MANAGEMENT OF CANCER PROSTATE

Essay Submitted for
Partial Fulfilment of
M. Sc. Degree in Radiotherapy
and Nuclear Medicine

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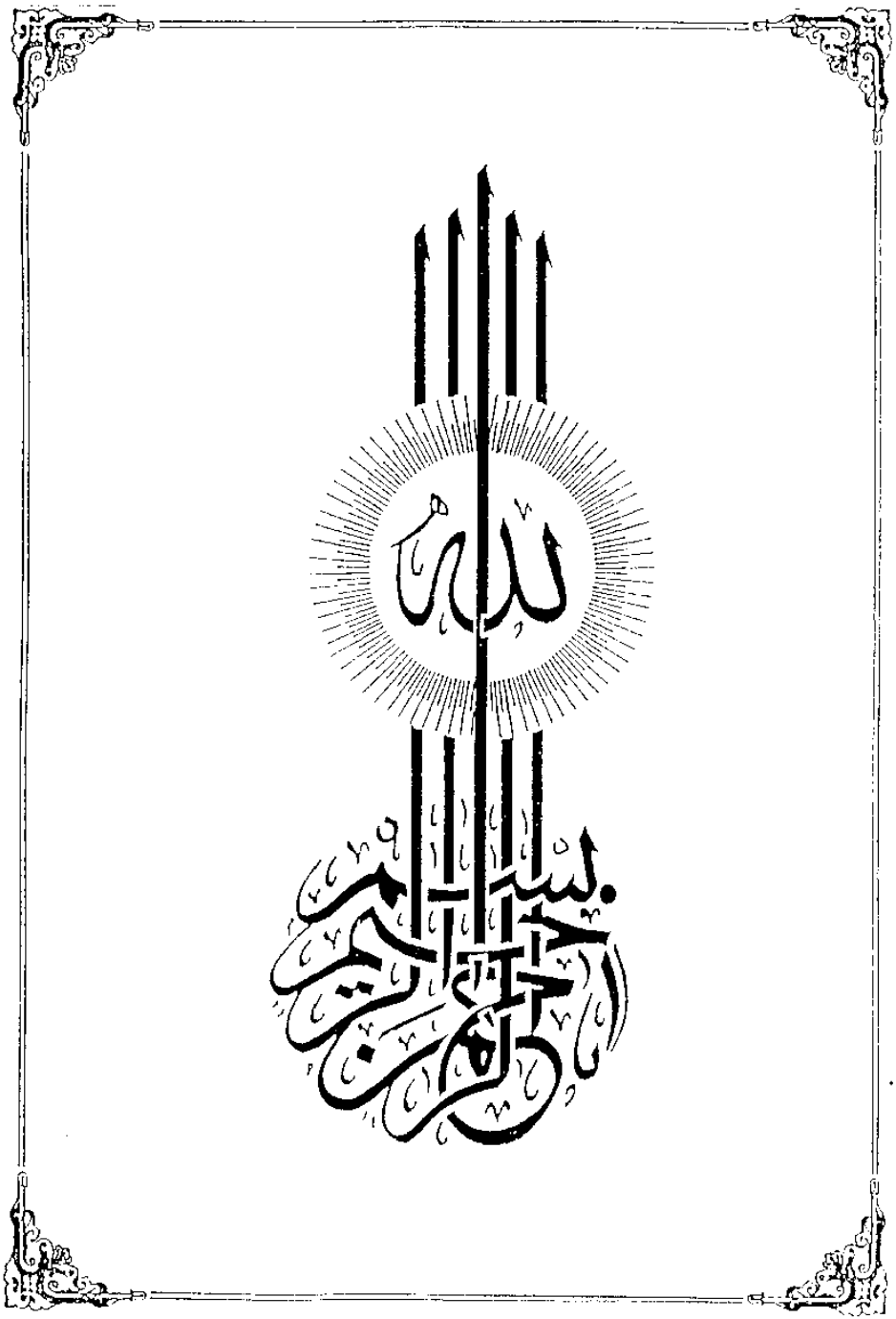
1995

I Dedicate This Work

To

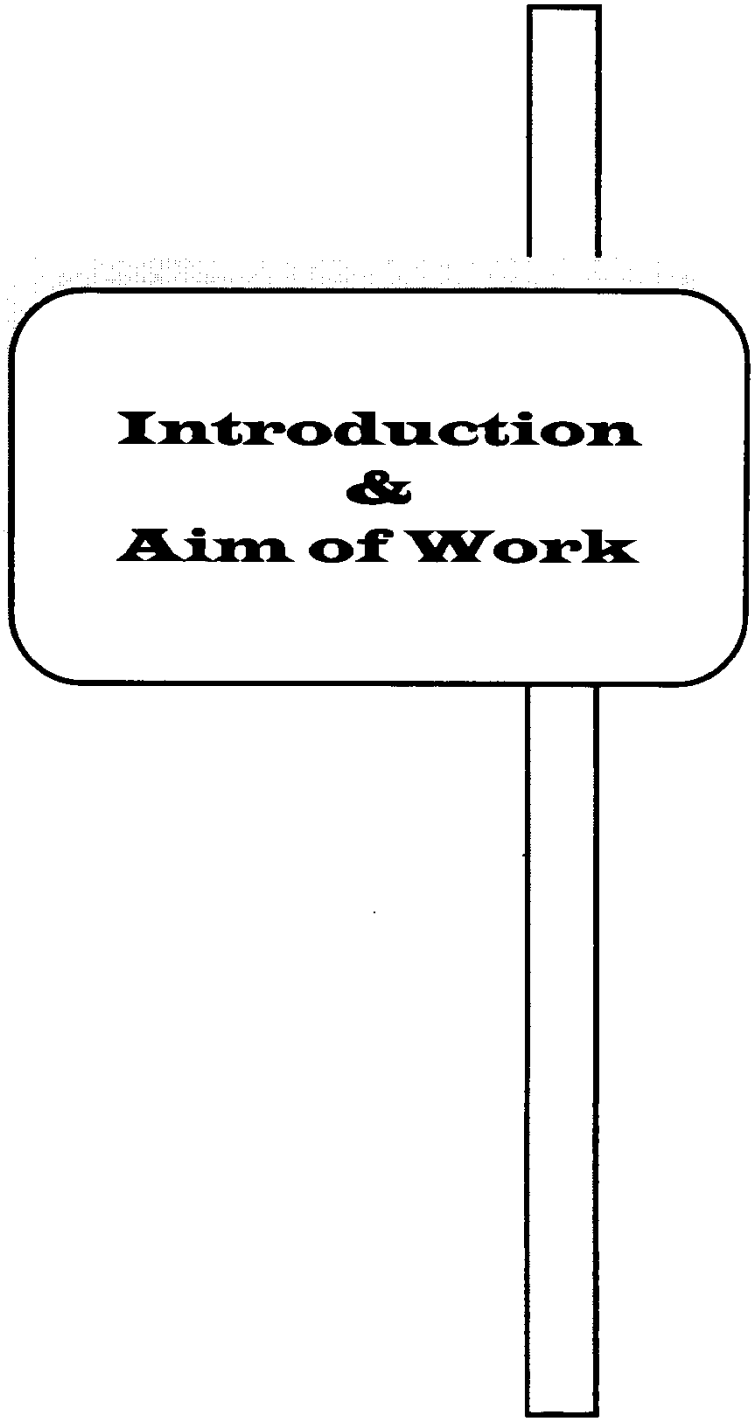
My Husband & Children



Index

List of Abbreviations

^{198}Au :	Gold - 198
^{32}P :	Phosphorus - 32
5.Fu :	5 Fluoro Uracil
^{89}Sr :	Strontium - 89
ACTH :	Adreno cortico trophic hormone.
BPH :	Benign Prostatic Hyperplasia.
Co ^{60} :	Cobalt-60 Teletherapy.
CRF :	Chorionotrophin releasing factor.
CT :	Computerized tomography.
DES :	Diethyl shielbestrol.
ECOG :	Eastern cooperative oncology group.
EORTC :	European organization for research on treatment of cancer.
ERT	External radiotherapy.
IVP :	Intra venous pyelography.
LH :	Luteinizing Hormone.
LHRH :	Luteinizing Hormone releasing hormone.
mCi	Millicuri.
MRI :	Magnetic resonance Imaging.
NPCP :	National Prostatic cancer project.
PA :	Postero anterior.
PC :	Prostatic carcinoma.
PLND :	Pelvic Lymph node dissection.
PR :	Perrectal.
PSA :	Prostatic specific antigen.
RTOG	Radiation therapy oncology group.
T :	Testosterone.
TNM :	Tumor, Lymph node, metastasis.
TURPs :	Transurethral prostatic resection.
U/S :	Ultra-Sound.
UICC :	International Union Against Cancer.
VACURG :	Veterans Administration Cooperative Urological research group.



Introduction

Cancer of the prostate is the most common malignant neoplasm in man.

In autopsies, 30% of men elder than 50 years harber foci of cancer within the capsule. (Dhom G 1983). Prostatic cancer is now the most commonly diagnosed cancer in United States men as well as the second leading cause of male cancer death. (Boring et al, 1992). This remarkably high prevalence of cancer unmatched in any other organ, makes prostate cancer the most common malignancy in humans.

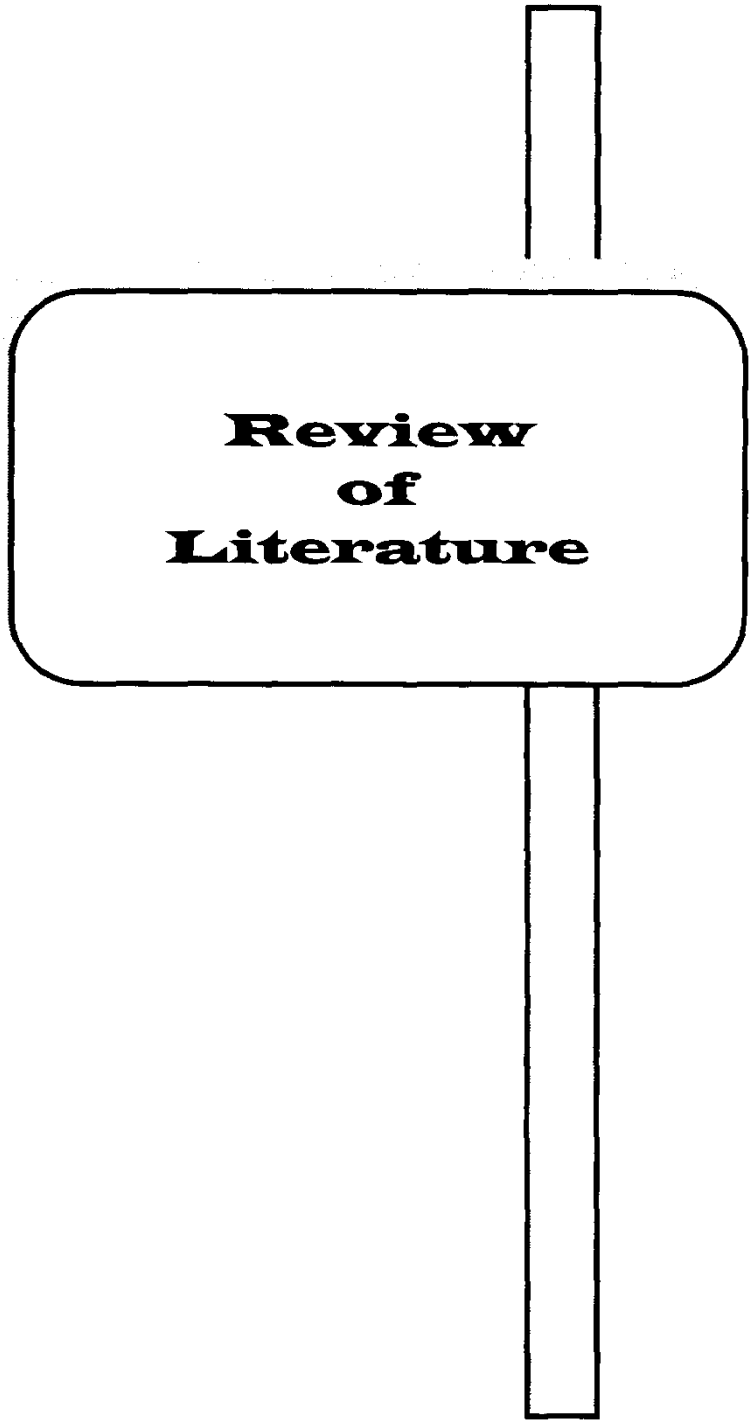
Epidemiologic and screening studies over the past several decades have raised several questions about the pathogenesis of this disease, but a definitive cause for prostatic cancer has not been established. (Pienta, 1993).

After the age of 50, both incidence and mortality rates from prostatic cancer increase at a near exponential rate. Prostatic cancer increases faster with age than any other major cancer and with an aging population, the burden of illness from prostatic cancer is likely to continue to increase in the future. (Coffey, 1987).

Nevertheless only 1% of these men will be diagnosed with prostate cancer each year, and only 0.3% will die from the disease. This enormous discrepancy between the high prevalence of the disease at autopsy and low incidence of the disease clinically has confounded understanding of its clinical significance and stymied efforts to detect and treat prostate cancer. (Carter HB, 1990).

Aim of the work

The aim of this essay is to revise the clinicopathological aspects of cancer prostate and the recent trends of its management including, epidemiology, aetiology, anatomy, pathology, clinical picture, diagnosis and different treatment modalities.



Anatomy of the prostate

The anatomy of the prostate was described by Ackerman and del Regato's (1985) as following:

The prostate gland lies at the base of the bladder just anterior to the rectum, above the levator ani, and around the initial portion of the urethra. It is a wal nut shaped solid organ, weighing about 20g., and consisting of fibrous, glandular and muscular elements. The normal consistency is similar to the hip of the nose, with carcinomatous tissue having a firmer consistency. The seminal vesicles and vas deferens pierce the postero superior aspect of the gland and enter the urethra at verumontanum. (Fig. 1).

The lateral margins of the prostate are delineated usually against the levator ani muscles forming the lateral prostatic sulei, often there is mid line furrow that demonstrates the Lt and Rt lobes of the prostate.

The prostate is attached anteriorly to the pubic symphysis by the puba prostatic ligament. It is separated from the rectum posterioly by Deno villiers fascia (retro vesical septum), which attaches above to the peritoneum and below to urogenital diaphragm. It is that portion of prostatic fascia that restricts posterior extension of prostatic carcinoma into the rectum.

The prostate is devided into five histologically distinct lobes; anterior, posterior, median, and two lateral lobes. It is the posterior lobe extending across the entire posterior surface of the gland that is felt on rectal examination.

McNeal (1981), defined four morphologic areas of the prostate:

1- Peripheral zone, consisting 70% of the glandular prostate, is the site of over 95% of carcinomas of the prostate.
2- The central zone, constituting 25% of the glandular prostate, has marked histologic differences from the peripheral zone.
3- The peri-prostatic region is the urethral segment proximal to the verumontanum and is the site of benigh prostatic hyper plasia.
4- The anterior fibro muscular stroma forms the anterior surface of the prostate.

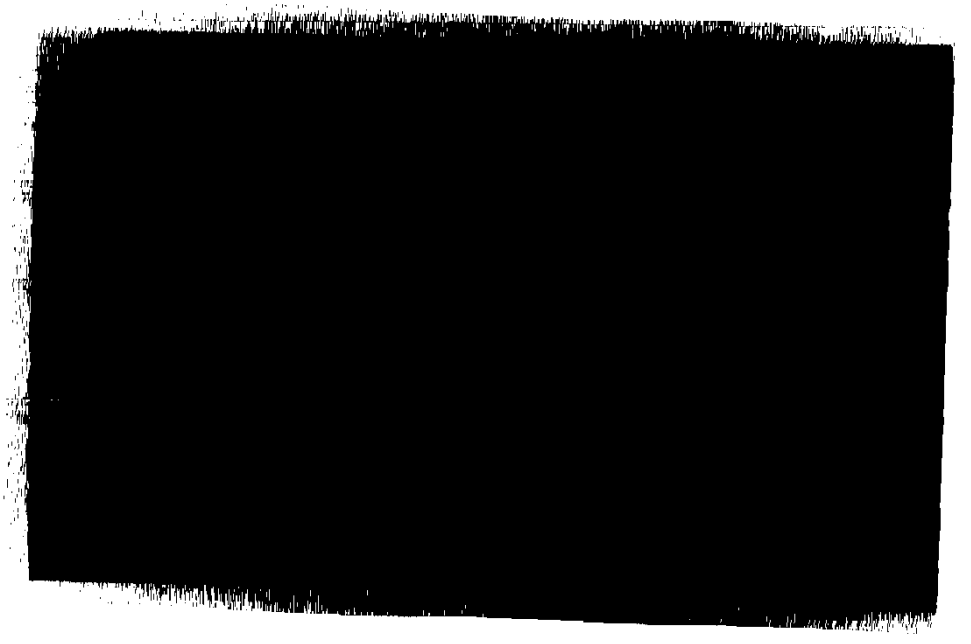


Fig. (1) View of posterior urinary bladder illustrating positions of prostate and seminal vesicles (Anson and McVAy, 1971).

Histologically the central acini are large with irregular contours, whereas the peripheral zone ducts are narrow and terminate in small simple acini.

Arterial supply of the prostate :

The arterial supply to the prostate comes from the inferior vesical and the middle hemorrhoidal branches of the hyprogastric artery.

Venous drainage of the prostate :

Just outside the prostatic capsule lies a venous plexus communicating with the deep dorsal vein of the penis and the vesical plexus and draining into the internal iliac veins. This plexus communicates also with the vertebral veins plexus.

The whole of the prostate and its plexuses is surrounded by the posterior fascia, the posterior portion of which, the fascia of Denonvilliers, forms an effective barrier between the prostate and the rectum. (Fig. 2).

Nerve supply of the prostate:

Within the immediate periprostatic area there is an abundant network of nerves from the hypogastric plexus.

Lymphatics : (Fig. 3)

Intraprostatic lymphatics course toward the capsule and there form a dense network that is most abundant on the posterior and superior surfaces. This network of lymphatics is drained by four major collecting trunks that follow the course of the prostatic arteries.

1- The external iliac pedicle, arises from the base of the prostate and from the upper part of its posterior surface. It follows the seminal vesicle, passes above the terminal segment of the ureter and terminates in a node of the external iliac chain.

2- The hypogastric pedicle, arises from the inferior aspect of the prostate, travels toward the posterior surface and then turns along the prostatic artery to terminate in a hypogastric node.

3- The posterior pedicle, arises from the posterior surface of the prostate and follows an antero posterior direction to end in lymph nodes medial to the second sacral foramen or in other nodes of the promontory of the sacrum.

4- The inferior pedicle, usually formed by a single trunk, follows a downward direction on the inferior surface of the prostate until it reaches the perineal floor. It follows the internal pudendal artery to terminate in one of the hypogastric nodes near its origin.

The lymphatics of the prostate anastomose with those of the bladder fundus, seminal vesicles, ampulla of ductus deferens and the rectum.

There are also intercalating lymph nodes between the prostate and the rectum; but the lymphatics of the prostate, for the most part, are drained by the external iliac, hypogastric and sacral lymph nodes. (Fig. - 2)

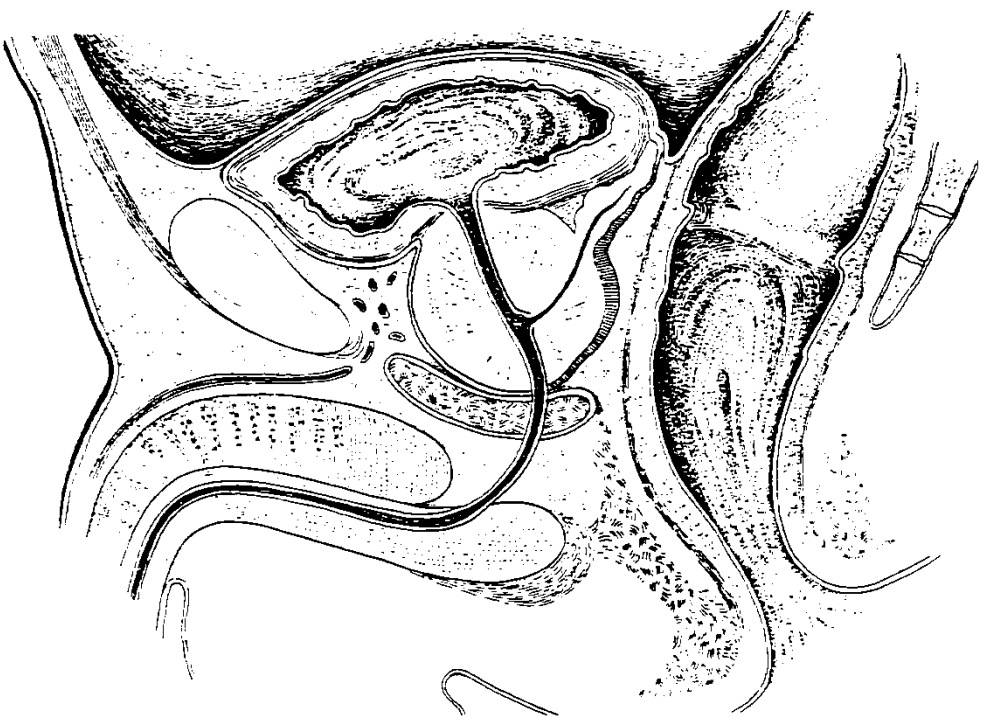


Fig. (2) Sagittal section of male pelvis showing relationship of prostate to urethra and its separation from rectum by Denonvilliers' fascia. (Del Regato and spjut, 1985)

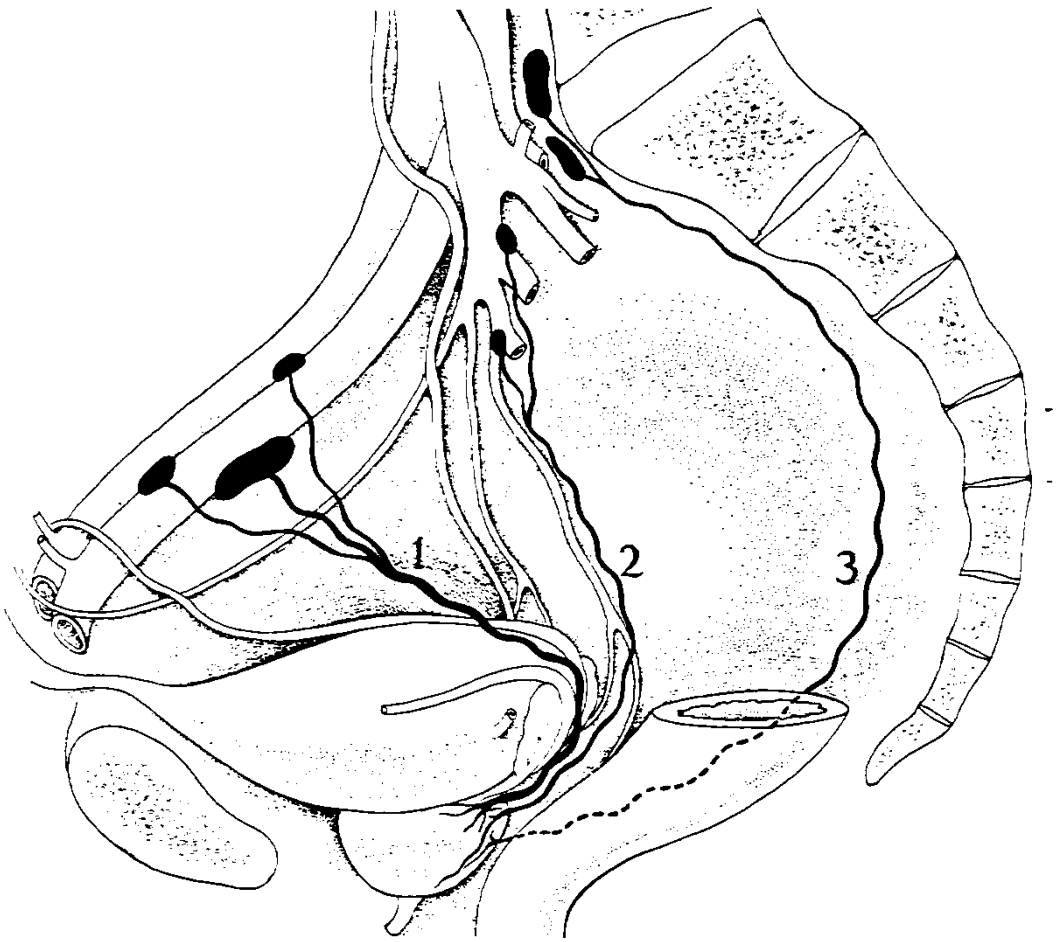


Fig. (3) Lymphatics of prostate showing external iliac pedicle, 1; hypogastric pedicle, 2; posterior pedicle, 3; Inferior pedicle, which follows downward direction and ends in hypogastric nodes, is not illustrated here. (Del Regato and spjut, 1985)

Epidemiology of Prostatic Cancer

Incidence:

It is estimated that 132,000 cases of P.C will be diagnosed in the United States in 1992, surpassing lung cancer in men. During this same time 34,000 men are expected to die of this disease for an incidence: death ratio of 3.9, it accounts for 12% (and is the 2nd leading cause) of all cancer deaths in males. Black americans continue to be diagnosed at a more advanced stage, and therefore, their survival is lower than whites. (Boring, 1992)

In Radiotherapy and Nuclear Medicine Department, Ain Shams University, the number of cancer prostate patients presented in the period from 1989 to 1994 was 81 cases representing 2.1% of male cancer patients and 1.01% of the all cancer cases in the same period, While El Bolkainy (1991) reported in his series an incidence of 2.5% of total cancers and of total male cancers.

In the series of Mokhtar at the National Cancer Institute, the relative frequency of cancer prostate among 123 cases of male genital tract cancer was 39.8%. (Mokhtar, 1991)

Geographical distribution of P.C.

The incidence of P.C and disease related mortality are not equally distributed among ethnic or racial groups. American blacks demonstrate the highest incidence of P.C, with American whites and Scandinavians displaying the next highest levels. The lowest rates of P.C sre displayed in oriental populations from Japan, Singapore, China and other part of South-East Asia. Europe has a moderate incidence of P.C. (Zaridze, 1987)

Age:

Prostatic carcinoma is a disease of the elderly, uncommon before 55 years of age with an incidence and mortality rate increase geometrically with age. (Coffey, 1987).

Religion.

King et al (1970), reported a higher risk among protestants, intermediate among catholics and lower among jews for the New York population.