

**RECENT ADVANCES
IN MANAGEMENT OF
CANCER PROSTATE**

ESSAY

Submitted in Partial Fulfilment
for the Requirement of M.Sc. Degree in Urology

BY

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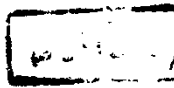
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INTRODUCTION

INTRODUCTION

Treatment of cancer prostate is still a matter of controversy, some proposed radical surgical removal of cancer prostate in its early localized stages, Others claimed combined radical and surgical method in advanced cases. Third group put forward the idea of radiotherapy as a curative method in localized forms of cancer prostate and being palliative in late metastatic carcinoma of the prostate.

It is our aim here to review the different treatment modalities in the treatment of cancer prostate together with the most recent methods tried in advanced localized malignancies.

***ANATOMY OF THE
PROSTATE GLAND***

ANATOMY OF THE PROSTATE GLAND

The prostate gland is a composite structure which includes glandular elements and a stroma of collagenous and muscle tissue. It is classically described as a compressed inverted cone surrounding the very beginning of the male urethra and is situated in the true pelvis behind the inferior border of the pubic symphysis and pubic arch lying in front of the ampulla of the rectum.

The prostate gland is conical in shape and has a base-apex - ant - post and two inferolateral surfaces.

The adult prostate is a firm, elastic gland, flattened anteroposteriorly and 2.6 cm in thickness.

The weight of normal prostate of an adult individual is 16-22 gms.

Anatomical Relations:-

The base

It is the superior surface which is continuous with the neck of the urinary bladder at the vesicoprostatic junction which is marked by circular groove filled with fat and areolar connective tissue.

The base is triangular in shape and is pierced by the prostatic urethra near to its anterior part.

The apex

The apex of the prostate is directed inferiorly lying on superior surface of the superior fascia of the urogenital diaphragm which itself continuous with the fascial sheath of the prostate.

The anterior surface

The anterior surface extends from the apex to the base and convex from side to side. It is about two centimeters

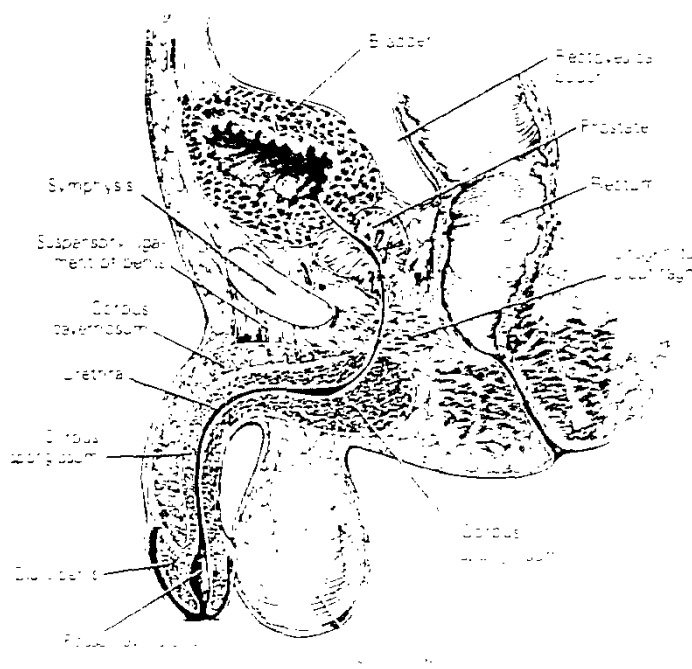


Fig. 1. Sagittal section showing the position of the prostate in the pelvis and its relation to the symphysis pubis, the rectum, and the urinary bladder. From DONALD R. SMITH, GENERAL UROLOGY, 1981.

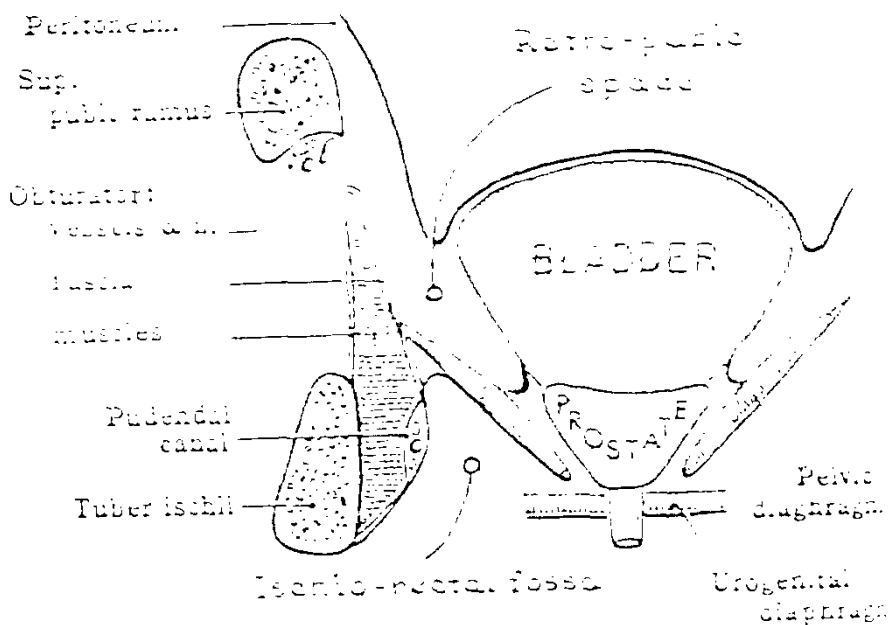


Fig. 2. Diagram shows relation of the prostate to the pelvic structures. From GRANT'S ATLAS OF ANATOMY, 6th EDITION, 1970.

behind symphysis pubis and separated from it by a rich plexus of veins and loose adipose tissue. Near its upper part it is connected to the pubic bone on each side by the puboprostatic ligaments. The prostatic urethra emerges through this surface little above and in front of the apex of the gland.

The posterior surface

The posterior surface of the gland is flattened transversally and vertically is convex. It lies in front of the ampulla of the rectum and separated by denonvilliers fascia. The upper border of the posterior surface is the vesico prostatic junction. The two ejaculatory ducts enter this surface near to its upper border where they pass downwards and forwards to open in the prostatic urethra on either side of the verumontanum.

The inferolateral surfaces

The inferolateral surfaces are prominent and some what convex, and are related to the anterior part of the levator ani-muscles which are separated from the gland by a rich plexus of veins embeded in fibrous tissue forming the lateral part of the prostatic sheath.

Dimensions

The normal prostate weighting bet 16-22 gms in adult individual. The prostate measures about 3.5cm transversely at its base and about 2.5cm in its vertical and antero posterior diameter.

The Fascial Connections of the Prostate

The prostate capsule proper

The prostate gland has a fibromuscular stroma directly continous with the fibromuscular element of the gland

itself. Which in turn is directly continuous with the muscular element of the smooth musculature of the bladder neck. This fibromuscular stroma condenses on the periphery of the gland to form prostatic capsule proper which is thin but firm capsule adherent to the prostatic tissue.

The prostatic sheath

The prostate is surrounded by another fascia called the prostatic sheath made up primarily of fibrous tissue which is a condensation of endopelvic fascia. Anteriorly the sheath is continuous with the puboprostatic ligaments and inferiorly it blends with the fascia on the deep surface of the transverse perini muscles. Posteriorly the prostatic sheath is fused with the obliterated rectovesical peritoneal pouch which at the embryologic stage extends downwards to the pelvic floor but which now forms a denser layer known as fascia of denonvilliers, separating the rectum from the posterior surface of the prostate as well as the seminal vesicles and the base of the bladder. So, it is evident that these fascial investments and attachments make the prostate gland well fixed in its place and allow only a limited degree of mobility.

Structure of the prostate

The prostate gland is a mixed glandular structure approximately 90 percent of its weight is a muscular mass, while the rest is a glandular epithelial element. The ducts and acini of the glandular element are lined by columnar epithelium. They gather to drain into the posterior aspect of the prostatic urethra on either side of the median elevation, as the prostatic ducts the glandular element is primarily in the posterior and lateral parts while the anterior segment is mainly fibromuscular. Former classification divided the prostate gland into five lobes anterior

lobe, posterior lobe, median lobe and two lateral lobes as the glandular element relates to the three ducts passing through it, the prostatic urethra and the two ejaculatory ducts-which meet at the level of the verumontanum. The median lobe would be the segment trapped in the triangle between the urethra anteriorly and the plane of the ejaculatory ducts posteriorly. The posterior lobe would be behind the plane of the ejaculatory ducts and in contact with the inframontanial part of the prostatic urethra. The lateral lobes would be on each side of the urethra, whereas the anterior lobe would be purely fibromuscular commissure joining the two lateral lobes anterior to the urethra. This classification based on the work of **Lowsley, 1912**, considered that the prostate originates from five separate groups of glandular embryonic elements that later fuse as one uniform gland. This classification of the prostate into five lobes considered that the prostate originates from five separate groups of glandular embryonic elements. However, recent understanding of the development and structure of the prostate shows that separating the gland into five lobes does not describe any anatomic reality. As urologists frequently refer to midline and laterally projecting nodules of benign prostatic hyperplasia as middle and lateral lobes respectively. However, those lobes are not reference points of normal anatomy but exist only in glands with B.P.H. So this old concept probably arose from confusion between the truly normal prostate and the prostate involved by hyperplastic changes. In more recent years the morphology of the prostate has come under intense study by several investigators (**Tisell and Salander 1975, McNeal, 1980-81, and Blacklock 1982**) of those McNeal's work appears to be the most widely accepted. After detailed anatomic and histologic study of the adult prostate McNeal has established a different nomenclature for its various parts and rather than

dividing the prostate into arbitrary lobes he identified zones that appear to have morphologic, functional and pathologic significance using sagittal, coronal, and oblique coronal sections he divided the prostate into four distinct zones, each zone makes contact with a specific portion of the prostatic urethra which can be taken as the primary anatomic landmark for defining these zones.

1- The anterior fibromuscular stroma:

The description made by McNeal, 1981, include the following:- This is a thick sheet of fibro muscular tissue that covers the entire anterior aspect of the prostate. It composes up to one-third of the total bulk of the prostate and is entirely lacking in glandular element. A continuous sheet of smooth muscles surrounds the urethra proximally at the bladder neck where it merges with the internal urethral sphincter and detrusor muscle from which it originates. Near the apex the smooth muscle merges with the transverse loops of striated muscle that represent a proximal extension of the external sphincter along with the anterior aspect of the distal segment of the prostatic urethra.

2- The peripheral zone:

This is the largest anatomic subdivision of the prostate, containing 75% of the total glandular tissue of the prostate. It encloses the central zone in a concavity on its upper anterior aspect and below the verumontanum it comes into contact with the lower prostatic urethra on its posterior and lateral aspects. The ducts originate as double row of orifice in the posterolateral recess of the urethra below the verumontanum extending into the apex of the gland, these ducts course 1st backwards into the substance of the zone and swing laterally and anteriorly to end in small round acini.

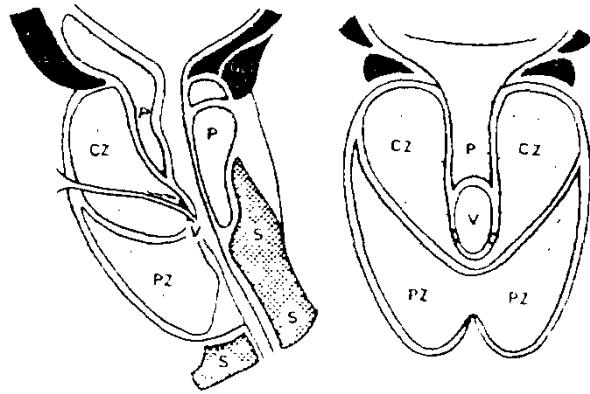


Fig. 3. The morphology of showing central zone (C.Z.) and peripheral zone (P.Z.) in diagrammatic midline sagittal section (a) and coronal section behind the urethra (b).

P = Preprostatic sphincter.

S = Striated sphincter of the urethra and external sphincter.

V = Verumontanum.

From SCIENTIFIC FOUNDATION OF UROLOGY 2nd EDITION, 1982.

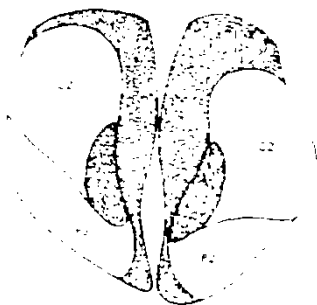


Fig. 4. Coronal section of the prostate through the urethra showing the central and peripheral zones and the transition zone (T.Z.).

From SCIENTIFIC FOUNDATION OF UROLOGY 2nd EDITION, 1982.

The epithelium consists of pale uniformly columnar cells with basal small dark nuclei. Laterally, some of the terminal ducts curve anteriorly to form a shallow cup around the striated sphincter and then anchor into the lateral extent of the anterior fibromuscular stroma. In this region almost all carcinoma arise. Furthermore, this is the tissue sampled in most random biopsies of the prostate.

3. The central zone:

This is the smallest of the two subdivisions of the functioning prostatic glandular tissue making up about 25% of its mass. It comes into contact with the urethra only at the upper end of verumontanum where its duct orifices open in a tight circle immediately around the ejaculatory duct orifices. The ducts branch laterally to form a flat wedge of glandular tissue with its apex at the vertex and its base at the base of the prostate posterior to the bladder neck. The central zone is penetrated on its upper posterior surface by the vas deferens and the duct of the seminal vesicle on each side where these unite to form common ejaculatory duct within its substance before they enter the urethra on either side of the verumontanum. McNeal has distinguished the central from peripheral zone depending on the difference in architecture and histologic features of the central zone which is closely resembling those of the seminal vesicles suggesting that the central zone could be of Wolffian duct origin. This possibility correlates with increased occurrences of carcinoma in both seminal vesicles and the central zone.

4. The transition zone:

It is a small group of ducts arising at a single point at the junction of the proximal and distal urethral segments. It is bilaterally represented and comprises a small region