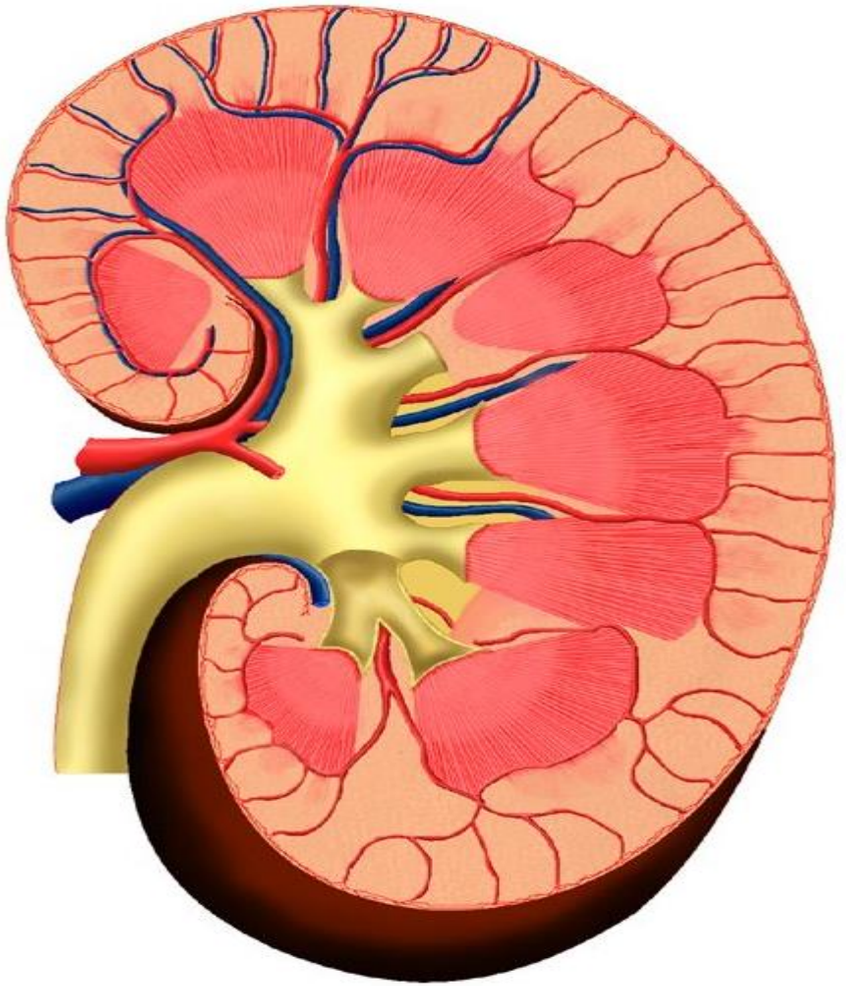
King Saud University
College of medicine
Renal block

Ureters, bladder and urethra



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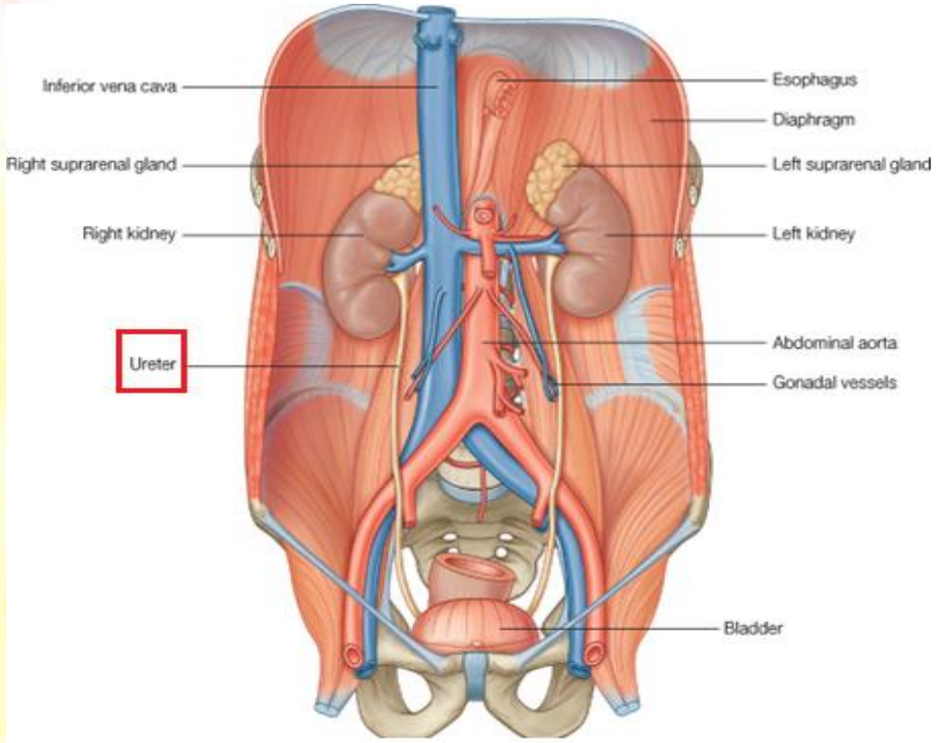
Start with "بسم الله"

Ureter

- The ureters are muscular tubes(25-30 cm) that transport urine from kidney to urinary bladder.They are continuous of renal pelvis.

Parts of ureter

- Abdominal and pelvic.



Course of ureter

In Abdomen

- It descends anterior to psoas major muscle

(Opposite the tips of lumbar processes).

- It crosses the end (bifurcation) of common iliac artery to enter the pelvis.

In pelvis

- When the ureter enter the pelvis it runs downward in front to internal iliac artery reaches ischial spine .
- At the level of ischial spine it turns forward and medially to reach the upper lateral angle of urinary bladder and crossed by vas deferens.
- The ureter passes obliquely through the wall of bladder about ¾ inch (2cm) before it opens into the bladder cavity => this arrangement forms a valve like mechanism which prevents reverse flow of urine toward the kidney when the bladder is distended.

Ureteric constrictions

(Sites of kidney stones)

The ureter is constricted at 3 points :

1- At the ureteropelvic junction (where the ureter is join the renal pelvis).

2- At the crossing of external / common iliac artery.

3- At site of entrance to bladder (Ureter passes inside the bladder wall).

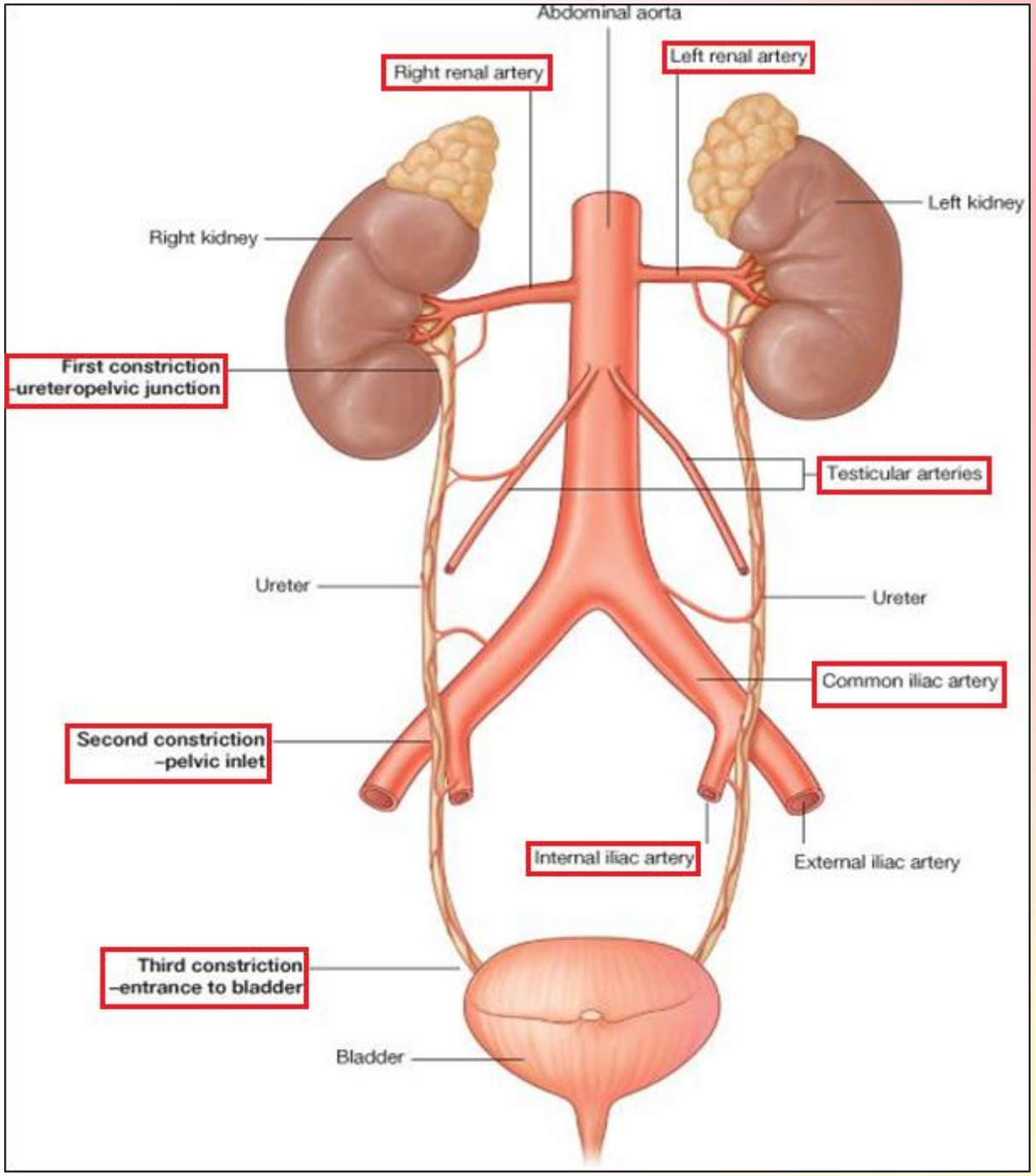
Blood supply of ureter

1- Renal artery

2-gonadal artery

3- common iliac artery

4-internal iliac artery

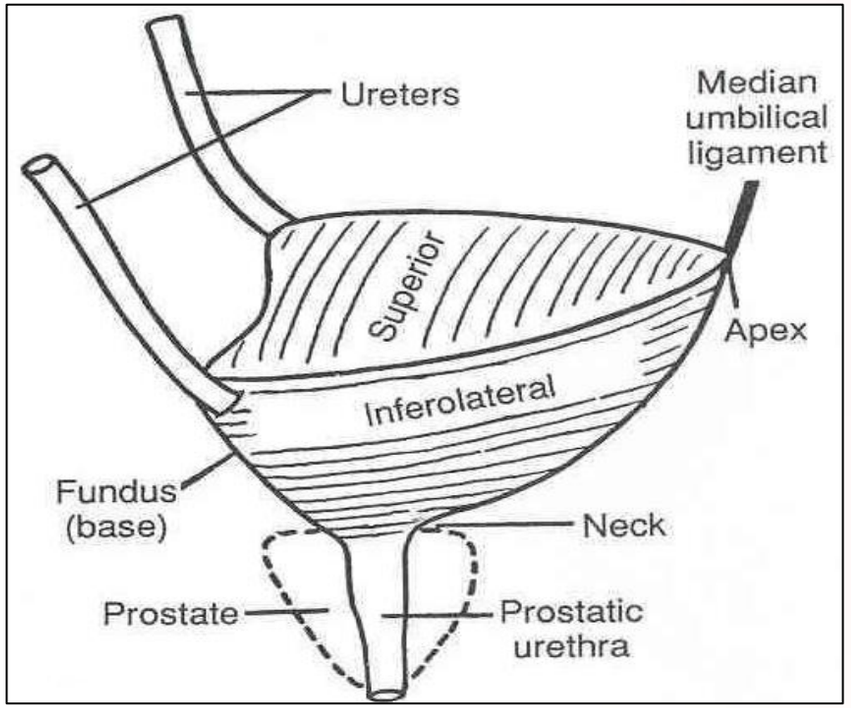


Urinary bladder:

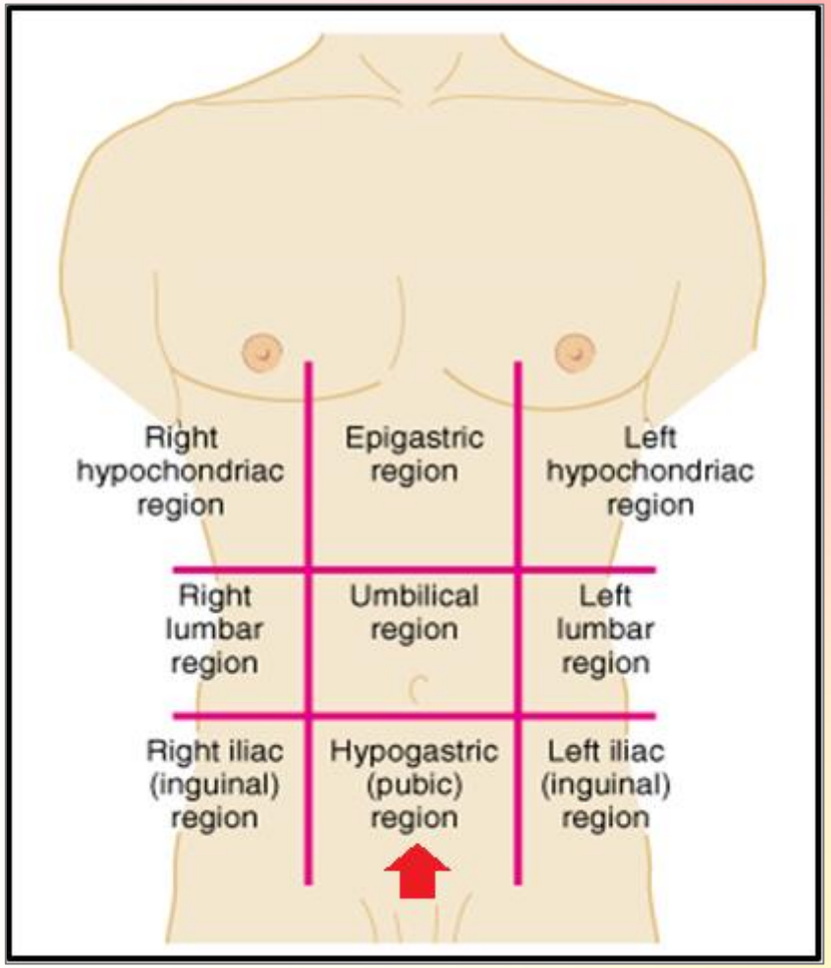
- Urinary bladder located immediately behind the pubic symphysis.

An empty Bladder is pyramidal in shape it has :

1-Apex
2- A base (posterior surface)
3- A superior surface
4- Two infrolateral surfaces
5- A neck



- An empty bladder In adult is entirely a pelvic organ , it expands superiorly into the abdominal cavity(hypogastric region) when full.
- Normally, In young children the empty urinary bladder projects above the pelvic inlet(in the abdomen) .



Apex

- Directed forward and lies behind the upper margin of symphysis pubis
- Apex of bladder is connected to umbilicus by *median umbilical ligament .

Base (posterior surface)

- Triangular in shape
- Upper part covered by peritoneum
- Lower part :

males => vas deferentia and seminal vesicles.

NOTE: Vas deferens (sperm) + Seminal vesicle (fluid) = Ejaculatory Duct.

females => vagina.

Superior surface

- Covered by peritoneum:

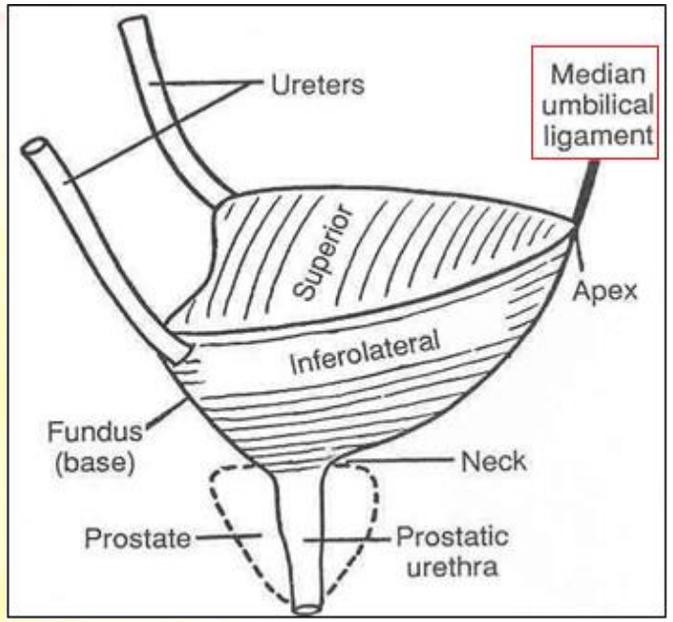
Males => completely.

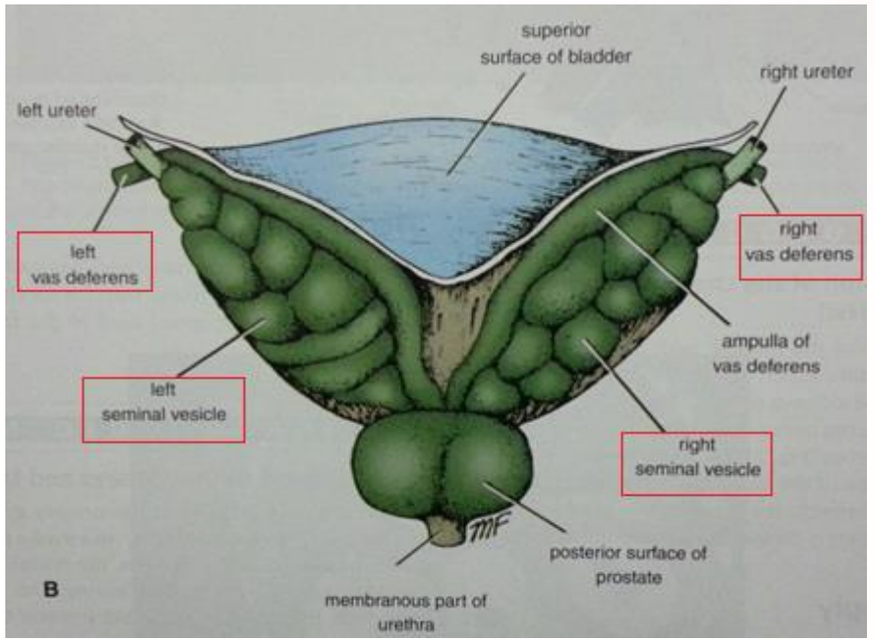
Females => incompletely because of uterus.

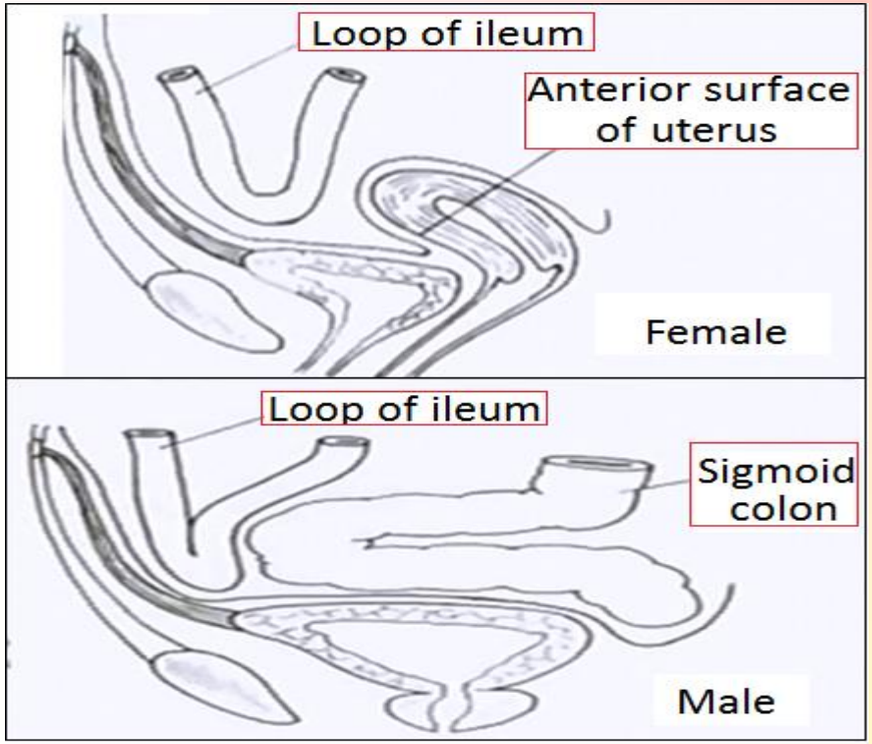
- Boundaries:

Males => colic of ileum and sigmoid colon .

Females => uterus.







* A remnant of the embryological urachus that contributes to the formation of the bladder

Inferolateral surfaces

Are related to **retropubic fat** separating them from pubic bones

Posteriorly lie in contact with the obturator internus muscle above and levator ani muscle below .

Retropubic fat

- Accomodates distention of bladder
- Continuous with anterior abdominal wall.
- Rupture of bladder results in escape of urine to anterior abdominal wall

Neck

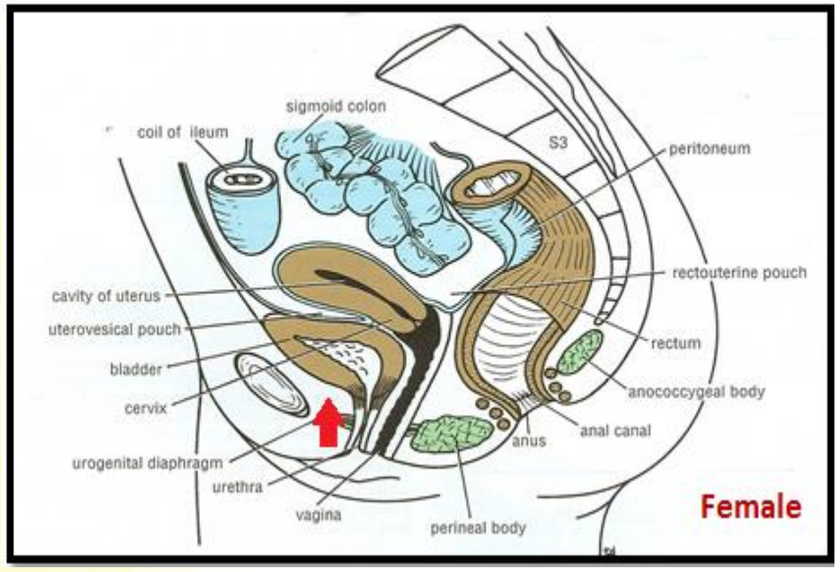
inferior & most fixed part of urinary bladder

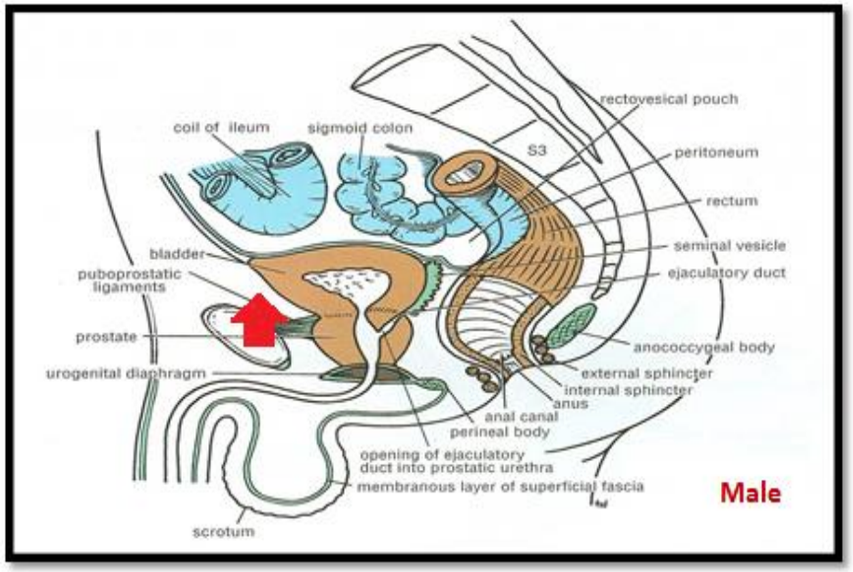
Is related to lower border of symphysis pubis

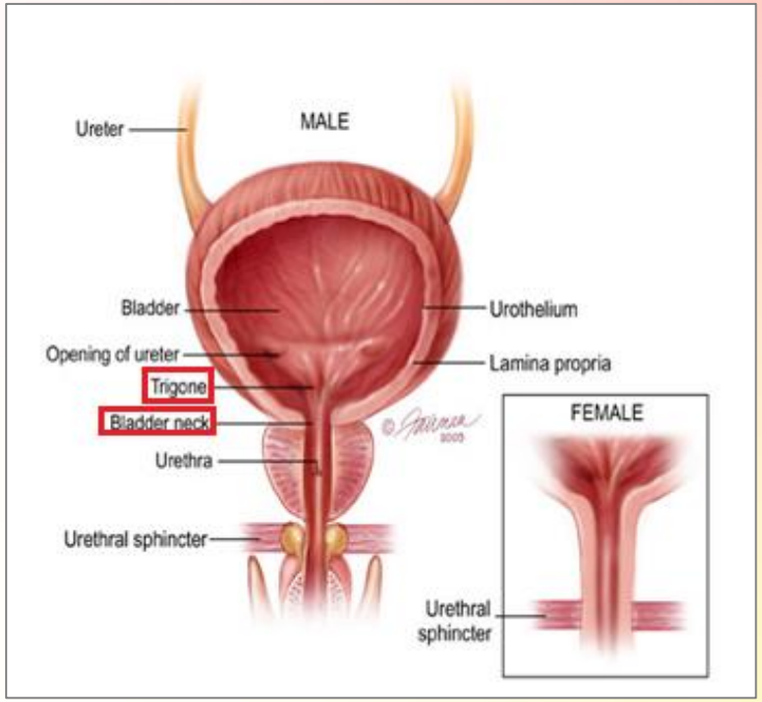
In male, Is related to upper surface of prostate gland

the smooth muscle fibers of the bladder are continuous with those of the prostate

The circular muscle fibers thickened to form the sphincter vesicae







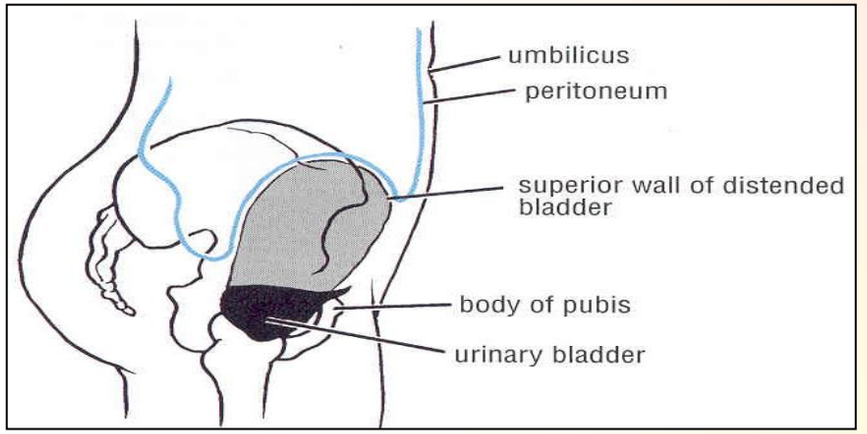
Blood and nerve supply of bladder

Interior of the Urinary Bladder

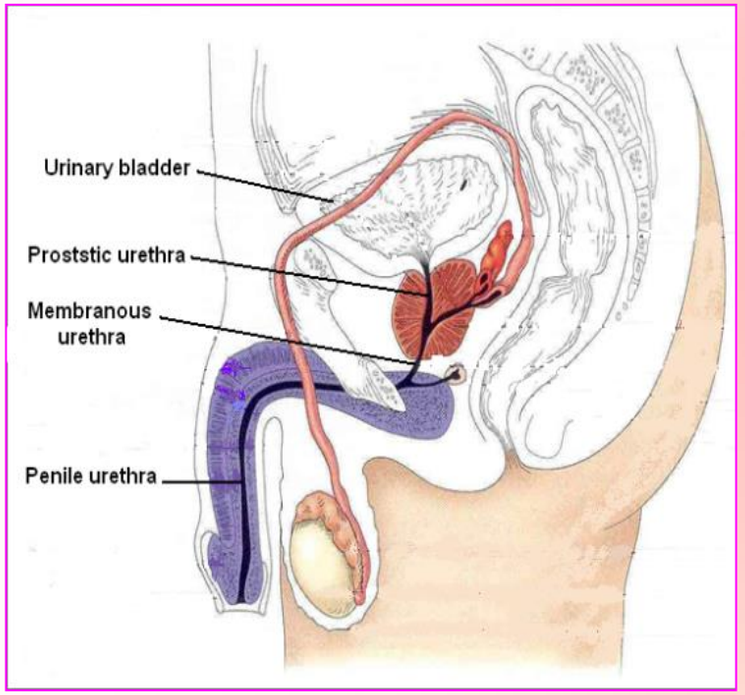
- Mucous membrane is folded except in the trigon.
- Trigone: a triangular area in base(posterior) of bladder bounded by the 2 ureteric orifices & internal urethral orifice.
- **Uvula vesicae,** elevation behind the urethral orifice, It is produced by the median lobe of prostate.

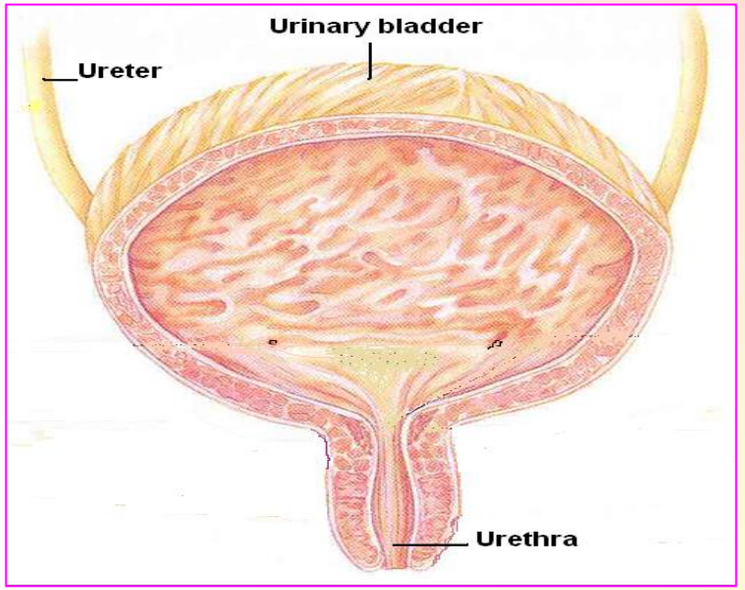
Arterial supply	Nerve Supply
internal iliac artery	***Sympathetic:*** **from L1,2** ***Parasympathetic:*** **pelvic splanchnic nerves from S2, 3, 4** ***Sensory:*** **transmitting pain due to over distention of bladder**
Venous drainage	into internal iliac vein
Lymphatic's	into internal iliac lymph nodes

- The normal capacity of bladder is about 300-500ml.
- As bladder fills, the superior surface bulges upward into abdominal cavity.
- The peritoneal lining is peeled off the lower part of anterior abdominal wall and the bladder comes into direct contact with the anterior abdominal wall



Male Urethra	Female Urethra
About 8 inches (20cm) long	About (4 cm) short
Extends from the neck of bladder to the external urinary meatus on the tip of the glans penis.	Extends from neck of urinary bladder to open externally through the external urethral orifice .
Divided into three parts: 1-Prostatic urethra: (Length=3 cm) ❖ Widest & most dilatable ❖ Extends from neck of bladder inside prostate gland ❖ Structures openings into prostatic urethra: -Ejaculatory ducts -Ducts of prostate gland	Anterior to the vaginal opening
2-Membranous urethra (Length=1 cm) Surrounded by external urethral sphincter	Has only urinary function
3-Penile (spongy) urethra (Length=16 cm) ❖ Narrowest part of whole urethra ❖ Extends inside penis & opens externally through external urethral orifice	
Has both urinary and productive functions	





summary

Organ	Male	Female
Ureter	▪***Beginning:*** as continuation of renal pelvis. ▪***Course:*** descends anterior to: psoas major & end (bifurcation) of common iliac artery. ▪***Termination:*** opens at upper lateral angle of base of urinary bladder ▪***Sites of constriction:*** at uteropelvic junction, at pelvic inlet, at site of entrance of bladder ▪**Arterial supply:** renal, gonadal, common & internal iliac arteries	
Urethra	▪***Function:*** both urinary & genital	▪***Function:*** urinary only
	Length: 20 cm, divided into prostatic (3 cm), membranous (1 cm) & penile (16 cm)	***Length:*** 4 cm
	Course: Extends from neck of bladder to opens externally through external urethral orifice (narrowest part of whole urethra)	***Course:*** Extends from neck of bladder to external urethral orifice (anterior to vaginal opening)

Organ	Male	Female
Urinary bladder	▪***Apex:*** related to symphysis pubis, continuous with median umbilical ligament	
	Base: related to vas deferens & seminal vesicle	Related to Vagina
	Superior surface: related to coils of ileum & sigmoid colon.	to uterus
	▪***Inferolateral surfaces:*** related to retropubic fat ▪***Trigone:*** lies in the base of bladder, bounded by ureteric orifices & internal urethral orifice, its mucous membrane is elastic	
	▪***Neck:*** continuous with urethra, related to upper surface of prostate gland (in male)	continuous with urethra,
	•***Uvula vesicae:*** dilatation behind internal urethral orifice, produced by the median lobe of the prostate gland	
	▪***Supply:*** internal iliac (artery, vein, lymph nodes) ▪***Nerves:*** parasympathetic (S2,3,4), sympathetic (L1,2)	

Quiz

1. Ureter begins as a continuation of:
A. Renal pelvis
B. Renal cortex
C. Renal medulla
D. Renal artery

2. The apex of the urinary bladder is connected the umbilicus by:
A. Allantoise
B. Median umbilical ligament
C. Umbilical cord
D. Urachus

3. Which of the following is completely covered by peritoneum:
A. Posterior surface
B. Superior surface
C. Anterior surface
D. Lateral surface

4. The inferolateral surfaces of the bladder are posteriorly related to:
A. Retropubic fat and pubic bones
B. Sigmoid colon
C. Coils of ileum
D. Obturator internus and levator ani

5. Rupture of the bladder result in escape of urine into:
A. Posterior abdominal wall
B. GIT
C. Anterior abdominal wall
D. Pelvis

6. Which one of the following is the most fixed part of the bladder:
A. Neck
B. Apex
C. Base
D. Superior surface

7. Uvula vesicae is produced by:
A. Median lobe of the prostate
B. Lateral lobe of the prostate
C. Anterior lobe of the prostate
D. Superior lobe of the prostate

8. Parasympathetic fibers of the urinary bladder are derived from:
A. L1, L2
B. S1, S2, S3
C. L2, L3, L4
D. S2, S3, S4

9. Which of the following is the widest and most dilatable part of the
male urethra:
A. Penile
B. Membranous
C. Prostatic
D. Ejaculatory

10. Which of the following is the narrowest
part of the male urethra:
A. Penile
B. Membranous
C. Prostatic
D. Ejaculatory

11. Which one of the following structures is related to the inferolateral surface?
A. Prostate gland
B. Sigmoid colon
C. Retropubic fat
D. Seminal vesicle

12. Which one of the following is the site of uvula vesicae?
A. In the superior surface of urinary bladder.
B. Behind the internal urethral orifice.
C. Between the 2 ureteric orifices.
D. In relation to the apex of urinary bladder.

13. Which of the following does not supply the ureter:
A) Common iliac artery
B) External iliac artery
C) internal iliac artery
D) Renal artery

14. Which of the following structures open into the prostatic urethra :
A. Ejaculatory duct
B. ducts of prostate gland
C. Thoracic duct
D. Both A & B

15. The female urethra :
A) Is approximately (7,62 cm) in length
B) Is rapidly accessible to infection
C) It difficult to dilate

Question	Answer	Question	Answer
1	A	13	B
2	B	14	D
3	B	15	B
4	D		
5	C		
6	A		
7	A		
8	D		
9	C		
10	A		
11	C		
12	B		
13	B		