignant diseases (Mc Vay, 1984).

Blood supply of the prostate

Arterial supply : arteries are rami of the internal pudendal: inferior vesical arteries passing towards the base of the bladder and are joined by branches from the middle rectal arteries.

Venous supply : veins corresponding to the arteries drain to the internal iliac veins, in addition veins of the bladder and prostate together with the deep dorsal vein of the penis, drain through the prostatic plexus to the inferior vesical veins(Romanes, 1977).

Lymphatics: to lymphatic channels surrounding prostatic acini to periprostatic lymphatic plexus, which drain to hypogastric, scrotal, vesical and external iliac nodes.

Nervous supply

The nerve supply of the pelivc viscera is from the inferior hypogastric (pelvic) plexus. These contain sympathetic, parasympathetic and sensory nerve fibres (Romans, 1977).

PATHOLOGY OF THE PROSTATIC LESIONS.

Pathology of benign prostatic hyperplasia:

Non neoplastic nodular enlargement of prostate-nodular hyperplasia - benign prostatic hypertrophy is the most common symptomatic tumor like condition in humane. It seldom occurs befor the age of 50, but the incidence increases with age and it can be found at autopsy in 75% to 80% of men over age 80.

Prostatic hyperplasia occurs in the inner zone of the prostate;where as carcinoma is usually found in the outer portion .It ocurs at a time in a man' life when there are distubances of sex hormones (Kissane and Anderson. 1985).

Evidence based on histologic examination suggests that the etiologic agent of this disease begins to produce changes in prostate after the age of 40 years reaches its maximum intensity at about 60 years.

Grossly:

The enlarged prostate gland is smooth, or nodular, firm and somewhat elastic or rubbery. The appearane of the surfaces made by sectioning depends on whether the greatest amount of hyperplasia involves the glands or the fibromuscular tissue. If hyperplasia is more glandular. the cut surface reveals many various sized nodules, some of which are well circumscribed and surrounded by pearl white fibromuscular tissue. Some of the nodules have a honey comb architecture.

The cut surface

Of an enlarged prostate is yellowish and moist with milky fluid; cysts are common and some of these may contain white or amber-colored amylacea or calculi.

If the hyperplasia is predominantly of fibromuscular tissue, the cut surfaces are glossy, and homogenous and very little milky fluid can be expressed.

Microscopically:

The initial lesion has been demonstrated to be a multicentric aglandular fibromuscular nodule originating in the submucous portion of the prostatic urethra; the acini are increased in number and size, many undergo dilatation and invagination, forming villous projections. Some of the acini are lined by active cells and others by inactive cells; the active cells are tall columnar with poorly defined borders ,abundant finally granular or homogenous cytoplasm and basal nuclei often forming a double layer. The inactive cells that line many of cystic acini are cuboidal or low columnar with well defined cell walls, scanty vesiculated cytoplasm and single layered basal nuclei.

Depending on the relative amounts of stromal and glandular elements, the following types of hyperplasia, stromal (fibrous or fibrovascular) nodule, fibromuscular nodule, muscular nodule, fibroadenomatous nodule, and fibromyoadenomatous nodule are recognized (Kissane and Anderson, 1985).