

## Group Discussion on Anatomy of the Urinary System

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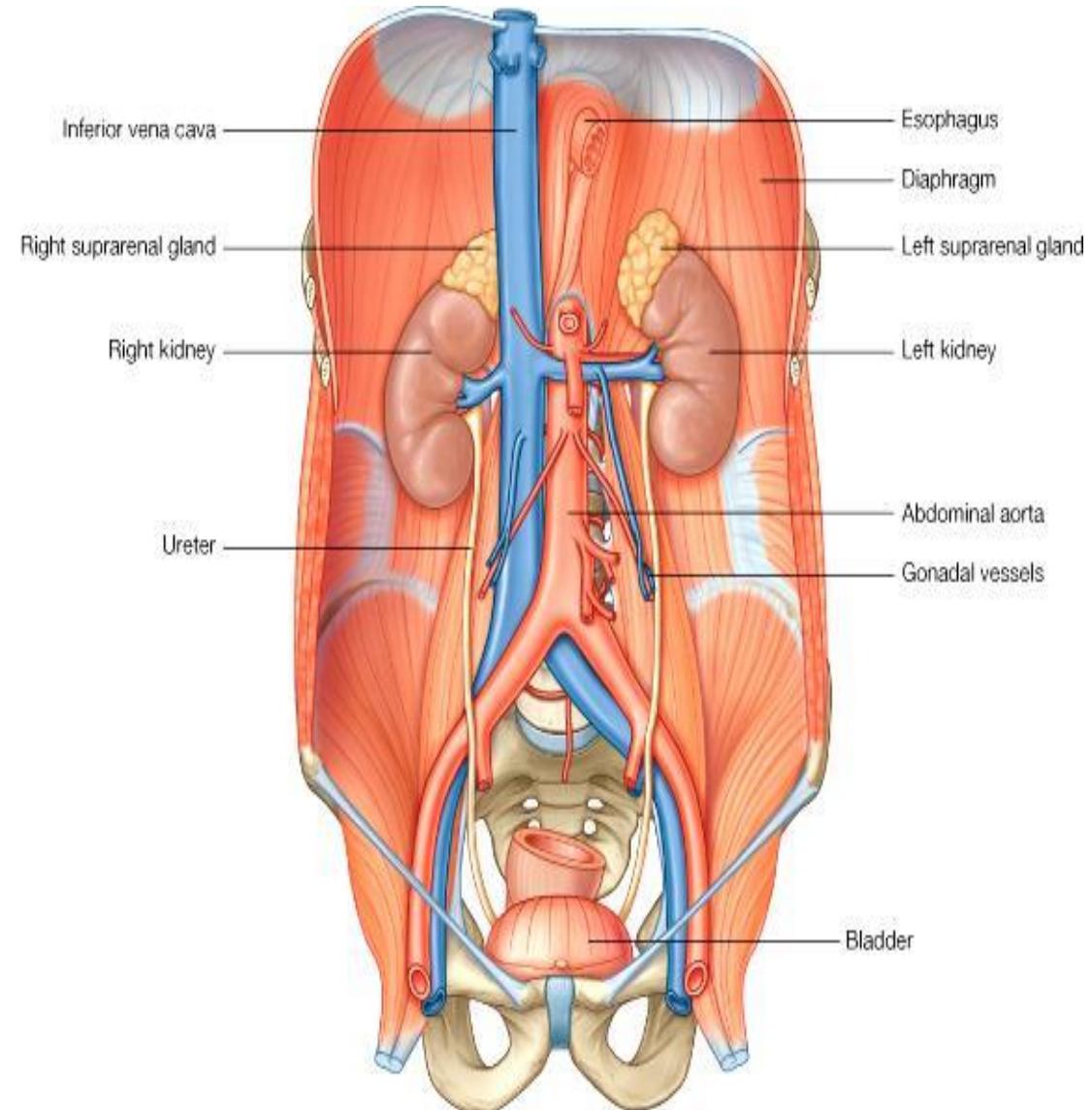
## **Objectives of the Lecture:**

**By the end of the lecture the student should be able to:**

- . What are the anterior and posterior relations of the kidney?
- . What is surface anatomy of the ureter?.
- . Where are the narrowings of the ureter lie?
- . Describe the surface of the ureters.
- . Explain the referred pain in case of stone in the ureter.
- . What is the anatomical cause of pain in case of stone in the urinary bladder.
- . Where is the site of rupture of the male urethra?
- . What the parts and lengths of male urethra
- . What are the differences between male and female urethra?

- 1. Amany, a 35-year-old woman, is admitted to A&E with severe left abdominal and back pain. Radiographic evaluation reveals that the left ureter is blocked with a kidney stone. Due to complete obstruction of the ureter, an emergency surgical procedure is performed. Which of the following landmarks is important for the identification of the ureter?
  - A. The left ureter is located anterior to the left common iliac artery
  - B. The left ureter is located anterior to the left internal iliac artery
  - C. The left ureter is located anterior to the left gonadal artery
  - D. The left ureter is located anterior to the left renal vein
  - E. The left ureter is located anterior to the left inferior epigastric artery

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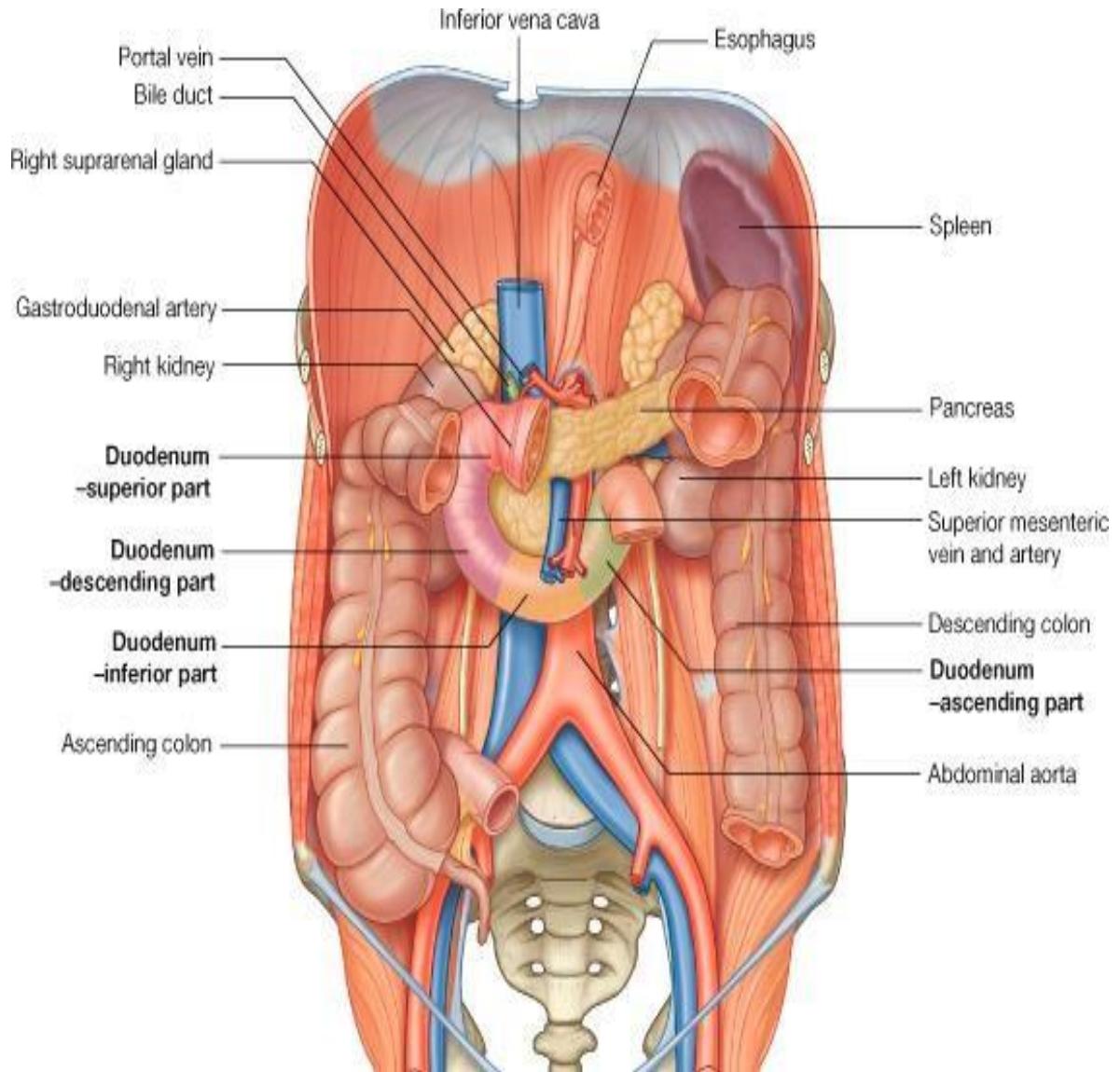
- 2. Ramy, 40 years old man underwent a surgery to remove a right renal pelvic stone. 7 days after the operation the wound started to discharge a greenish material. Analysis of this discharge declared the presence of bile content
  - A. On anatomical basis try to find an explanation for this condition
  - B. What is the posterior and anterior relations of the right kidney?
  - C. 1 month later, this patient suffered from a large hernia in the site of the operation wound. What could be the cause?

## **Answer:**

**A. On anatomical basis try to find an explanation for this condition**

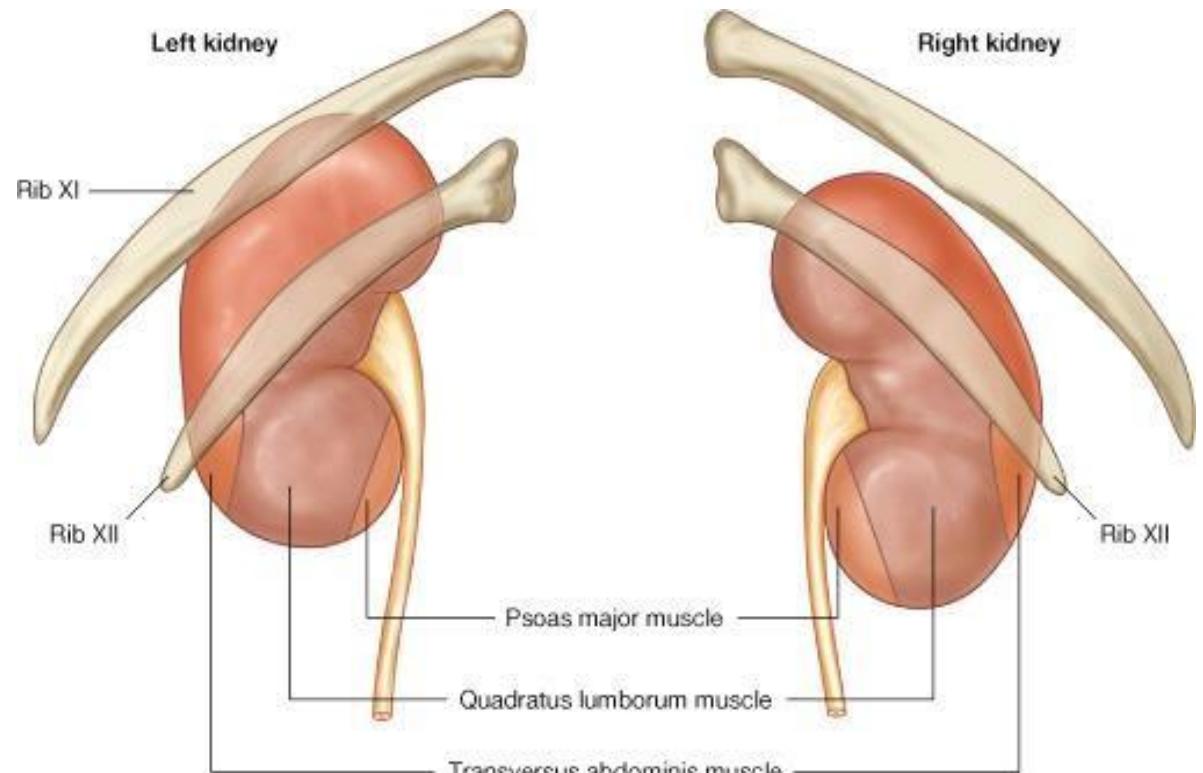
**This condition could be explained by intraoperative injury of the second part of the duodenum which is related to the front of the renal pelvis.**

**The second part of the duodenum receive the opening of the common bile duct.**

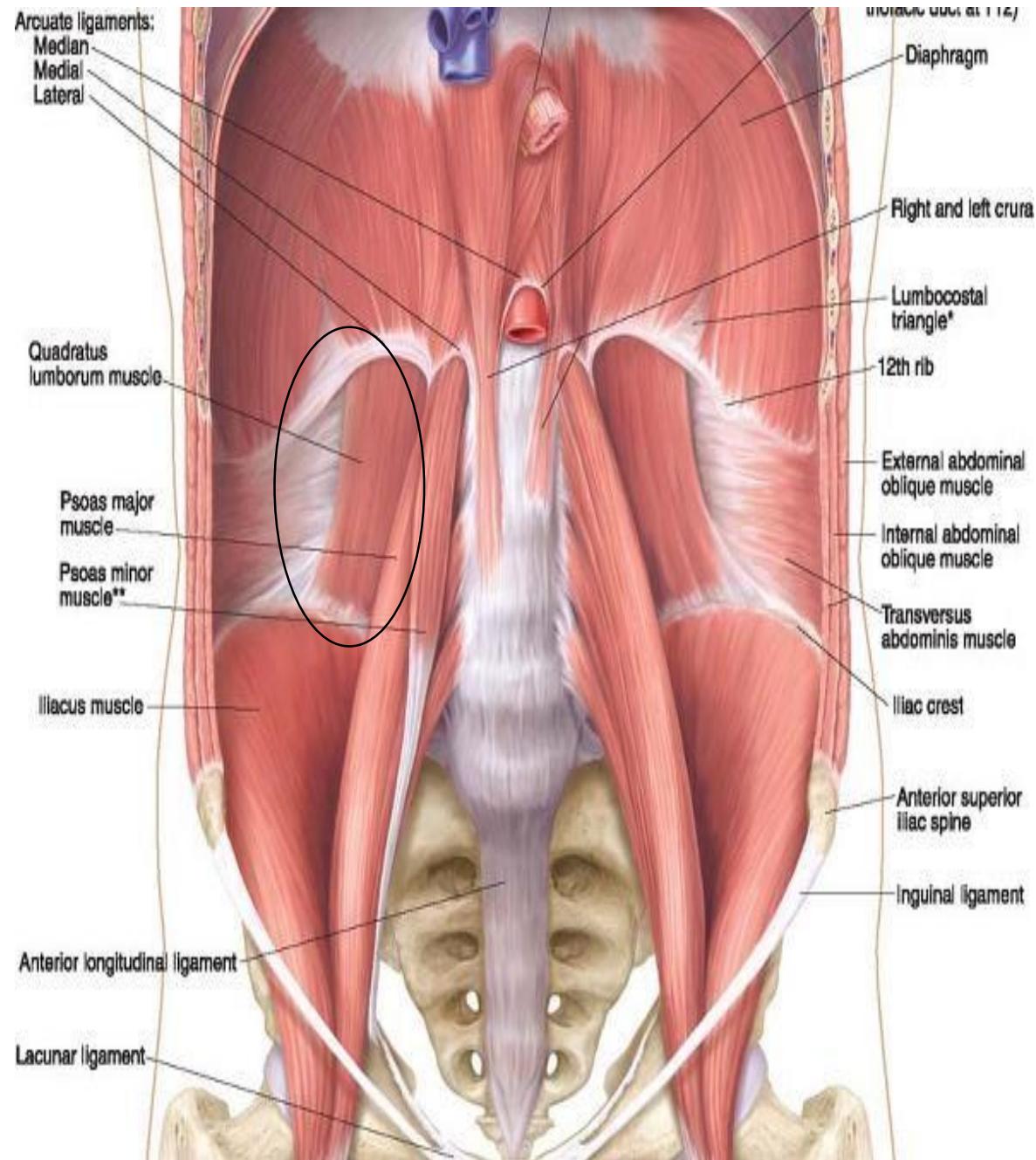


## B. What is the posterior relations of the right kidney?

1. Diaphragm
2. Costodiaphragmatic recess of the pleura
3. The 12th rib
4. Psoas muscle
5. Quadratus lumborum
6. Transversus abdominis muscle
7. Subcostal (T12)
8. Iliohypogastric, and
9. Ilioinguinal nerves (L1).



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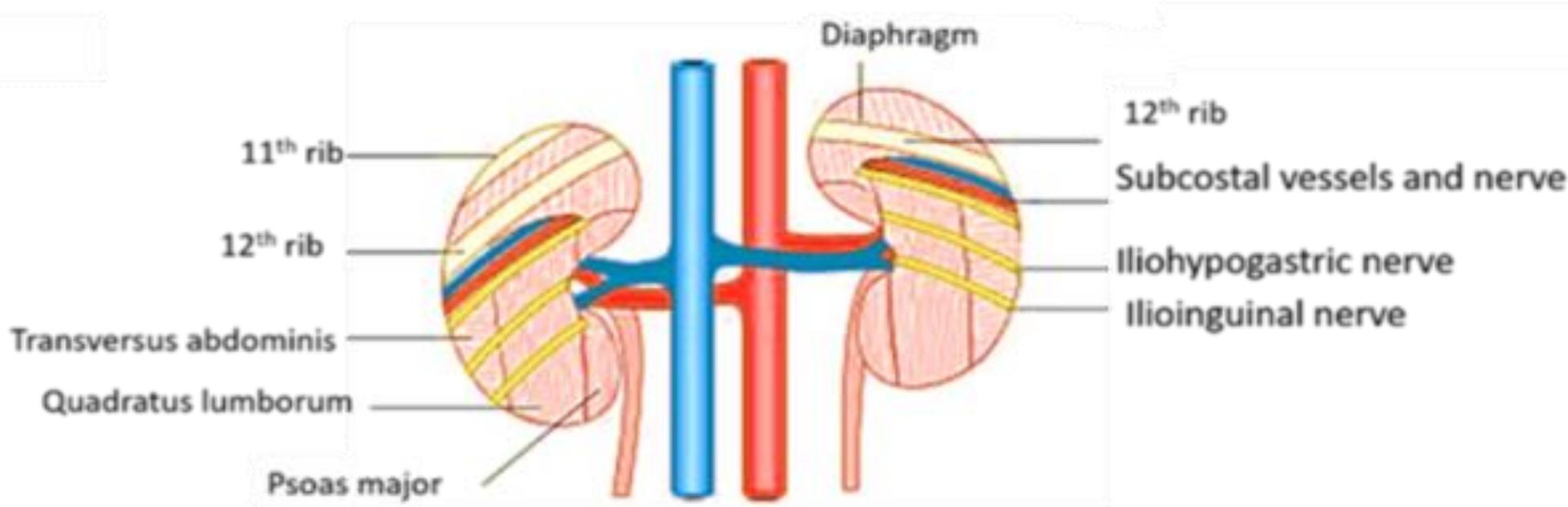


### **Left kidney**

- 11<sup>th</sup> and 12<sup>th</sup> ribs
- Diaphragm
- Psoas major muscle
- Quadratus lumborum muscle
- Transversus abdominis muscle
- Subcostal vessels and nerve
- Iliohypogastric nerve
- Ilioinguinal nerve

### **Right kidney**

- 12<sup>th</sup> ribs
- Diaphragm
- Psoas major muscle
- Quadratus lumborum muscle
- Transversus abdominis muscle
- Subcostal vessels and nerve
- Iliohypogastric nerve
- Ilioinguinal nerve



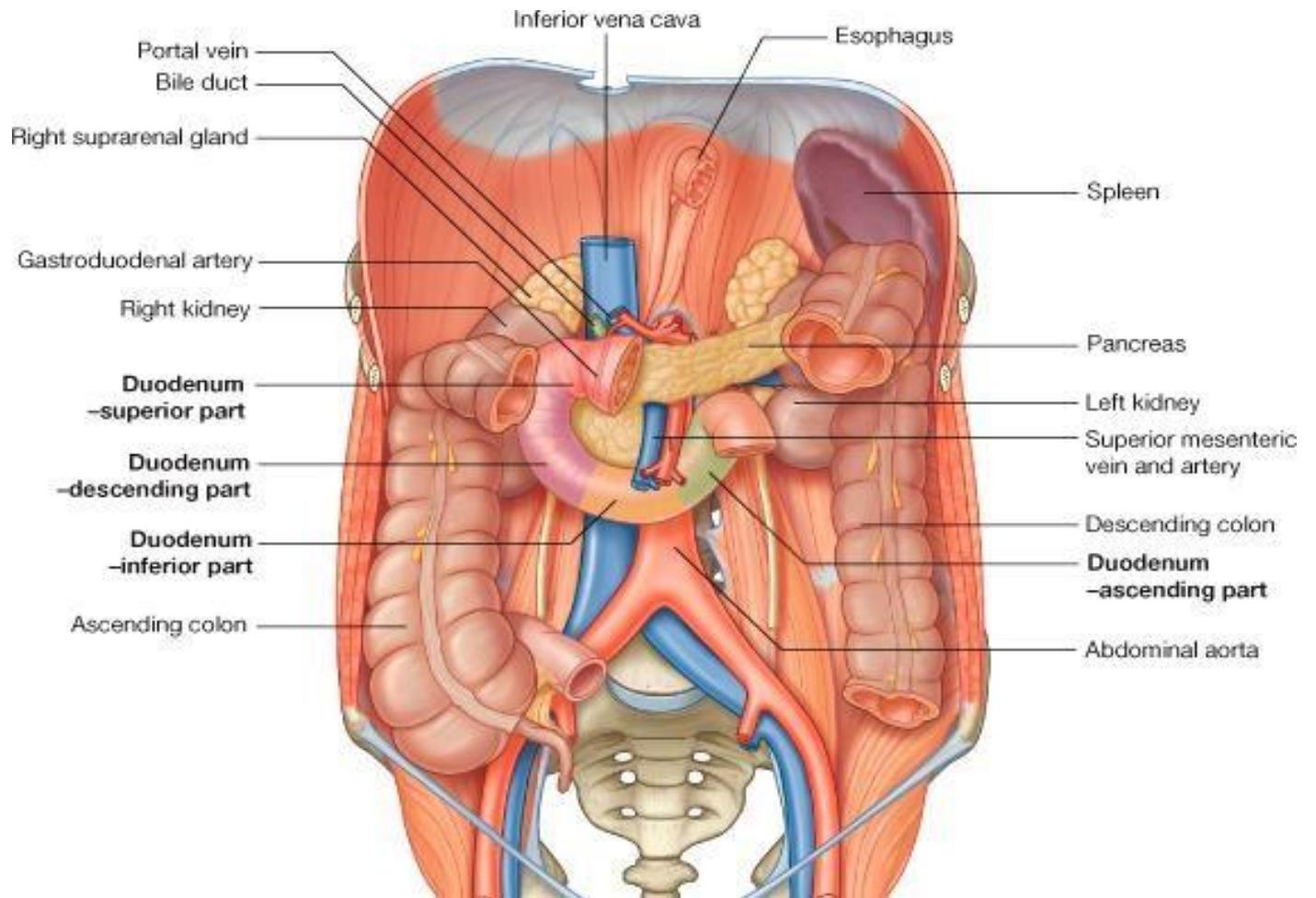
## B. What is the anterior relations of the right kidney?

1. Right suprarenal gland

2. Liver

3. Second part of duodenum

4. Right colic flexure



**C. Month later, this patient suffered from a large hernia in the site of the operation wound. What could be the cause?**

**Answer:**

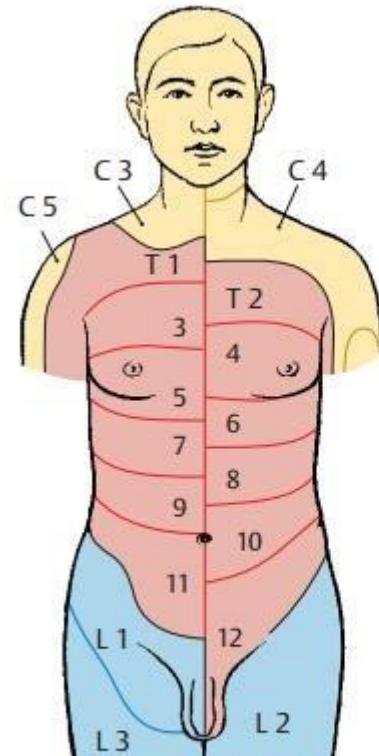
**C. Injury to the subcostal or iliohypogastric nerves with subsequent weakness of the lumbar triangle**

- 3. Hany 45 years old man presented to the emergency department complaining from severe right iliac pain referred to the right loin and the right testis. Plain X - ray revealed the presence of a small ureteric stone.
  - A. On anatomical basis, explain pain referral to the right loin and the right testis.
  - B. Where this stone could be impacted, Why?
  - C. Mention normal anatomical narrowing sites of the ureter
  - D. Mention other anatomical structures that can be the cause of right iliac pain.

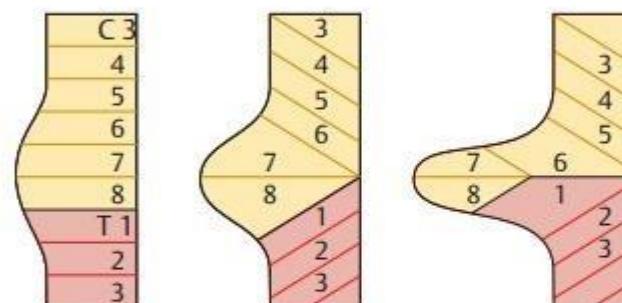
On anatomical basis, explain pain referral to the right loin and the right testis.

Answer:

Pain of ureteric origin is referred to the testis as they share the same segmental innervations (T12 , L1)



B Overlap of dermatomes (according to Förster)



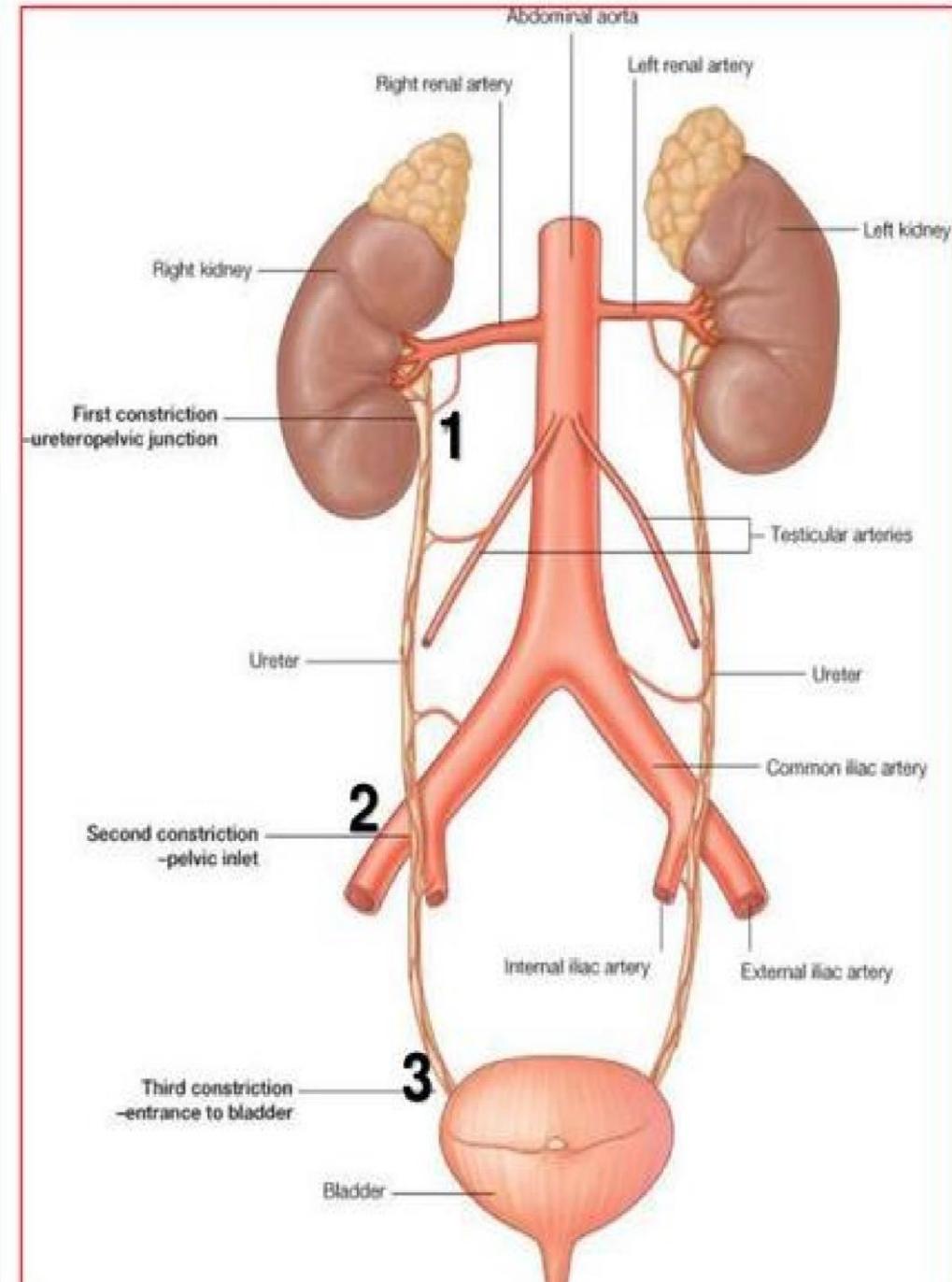
C Development of dermatomes in the upper limb (according to Bolk)

## B. Where this stone could be impacted.

Why?

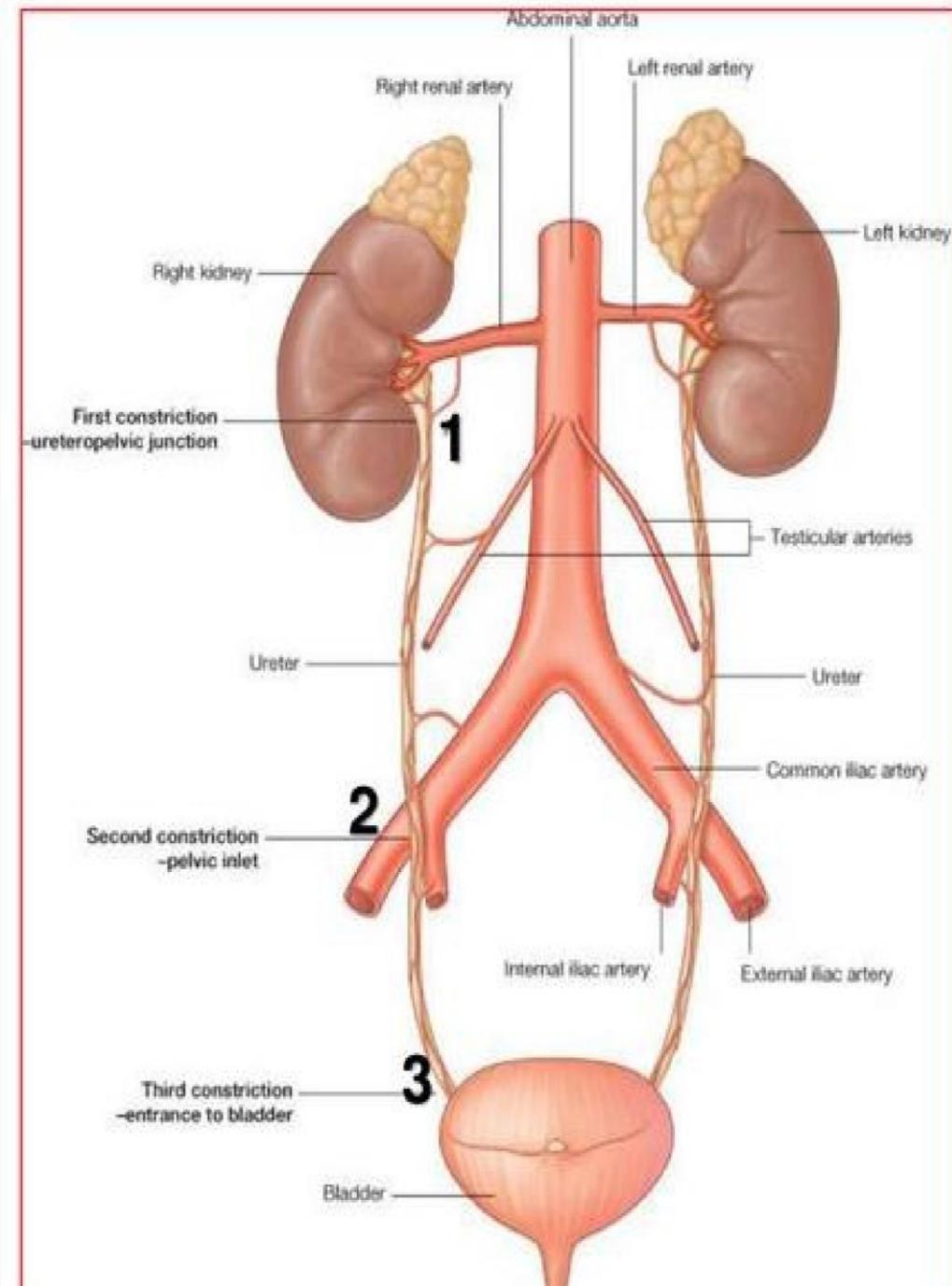
Answer:

In the lower third of the ureter  
where it crosses the site of bifurcation  
of the common iliac artery.



C. Mention normal anatomical narrowing sites of the ureter

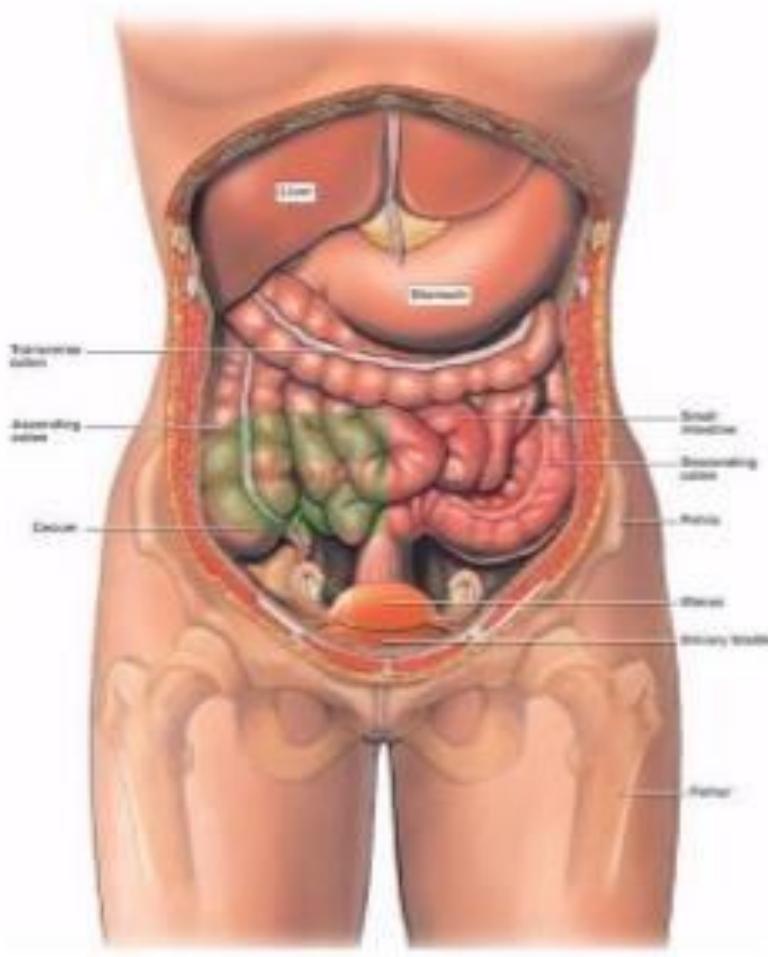
1. Pelviureteric junction
2. At the pelvic brim (site of bifurcation of common iliac artery)
3. Uretrovesical junction



**D. Mention other anatomical structures that can be the cause of right iliac pain.**

**Answer:**

- 1. Appendix**
- 2. Cecum**
- 3. Ileocecal valve**
- 4. Right ovary**
- 5. Right uterine tube**



Right hypochondrium	Epigastric region	Left hypochondrium
Right lumbar	Umbilical region	Left lumbar
Right iliac region	Hypogastrum	Left iliac region

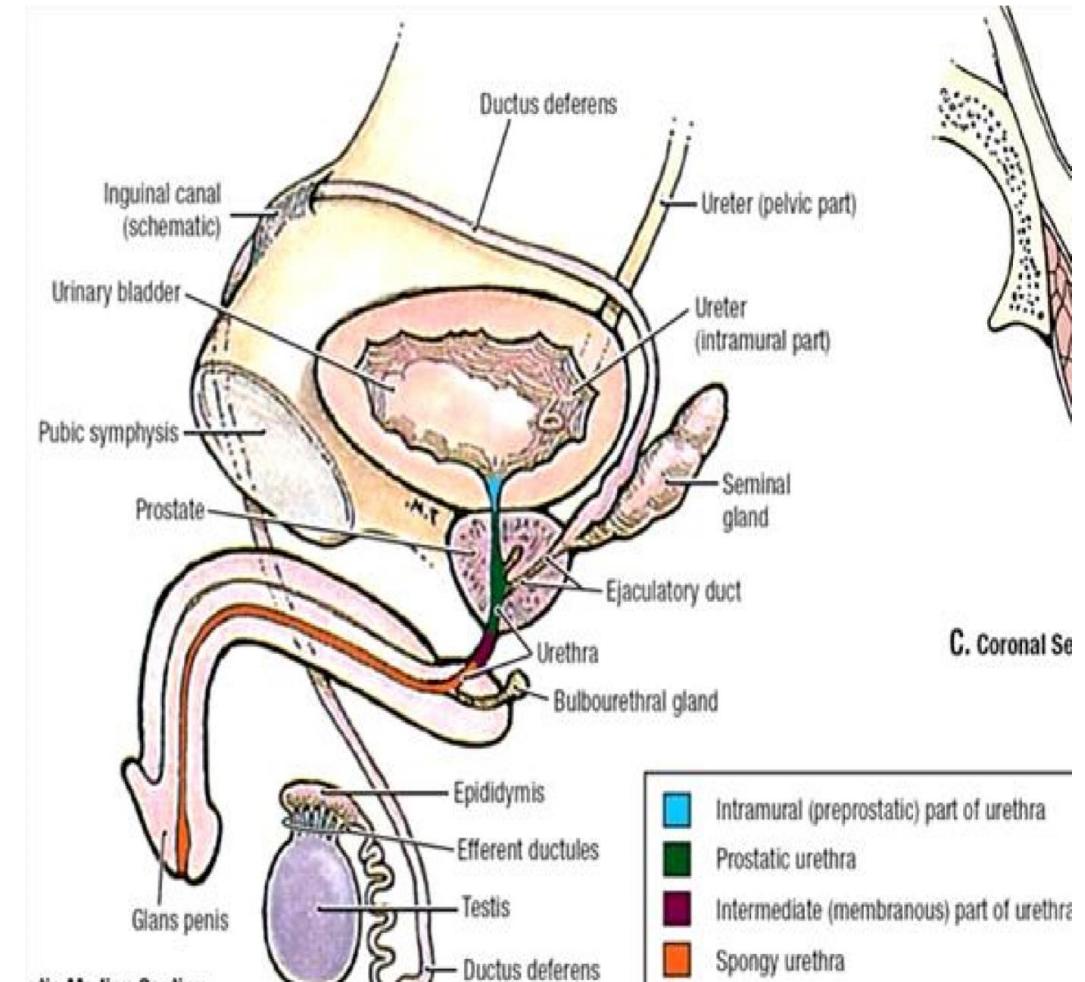
• 4. Maher, 40 years old man fallen astride on a sink cover while he was walking a street. He experienced severe perineal pain and contusions. 4 hours later, he could not pass urine and he noticed a swollen lower anterior abdominal wall.

- A. Using your knowledge about urinary system, try to find a suitable anatomical explanation for such condition.
- B. What is the weakest part of the male urethra?
- C. Mention parts of the male urethra and their sites and length
- D. What are the differences between male and female urethra?

**A. Using your knowledge about urinary system, try to find a suitable anatomical explanation for such condition.**

**Answer:**

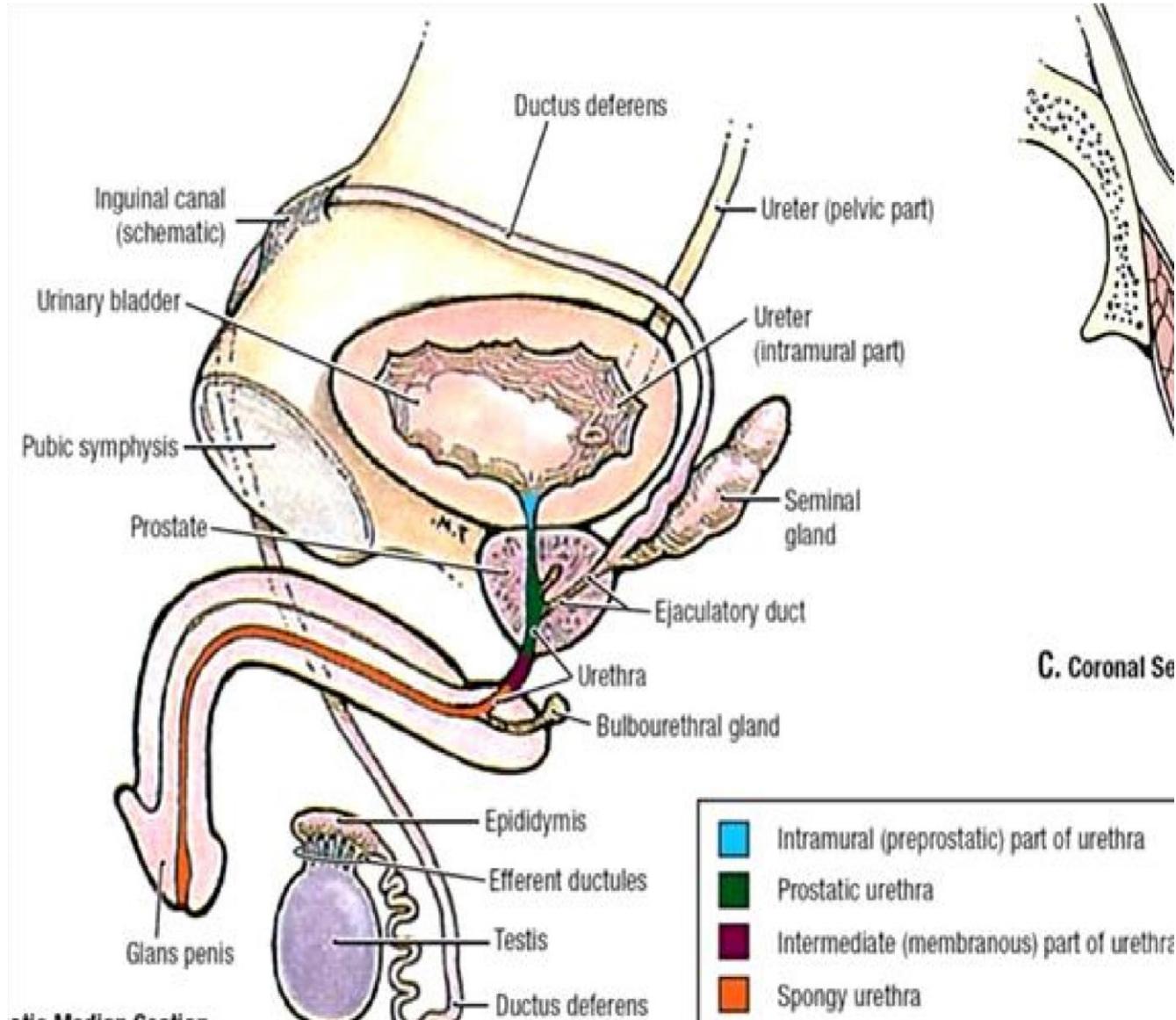
**A. Traumatic injury of the membranous urethra in the deep perineal space.**



## B. What is the weakest part of the male urethra

**Answer:**

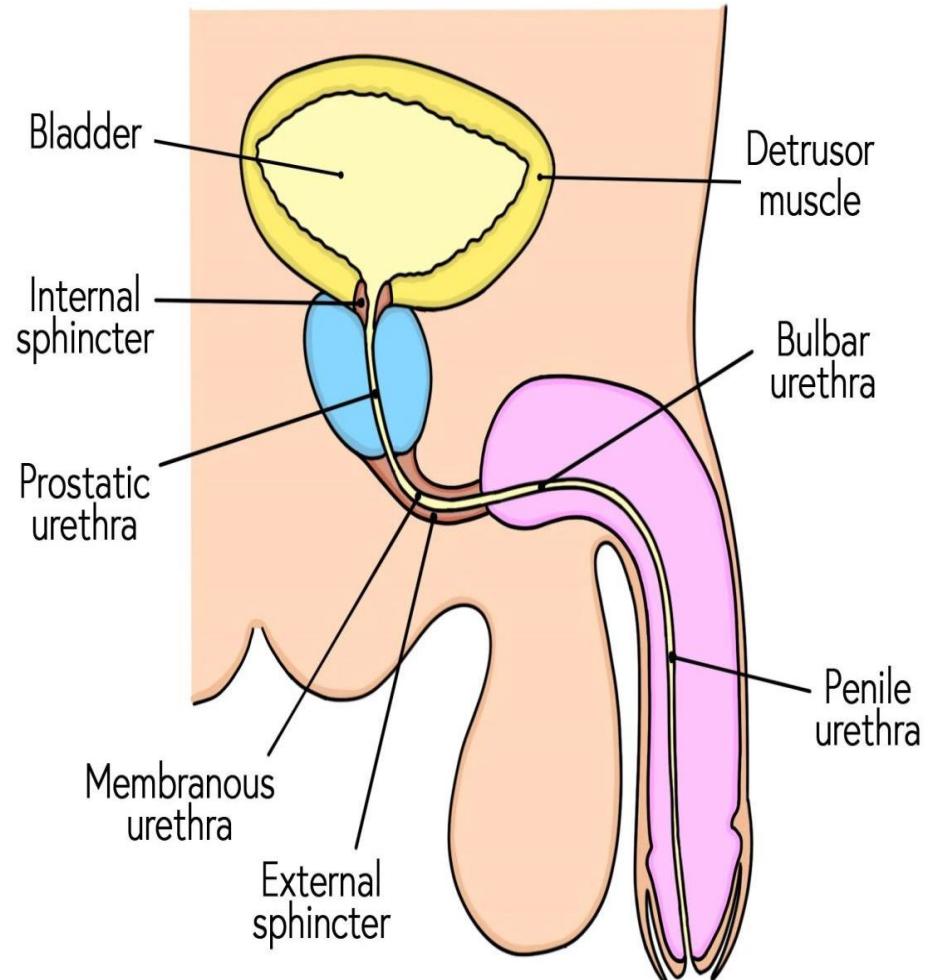
**Membranous urethra**



## C. Mention parts of the male urethra and their sites and length.

### Answer:

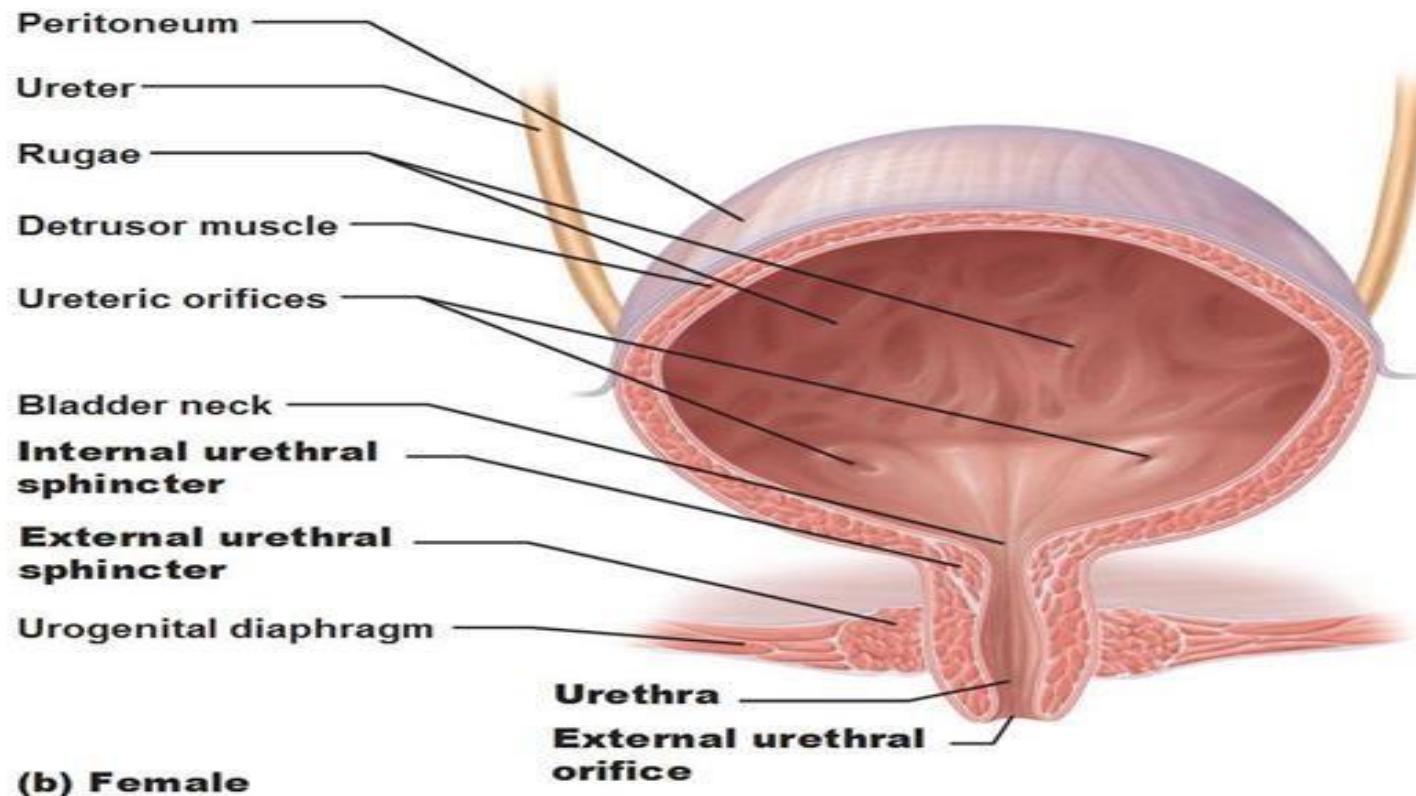
1. **Prostatic urethra (traversing the prostate) 3 cm.**
1. **Membraneous urethra (traversing the deep peroneal pouch) 1 cm**
1. **Spongy urethra (traversing the penis) 16 cm**



## D. What are the differences between male and female urethra

**Answer:**

**Female urethra is shorter, wider, not traversing the clitoris.**



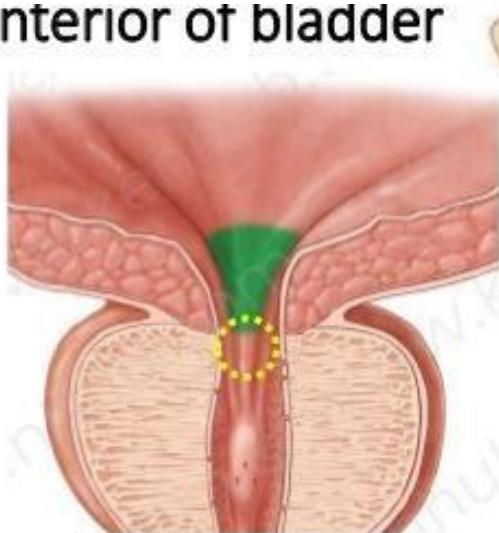
- 5. Mourad, 2 years old male was informed by his mother to have a bout of crying while he is put in the supine position. The bouts are relieved if his mother put him in the prone position. Urologic consultation declared the diagnosis of urinary bladder stone.
- On anatomical basis, try to explain this phenomena.

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Answer:

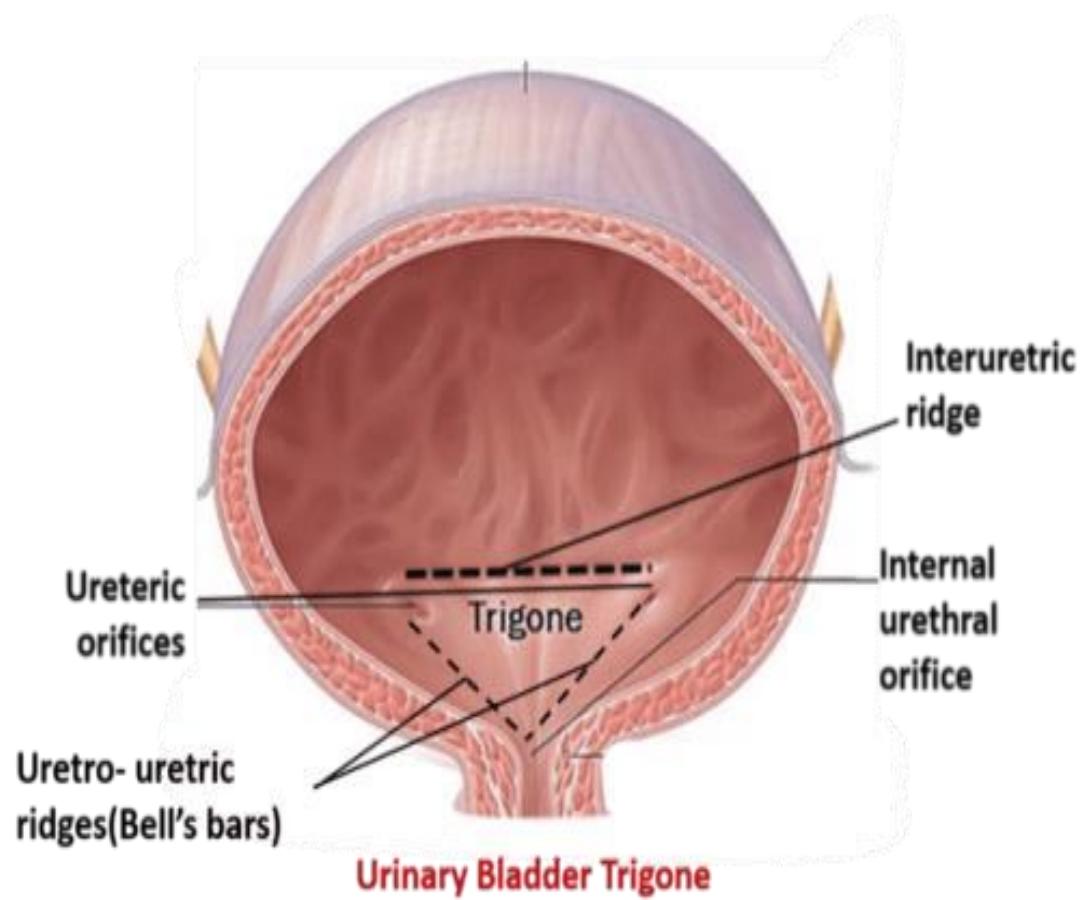
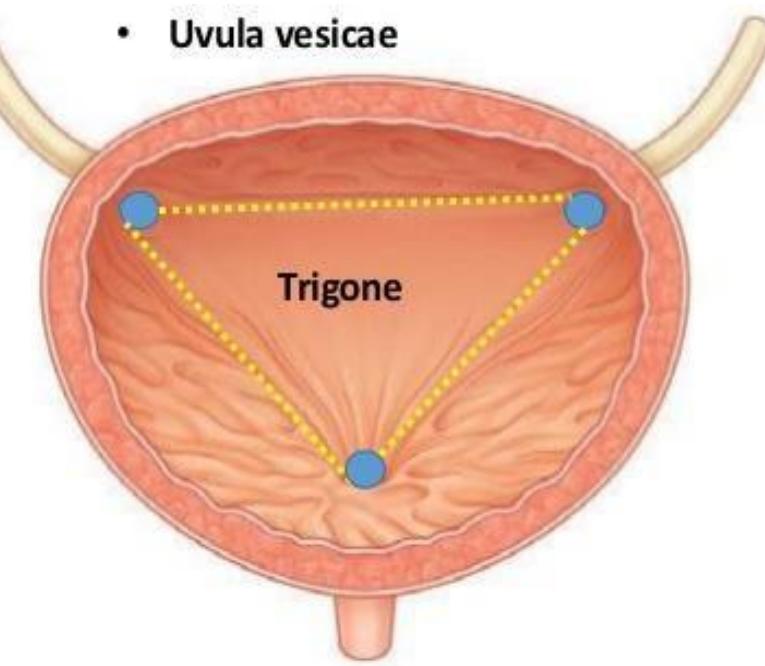
In the supine position, the stone is touching the trigone, the most sensitive area in the bladder

Interior of bladder



Internal urethral sphincter  
(sphincter vesicae)

• Uvula vesicae



**THANK YOU**