

Mono cryptorchidism: Its anatomical basis and clinical implications

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ABSTRACT

Cryptorchidism is the absence of at least one or both the testes in the scrotum. It is also known as undescended testis (UT) and is the most common birth defect involving male genitalia. Descent of testes into scrotal sac is important for males to have functional testes and lead a normal sexual developmental life. Understanding the cryptorchidism is important for clinically assessing the status of the patient and planning the treatment.

Present case: An adult male cadaver presented with a herniation through right superficial inguinal ring. On further dissection the right scrotal sac was found without the testis. The right inguinal canal too showed only neurovascular bundle enclosed by a thin membrane. After opening the abdomen, the right testis was found in the right iliac fossa close to deep inguinal ring, which tells that the development has begun but got ceased at a later stage.

Conclusion: Proper understanding & knowledge of cryptorchidism is important for clinically assessing and treating the undescended testis.

KEYWORDS: Cryptorchidism, Inguinal Hernia, Undescended testis, Ectopic Testis, Testicle, orchidopexy.

INTRODUCTION

Testes are male gonads, which are paired and present in each half of the scrotal sac with the left being a little higher than the right one. Testes are homologous to ovaries in females. They are responsible for major functions like spermatogenesis, production of testosterone (the male sexual hormone).

A normal testis is ellipsoid in shape, and measures 5 cm, 2.5 cm and 3 cm in length, breadth and anteroposterior diameter, respectively. Each testis is covered by 3 layers namely tunica vaginalis, tunica albuginea and tunica vasculosa from superficial to deep.

During the intrauterine life (IUL) the development of testis follows a path of descent where it begins in close relation to posterior abdominal wall of lumbar region bilaterally along the central portion of the mesonephros^[1]. Then it reaches iliac fossa during third month, lies at the site of deep inguinal ring up to seventh month. Then it passes through the inguinal canal during seventh month and finally reaches the scrotum by end of eighth month. Then, testes descend into the scrotal sac at the time of parturition, due to factors such as increased abdominal pressure, male sex hormone and processus vaginalis^[2]. Any abnormality in the development may lead to Cryptorchidism. The testis may be found at any location in the path of descent for example abdomen, deep inguinal ring, inguinal canal, suprascrotal and this is known as ectopic testis^{Figure 1}.^[3,4]

Case Report:

During routine dissection of abdominal region for 2020-21 batch on 11-Nov-2021, a male cadaver initially showed a herniation through the right superficial inguinal ring. The herniated structure appeared flat anteroposteriorly and resembled to be a part of intestine.^{Figure 1}

But on further dissection on the right lateral wall of the scrotum to trace spermatic cord, the sac neither had the testis nor the epididymis. On the other hand, left side was anatomically normal with proper location of testis and epididymis.^{Figure 2}

Henceforth, it was decided to trace the right testis through the inguinal canal, but only a neuro-vascular bundle was observed, engulfed within a thin membrane. So, in next step the abdomen was opened to find the hidden testis. Caecum and appendix were retracted and checked the right iliac fossa. A small mass was found within the iliac fossa approximately at the level of L4 vertebra^{Figure 3}. Few of its parts were extending into the inguinal canal through deep inguinal ring. All the other organs of abdomen were in situ.

The **Gross features** showed the following measurements: length-3.4 cm, breadth-0.6cm, anteroposterior diameter-2.5

cm. The mass appeared to be transversely compressed. The mass was assumed to be testis. So, to confirm it, a small section from the mass, as well as from the structure herniated through superficial inguinal ring were taken and sent for histopathological examination.

The **report** confirmed the mass to be testis. Seminiferous tubules were hyalinized. Testicular wall was cystic and lined by flat epithelium. Figure 4 There was no evidence of malignancy. The herniated structure showed neurovascular bundle enveloped by a flat epithelium.

DISCUSSION

Cryptorchidism is the absence of at least one or both the testes in the scrotum. As per literature incidence of cryptorchidism showed 3 to 4 /100 new borns of full term and 21/100 of prematurely new borns showed cryptorchidism. Usually, testes start to descend within 3 months from birth, but after 3 months descent doesn't happen in 1 to 2 /100 cases which may present with cryptorchidism.^[5]

A J Kirsch et al noted the average age at presentation to be 34 months with 63% presenting before the age of 48 months. The study showed 58% left sided cryptorchidism, 35% right sided and 7% bilateral.^[6] In **Adult men** above 30 years of age, 24% palpable testes were present. 39% palpable testes were found distal to Superficial inguinal ring on surgical exploration. 41% were atrophic or absent. 20% were intraabdominal with 31% bilateral.^[6]

The current case is an adult male cadaver with absent testis on the right side which is very rare sight. Many a times, UT is confused to **ectopic testis**. The latter is a rare congenital anomaly (differing from cryptorchidism) where testis has descended from abdominal cavity, but located elsewhere away from the normal path of descent.^[3]

Rabia Ahmed G. et al, reported 1132 cases with UT in their study, out of which 44 cases (3.9%) showed testicular ectopia. 23 cases with mean age of 5 years fulfilled the criteria of inguinal ectopic testis. Here, congenital inguinal hernia is the most common associated anomaly (22.7%).^[7] The current case too presented with hernia through right superficial inguinal ring.

Incidence of ectopic testis is more than 1 million cases per year in India. Usually, single testicle is affected. In 10% of patients both testes are affected. It is uncommon in general population, but most commonly seen in premature newborn males.^[7]

The exact **cause** of UT is not known but some common causes were combination of genetics, maternal health and other environmental factors which affect the hormonal regulation, physical changes and nerve activity that influences the development of the testicles. **Risk factors** related to the child are low birth weight, premature birth, familial history of UT and other abnormalities of genital development.^[8]

Conditions that can restrict growth of foetus are Down's syndrome or any abdominal wall defect, alcohol consumption and active smoking or exposure to passive smoking by mother during pregnancy, parents' exposure to some pesticides such as vinclozolin and phthalates which have anti-androgenic effect.^[8] Since the current case belonged to an unclaimed cadaver, it was not possible to avail the history of the person, regarding his health issues.

Few of the noted **complications** of UT are i) risk of testicular cancer is higher in men with UT located in abdomen than in groin, surgical correction of a UT may decrease but not eliminate the risk of cancer, ii) fertility issues are more pronounced, like low sperm count and poor sperm & semen quantity, very high possibility of infertility and it may get worse if the condition goes untreated for an extended period of time, iii) testicular torsion occurs 10 times more often in UT than in normal, iv) trauma, if the testis is located in groin, it may be damaged from pressure or impressing against the pubic bone, v) inguinal hernia, commonly seen in 90% of boys with UT having a patent processus vaginalis.^[9] The herniated mass in the current case also contained processus vaginalis.

Treatment of UT involves both medical and surgical methods, but with medical management being less effective, surgical method remains the main stay of the management. Under medical treatment a series of **Human Chorionic Gonadotropin (HCG)** hormone is administered to the infant and the status of UT is reassessed and in addition to this testosterone hormonal therapy is also given for development of testis. But this has highly variable success rate ranging from 5%-50%.^[9]

Surgical management involves **Orchidopexy**, it is the surgery performed in the infants between 6 to 12 months of age because after 12 months the histological changes in the testis begin. The procedure involves mobilisation of testis and its spermatic cord, and testis is repositioned in the scrotum, by exposing the inguinal canal by division of external oblique aponeurosis. Although this procedure is effective, the vas deferens and vessels being tiny are vulnerable to injury.

In some cases of where the undescended testis is located at a higher position, a '2-stage' surgical approach is necessary. The testis is initially mobilized as far as possible and anchored at that position. Later after 6 months the mobilisation is re performed.^[10] Patients with bilateral UT, even after receiving orchidopexy remain infertile and azoospermic.

CONCLUSION

Proper understanding & knowledge of cryptorchidism is important for clinically assessing and treating the undescended testis. In the present case study, it was observed that the male cadaver had an "undescended right testis" present inside the abdomen close to posterior abdominal

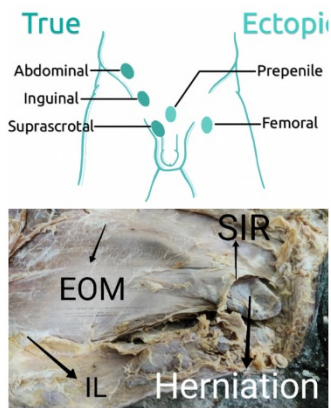


Figure 1: A) common abnormal positions in ectopic testis B) Herniation through inguinal

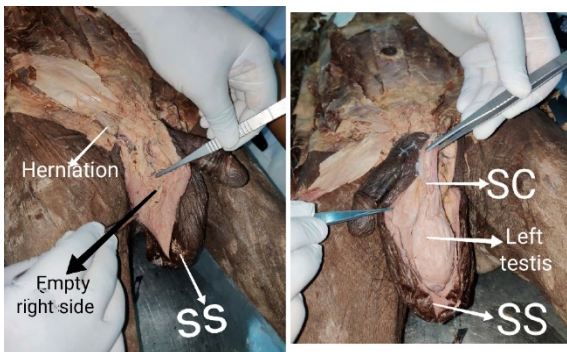


Figure 2: Scrotalsac A) Absent testis on right side B) Normal testis on left side

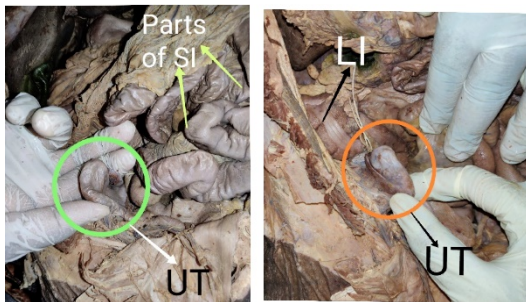


Figure 3: A&B) Right testis found intra-abdominally in the right iliac fossa

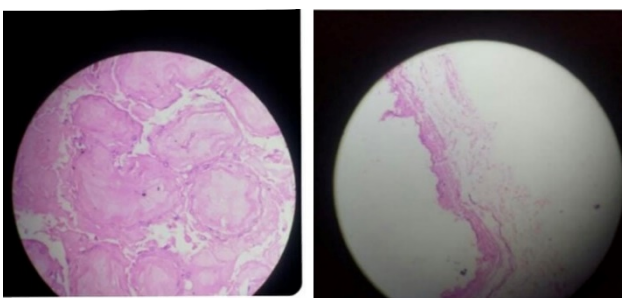


Figure 4: Histopathology: A) Hyalinization of seminiferous tubules B) Cystic testicular wall lined by flat epithelium

wall. Inguinal canal on right side contained only a neurovascular bundle enveloped by a layer of processus vaginalis. Vas deferens was absent. No abnormality was seen on the left side, both testis and spermatic cord were completely normal anatomically. No malignancy was reported as per histopathology examination.

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