

Post TURP Pyuria for Evaluation and Management

Thesis

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LIST OF ABBREVIATIONS

CZ	Central zone
DRE	Digital rectal examination
E-coli	Escherichia coli
IES	Invaginated extraprostatic space
IPSS	International prostate symptom score
IVP	Intravenous pyelography
NFLX	Norfloxacin
PBH	Benign prostatic hyperplasia
PSA	Prostatic specific antigen
PUT	Plain urinary tract
PVR	Post voiding residual urine
PZ	Peripheral zone
Qmax	Maximum flow rate
QOL	Quality of life
TRUS	Transrectal ultrasonography
TUR	Transurethral resection syndrome
TURP	Transurethral prostatectomy
TZ	Transition zone
UTI	Urinary tract infection

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INTRODUCTION

Transurethral resection of the prostate has been reported to represent nearly 25% of the urologist workload (**Holtgrewe et al., 1989**) and remained the dominant major procedure performed by urologists. A number of methods of treatment of bladder outflow obstruction have been proposed over the years, but transurethral prostatectomy remains the standard by which all others must be judged (**Gordon, 1994**).

Since Guyon performed the first reported transurethral prostatic resection at the Necker Hospital in Paris in 1901 this operation has replaced open prostatectomy as the procedure of choice for more than 95% of patients (**Kubba et al., 1995**). Modern electro surgical transurethral prostatic resection was first described by Stern in 1926 and modified by McCarthy in 1931.

Persistent pyuria is one of the common complications after transurethral prostatectomy. Thus, postoperative urine analysis and urine culture are reliable indicators when following up voiding symptoms (**Cho et al., 2007**).

In 1998 **Oka et al.** conducted a retrospective study on the duration pyuria after TURP and the factors affecting the duration of pyuria in 273 patients. The investigators observed a significant correlation between the duration of pyuria and the

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patient age, resected weight, operating time, resected weight being the most important factor (*Oka et al., 1998*).

Cho et al. in 2007 studied the risk factors of the duration of pyuria in 82 patients who underwent TURP due to benign prostatic hyperplasia. The investigators observed a significant differences in the duration of pyuria according to age, preoperative pyuria and resected volume of prostate (*Cho et al., 2007*).

Goya et al. in 1989 studied the duration of pyuria in 35 patients who underwent TURP the average postoperative duration of pyuria was 58.0 ± 23.6 days. The investigators found the volume of resected tissue over 20 grams and the existence of diabetes mellitus make it significantly longer (*Goya et al., 1989*).

The investigators suggested to use a low dose antibacterial agent such as NFLX which has abroad spectrum and hardly develops bacterial resistance after TURP and unnecessary to change the antibacterial agent even when pyuria continues (*Goya et al., 1989*).

Several risk factors may be associated with the duration of pyuria following TURP. These risk factors will be discussed in the coming chapters.

AIM OF THE WORK

The aim of this work is to evaluate the incidence and duration of pyuria after transurethral resection of prostate (TURP).

To find risk factors associated with pyuria, after TURP and analyzing the data obtained to specify the statistically significant factors associated with pyuria after TURP.

ANATOMY OF THE PROSTATE:

The prostate gland roughly resembles an inverted cone, which lies inferior to the urinary bladder and anterior to the rectum, with the base of the gland abutting the bladder base and apex contacting the external urethral sphincter.

It measures about 3 cm from apex to base, 3.5 cm across the base and 2.5 cm in the antro-posterior dimension with its normal weight is about 18 gm (**Brooks et al., 1998**).

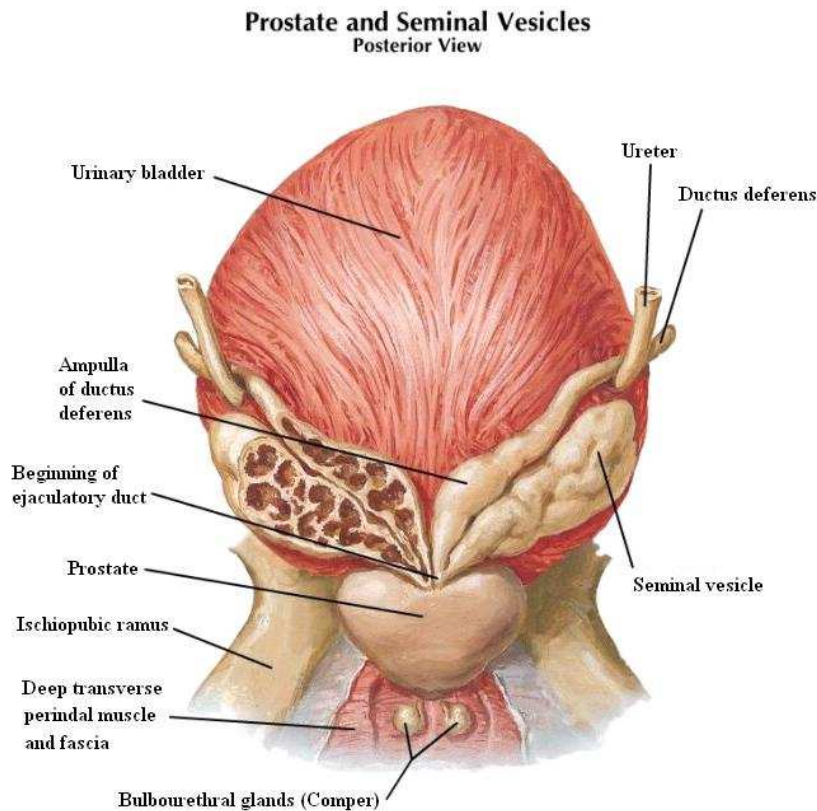


Figure (1a): Prostate [posterior view] (Quoted from Hall-Craggs, 1995).

The pubic symphysis is located anterior to the gland and is separated from it by periprostatic fascia, fat and santorini plexus. Denovillier fascia is located posterior to the prostate and separates the gland from the rectum. The lateral relation of the prostate are the obturator internus muscles superiorly and the levator ani inferiorly.

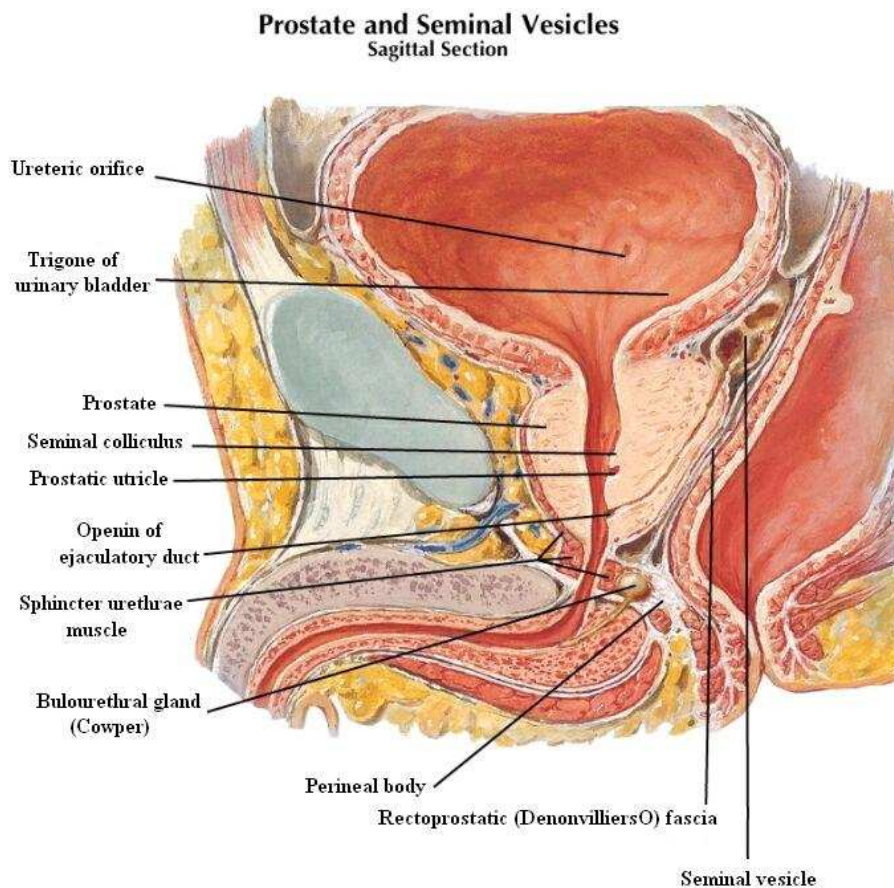


Figure (1b): Prostate [saggital section]
(Quoted from Hall-Craggs, 1995).

A group of nerves, lymphatics and vessels known as (The neurovascular bundles) or (lateral venous plexi) are located

posterolaterally at approximately 5 & 7 o'clock. The neurovascular bundles perforate the capsule microscopically and contain the cavernosal nerves that are responsible for potency and continence of external urethral sphincter (**Burnett, 1995**).

Prostatic urethra:

It extends from the vesical neck to the membranous urethra and divides the prostate into anterior (ventral) fibromuscular portion and a posterior (dorsal) glandular portion. It is about 2.7- 3 cm, and is considered the widest and most distensible part of the urethra.

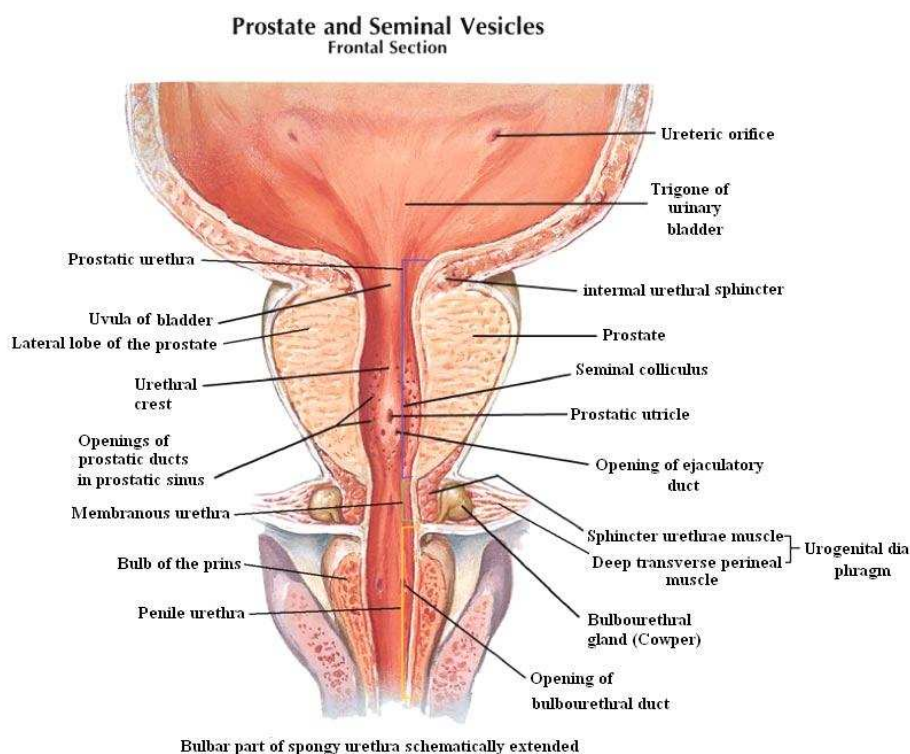


Figure (2): Prostatic urethra (Quoted from Hall-Craggs, 1995).

It contains an elevation of mucus membrane (verumontanum), which contains at its summit the slit like opening of the prostatic utricle and the openings of the ejaculatory ducts on both sides of utricular opening (*McNeal, 1981*).

The posterior wall of the urethra shows a sharp (35) degree angulations at about half of the distance between the apex of the prostate and its base at the bladder neck. This point of angulation divides the urethra into proximal and distal segments of about equal length. Only the distal urethral segment is related to the function of ejaculatory secretion (*Resnick, 1990*).

The prostatic capsule:

The prostate is composed of several anatomic layers; the outermost of it consists of the periprostatic venous plexus (**venous plexus of santorini**) that surrounds the prostate on all but its posterior aspect where it is interrupted by the anterior and posterior layers of **Denonvillier's fascia** which separate the prostate from the rectum . The tough fibrous prostatic capsule is encountered next to the venous plexus (*Strasser et al., 1998*).

The **true capsule** surrounds the glandular and fibromuscular components of the prostate. It consists of smooth muscle fibers that are in continuity with the stromal fibers of the gland. The capsule average 0.5 mm thickness at the

cephalic, posterior and lateral aspects, Anteriorly; it fuses with the anterior fibromuscular stroma (*Kaye, 1991*).

At the junction of the apex of the prostate with the membranous urethra, the capsule is deficient for a one millimetre distance (*Villers et al., 1990*).

The separation of the transition zone from the surrounding central and peripheral zones by a fibromuscular interface is termed the **surgical capsule**, since it represents the borders of surgical enucleation of adenomatous formation (*Resnick, 1990*).

Subdivisions of the prostate:

Two concepts are considered in subdividing the prostate:

1. Lobar Anatomy, (**Lowesley's**).
2. Zonal Anatomy, (**McNeal's**).

The lobar (**Lowesley's**) concept of the anatomy of the prostate is used as landmarks for endoscopic procedures and digital rectal examinations (DRE). McNeal's classification (zonal anatomy) is based on histological landmarks. The concept of zonal, rather than lobar anatomy of the prostate originated several decades ago as regions of prostate differ not only embryologically & histologically but also in their predisposition to cancer (*Strasser et al, 1998*).

1- Lobar Anatomy, (Lowesley's):

The classic understanding of the prostate anatomy was the division of the gland into five lobes termed as lobar concept of anatomy; this concept did not consider the different histological components of the prostate but has based purely on anatomic position as defined in the embryonic and fetal gland. It has been emphasized that those divisions were identifiable only in the embryo and from the last months of gestation into postnatal life no divisions into separate lobes were possible (*Rifkin, 1995*).

In this description, the prostate was divided into five lobes:

1. **The anterior lobe** is in the anterior portion of the prostate. It is situated from the anterior margin of the gland to the level of the prostatic urethra posteriorly.
2. **The middle lobe** (also termed median lobe) is a smaller area between the proximal prostatic urethra and the ejaculatory ducts.

This lobe extends from the base to the level of the verumontanum in the mid portion of the prostate.

3. **The posterior lobe** encompassed the posterior portion of the prostate and is situated posterior to the ejaculatory ducts and the prostatic urethra. The posterior lobe extended to posterior margin of the gland.