COMPLEMENTARY ROLE OF ULTRASONOGRAPHY IN DIAGNOSIS OF PROSTATIC ENLARGEMENT

THESIS

Submitted in Partial Fulfilment
For the M. D. Degree in
(UROLOGY)

By

SHERIN IBRAHIM RAGI
B. Sc., M. B., B Ch., M. S. Urology

Supervisors

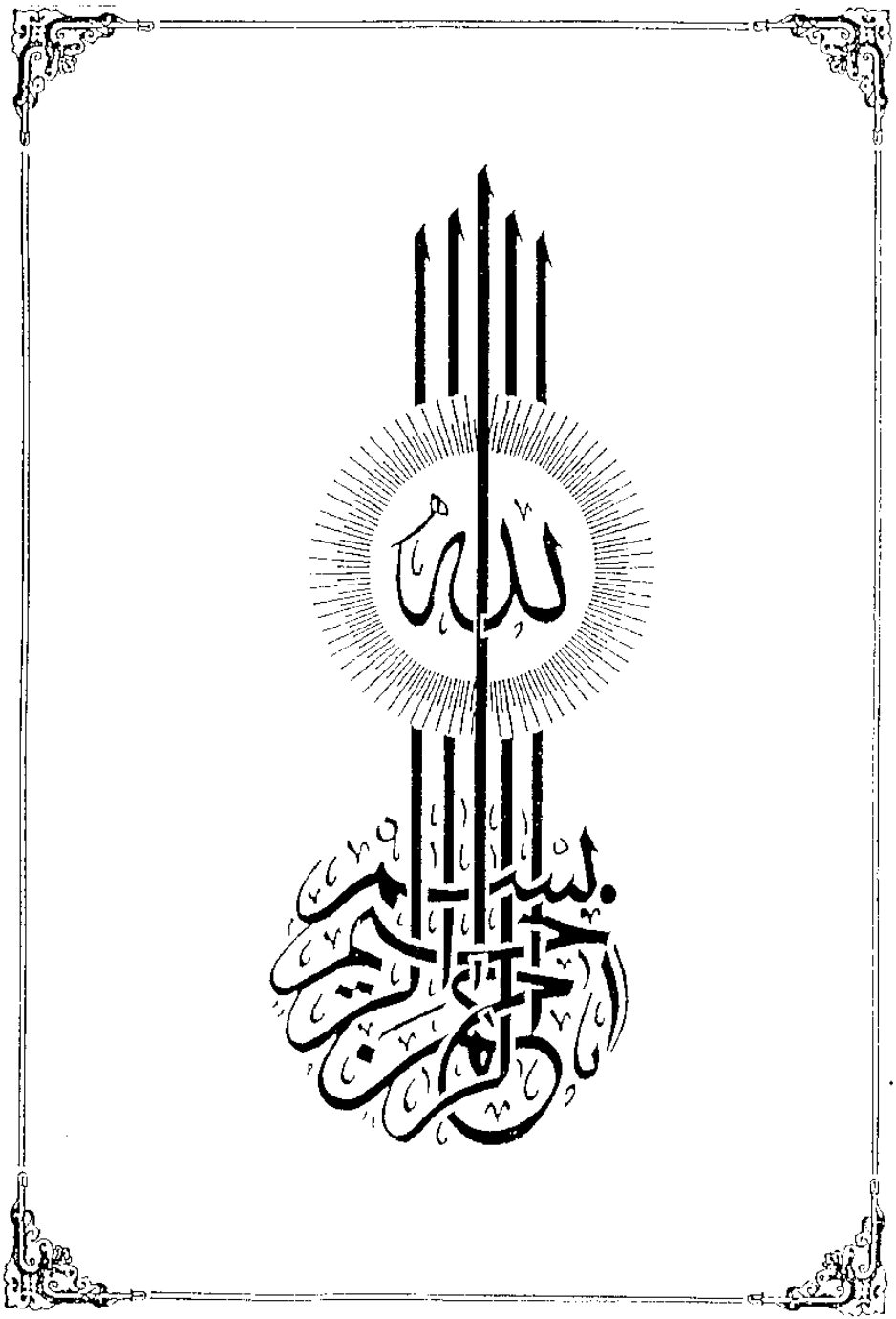
Prof. FAROUK M. FAHMY
Professor of Urology, Ain Shams University

Dr. MAMDOUH GHONIEM
Lecturer of Radiology, Ain Shams University

Faculty of Medicine
Ain Shams University

1985

List of contents



Acknowledgements

I would like to express my sincere appreciation to Prof. Dr. Farouk Fahmy, Professor of Urology, Ain Shams University, for his guidance and help throughout our work.

I am also very grateful to Dr.Mamdouh Ghoneim, Lecturer of Radiology, Ain Shams University, for his great help and assistance in directing and producing this piece of work.

Special thanks to Dr. Ali Maged, Chief of Urology departement, Ain Shams University, for his great enthusiasm in establishing the ultrasonography unit in the departement.

Last but not least, I would like to thank all my professors and junior colleagues, for the great help they gave.

INTRODUCTION

The technical advances and widespread clinical application of diagnostic ultrasound in the past several years have been beyond all expectations.

Diagnostic ultrasound to the kidney and the urinary bladder was made even in the early 1950's.

However, general acceptance in this area was rather slow.

At that time almost every patient with diagnostic problems had an intravenous pyelogram and a cystoscopic examination and only if the answer was not obtained by these techniques was ultrasound considered.

Furthermore, a urologist used to readings of his own x-ray films could not understand the poor quality of ultrasonic pictures then available, thus he tended to continue with familiar techniques.

Recent rapid improvements in ultrasonic equipment such as the introduction of grey scale scanning and dynamic scanning which may be called a "revolution" have completely changed this choice.

Especially, the development of intracavital scanning and of ultrasonically-guided puncture techniques increased remarkably the usefulness of ultrasound in this area.

Prostatic enlargement is a common cause of lower urinary tract obstruction in males.

The aim of this work is to clarify the complementary role of ultrasonography in diagnosis of diseases causing prostatic enlargement.

And its value in estimating the prostatic size in[B.P.H.] before and after prostatectomy to help the surgeon in his choice of operation.

In this work we are trying to combine conventional clinical examination as well as radiological, cystoscopical, ultrasonographic examination and histopathological studies, trying to establish a proper diagnosis, hence treatment of our patients on sound basis.

EMBRYOLOGY

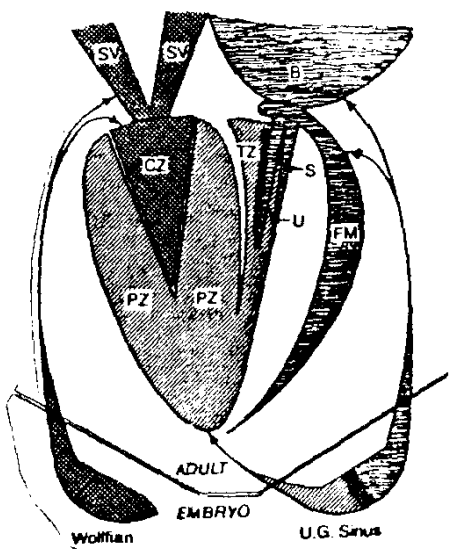
EMBRYOLOGY

The site of origin:-

The prostatic glandular tissue is mainly endodermal in origin, and is developed from the urogenital sinus.

However the origin of central part is a matter of controversy, Franks, (1979) proposed that it originates from the Mullerian duct, while McNeal, (1981) refered its origin to the Wolffian duct system.

Both of the above authors agree that the central part is mesodermal in origin.



B ; Bladder
S.V; Seminal vesicle
U ; Periurethral glands
C.Z; Central zone
F.M; Fibromuscular stroma
P.Z; Peripheral Zone
T.Z; Transitional Zone

The origin according to Mc Neal, 1981.

The intra-uterine development:-

The prostate appears at the 9th week of foetal life in the form of multiple solid projections from the urethral epithelium.

In the 12th week of foetal life these projections are differentiated into five distinct buds (Lowsley, 1912). These buds start to extend in the surrounding mesenchymal tissues in the arrangement of two laterals, one median, one anterior and one posterior.

At 16th week, they begin to branch and rebranch ending in a complex duct system.

Eventually these buds form the prostatic lobes, the ducts of which passes to open in the floor of prostatic urethra along side the verumontanum, while the ducts of posterior lobe open below the verumontanum.

Before birth the anterior lobe shrinks and become differentiated into a fibroglandular structure.

Extra-uterine development:-

Directly after birth, the prostate undergoes enlargement mainly in its central part which is explained by maternal oestrogen.

This condition subsides by time and the prostate of the child remains small and dormant waiting for the hormonal stimuli of puberty to be enlarged and become an active organ.

In pseudohermaphrodite the development of the prostate takes place according to type of gonads present.

If testis the prostate develops normally, but if ovaries the central part only of the prostate is developed.

In castrated boys before puberty the whole prostate fails to attain the adult size.

[Blandy, 1975]

ANATOMY

ANATOMY OF PROSTATE

General description:-

The prostate comprises a firm elastic structure partially glandular and partially fibromuscular.

It surrounds the beginning of urethra and is situated at the lower level in the lesser pelvis, behind the inferior border of symphysis pubis and the pubic arch, and anterior to the ampulla of the rectum.

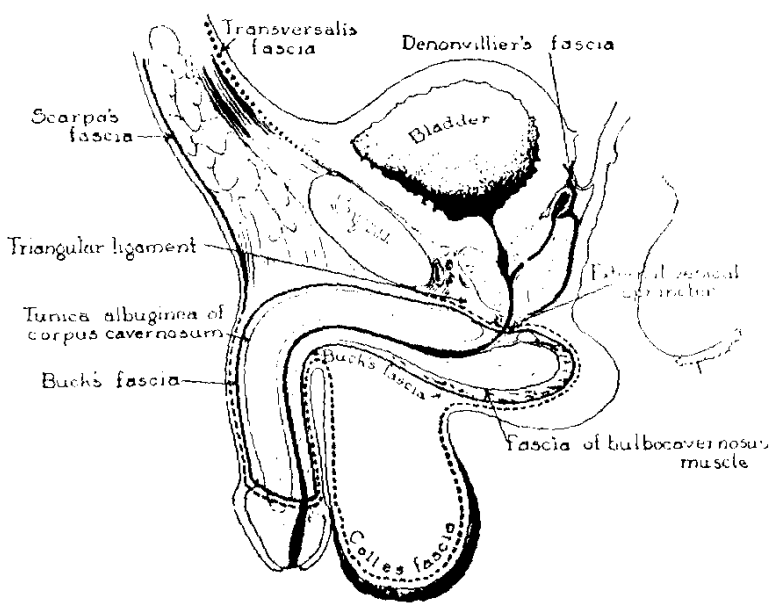


FIG (1)

Quoted from Campbell's Urology Vol (1) p. 15. (1979)

It represents the shape of a truncated cone, and hence possesses five surfaces, which are the following:

a) The base:-

It is the superior surface, it is triangular in shape and slightly concave.

It is directed upward and it is applied to the bladder neck and partially separated from the bladder by circular groove filled with fat and aereolar connective tissue.

b) Apex:-

Directed inferiorly and posteriorly and is with direct contact with the fascial covering of superior surface of the deep layer of urogenital diaphragm.

c) Posterior surface:-

It is flattened transversely and vertically convex, it is separated by its sheath and some loose connective tissue from the rectum and is about 4 cm from the anus.

It has a median suclus, termed median furrow.

TheDenonvillier's fascia separates it from the anterior ectal wall.

d) Anterior surface:-

It is narrow convex, 2 cm behind the symphysis pubis and separated by a plexus of veins and some loose adipose tissue.

It is attached to pubic bone via puboprostatic ligaments, and the urethra emerges from this surface a little anterosuperior to the apex.

e) Inferolateral surfaces:-

They are prominent and relate to and supported by anterior parts of levatorani muscles which is the levator prostate muscle.

[Fahmy, 1979]

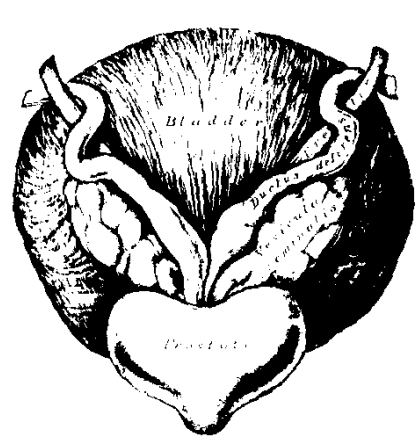


FIG (2)

Quoted from Herbut's Urological Pathology - (1952)

The prostate is about 15 - 22 gms in weight, 4.4 cm in transverse diameter, 3.4 cm in vertical diameter and 2.6 cm in thickness. [Wayrauch, 1959]

Prostatic urethra:-

Is the widest and most dilatable part of the urethra, it is about 3 cm long, lies more to anterior surface than the posterior one. In its posterior surface is the verumontanum located at the mid point.

Along side its summit opens the 2 ejaculatory ducts and on either side opens 2 rows of prostatic ducts.

A small depression in the middle of the verumontanum is known as the prostatic utricle.

Fascial Investments of the prostate:-

The prostate has two fascial layers.

a) True prostatic capsule:-

The gland is enveloped by a thin but firm capsule, adherent to the prostatic tissue and is structurally continuous with the interglandular stroma, being composed of the same component i.e. fibrous and muscular tissues, so it is inseparable