MALE URETHRA

I. INTRODUCTION

The male urethra is a musculomembranous duct that extends from the neck of the bladder to the external urethral meatus at the tip of the glans of penis. It has a long course across the prostate, urogenital diaphragm and the corpus spongiosum of penis, thus, three parts of the male urethra are distinguished, prostatic, membranous and spongy or penile.

Terminologically, the posterior urethra stands for the prostatic and membranous urethra and the anterior stands for the spongy urethra. The latter can be divided to a bulbous more fixed part and pendulous part. The male urethra, unlike the female, has, not only a major role in micturition, but also a major role in sperm ejaculation and thus human copulation.

II. DESCRIPTIVE ANATOMY

A- DIMENSIONS

In the flaccid state of the penis, the male urethra is twenty centimetres long. The prostatic part is three centimetres and half long, the membranous is one centimetre and half long and the spongy part is fifteen centimetres long.

The urethral lumen is virtual. During micturition, the internal diameter reaches one centimetre.

The urethral compliance differs through its different parts, it reaches, respectively, two centimetres and one centimetre and half for the prostatic and spongy parts and doesn’t exceed,

respectively, one centimetre and seven tenths centimetre for the membranous part and the external meatus.

Globally, the male urethra has narrowest points which are the bladder neck, membranous part, proximal end of navicular fossa located at the glans of penis and the external urethral meatus but, also, three dilatations, the prostatic part inside the prostate, the spongy part and the navicular fossa. The widest point is the prostatic dilatation, also known as the prostatic sinus, it constitutes a sperm container during ejaculation.

B- ORIENTATION

In the flaccid state of penis, the male urethra has a bendy inverted S course with two right-angled curves.

The proximal curve, between the membranous and bulbous parts, is fixed and opened forwards and upwards.

The distal curve, between the bulbous and pendulous parts, is mobile and opened backwards and downwards. It disappears during erection and bladder catheterisation.

C- SHAPE

The male urethra is red in colour.

The prostatic part extends from the internal urinary meatus in the bladder neck to the apex of the prostate, it crosses the prostate vertically from its base to its apex and constitutes the widest part of the urethra. Its posterior wall is characterised by a posterior midline longitudinal ridge

extending from the uvula vesicae, the urethral crest. In the middle of the crest is a one centimetre and half long and three millimetres high swelling, the seminal colliculus or verumontanum. Three openings are seen on the seminal colliculus, at the top, the opening of the prostatic utricle, a six millimetres deep pouch and, on each side of the latter, the openings of the two ejaculatory ducts. The upper end of the verumontanum splits into two folds the frenulum of verumontanum. The prostatic excretory ducts open in the crest and in the sulcus on each side of it.

The membranous part leaves the prostate just in front of the apex, passes down through the urogenital diaphragm and pierces the perineal membrane in the deep perineal pouch to become the penile urethra. It is the shortest and least dilatable part. Structurally, it does not contain any glands and is surrounded by the urethral sphincter.

The spongy urethra starts within the corpus spongiosum of the penis at the proximal curve and can be divided into bulbous and pendulous parts. In the bulbous part, it contains the openings of bulbo-urethral glands of Cowper. Beyond the root of the penis, with the organ in the flaccid state, the urethra continues as the pendulous part after the distal curve. Just proximal to the external urethral meatus at the tip of the glans there is a short dilated region, the navicular fossa.

Very small blind-ending pockets or lacunae are scattered in the fossa and elsewhere in the pendulous part correspond to openings of urethral glands of Littré, they are covered by small mucosal folds at the glandular openings, particularly, in the navicular fossa.

The external urethral meatus is a vertical slit when the empty urethra is horizontal in cross section suggesting why the steam of urine is spiral.

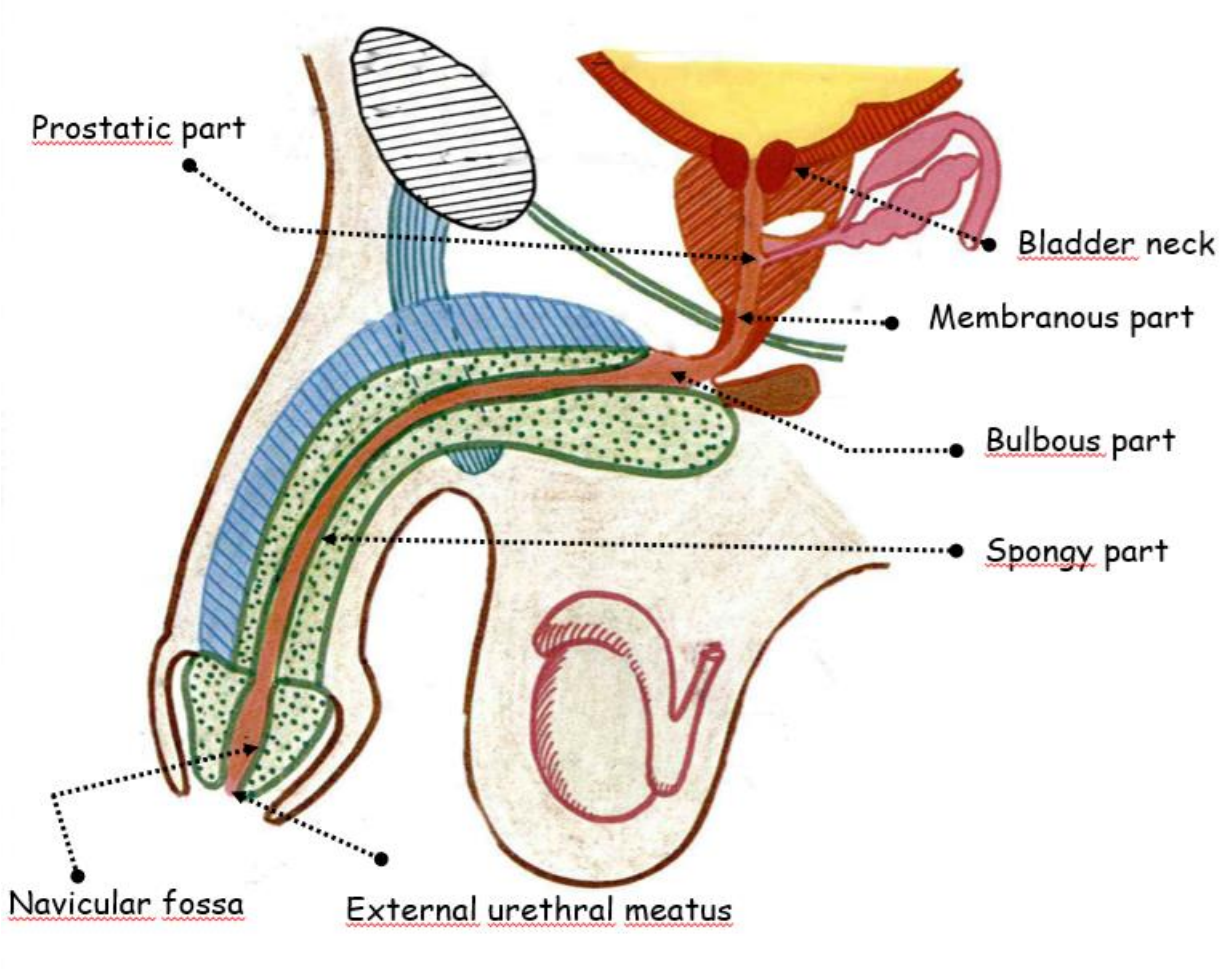

Figure 1: Lateral view of male urethra

III. STRUCTURE

The structure of the male urethra differs from one part to another. Globally, the macroscopic aspect of the mucous membrane of the male urethra consists of longitudinal folds.

The prostatic part is made of mucosa only. Its epithelium is transitional and its lamina propria is a lax connective tissue continuous with the prostatic stroma.

The membranous part is made of two layers. The mucous membrane consists of a transitional epithelium with squamous islets and lamina propria made of lax connective tissue. The inner layer of urethral muscle is longitudinal when the outer layer is circular. The urethral sphincter is a made of circular skeletal muscle fibres schematically divided into two muscles: the compressor urethrae muscle and the urethroprostatic muscle. It circles the membranous urethra outside the visceral muscle and the apex of the prostate. The compressor urethrae is made of transverse fibres attached to the pubic rami and the urethroprostatic is made of circular fibres circling the membranous urethra and arched preprostatic circling the anterior and lateral faces of the apex of the prostate. It is supplied by the perineal nerve. The urethral sphincter closes the membranous urethra and, thus, ensures the urinary continence. It, also, participates in the voluntary removing of the last drops of urine or sperm.

The epithelium of the spongy part is more squamous near the navicular fossa and its lamina propria contains the urethral glands resulting from the invagination of the epithelium. The urethral glands have a mucous secretion that has a protective role against urine. The urethral lacunae are depressions scattered through the mucous membrane and constitute the openings of the urethral glands. The latter are condensed in the dorsal wall.

IV. ANATOMICAL RELATIONS

A- PROSTATIC PART

The prostatic part is circled at its origin by the internal urethral sphincter in the bladder neck continuous with the prostatic stroma. The prostatic urethra is, then, surrounded by the prostate continuous with its lamina propria.

B- MEMBRANOUS PART

The membranous part is surrounded, in the deep perineal space, by the urethral sphincter and, thus, is in contact, forwards, with the compressor urethrae muscle and the transverse perineus ligament, laterally, with the urethroprostatic muscle, the dorsal artery and nerve of penis and the bulbo-urethral glands of Cowper and, backwards, with the deep transverse perineus muscle. It is fixed to the urogenital diaphragm by its superior and inferior fascia, the latter also known as the perineal membrane.

C- SPONGY PART

The spongy part is surrounded by the corpus spongiosum.

V. BLOOD SUPPLY; LYMPH DRAINAGE AND NERVE SUPPLY

A- ARTERIES

The prostatic part of the male urethra is supplied by the vesical and prostatic branches of the inferior vesical artery.

The membranous part is supplied by branches of the the middle rectal and inferior vesical arteries.

The spongy part is supplied by branches of the internal pudendal artery, the artery of bulb of penis, the deep artery of penis and the dorsal artery of penis.

B- VEINS

The veins of the male urethra drain into the veins of penis and the vesicoprostatic plexus that flows into the internal pudendal vein.

C- LYMPH DRAINAGE

The lymphatics of the prostatic urethra drain into the lymphatics of the prostate, mainly, the external iliac and obturator nodes.

The membranous part drains into the external iliac nodes.

The spongy part drains into the external iliac and inguinal nodes.

D- NERVES

The posterior urethra is supplied by the prostatic nerves of the inferior hypogastric plexus and the anterior urethra by the cavernous nerves of penis. The external urethral sphincter is supplied by the perineal nerve a branch of the pudendal nerve.

VI. CONCLUSION

The male urethra is a long pelvic, perineal and pendulous musculomembranous duct that, unlike women, ensures urine excretion and sperm ejaculation. However, urethral sphincter

remains, exclusively, the urinary continence sphincter like women. The internal urethral sphincter or the vesical sphincter has a role against the retrograde ejaculation. It is a pelvic and perineal organ with three structurally and anatomically different parts and a pelviperineal blood supply.