Bilateral Undescended Testis: A Rare Anomaly
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Received for publication: April 21, 2013; Accepted: June 11, 2013

Abstract: Cryptorchidism is a condition in which one or both of the testes have not descended or are not retractorile down the scrotal sac. It may be unilateral or bilateral. It is categorized as true undescended testes in which testes are present in the normal route of descent and ectopic testes in which testes may lie outside its normal path of descent at abnormal site. Common complications of Cryptorchidism are testicular cancer, sub fertility, testicular torsion and inguinal hernia. In a male cadaver, both testes were found between the superficial inguinal ring and the scrotum. On dissection the scrotal ligament was observed to be attached to the pubic crest. The genital branch of genitofemoral nerve (GFN) enters the inguinal canal through deep inguinal ring and supplies cremaster and the skin of the scrotum in males, but in this case it does not supply to scrotum.

Keywords: Cryptorchidism, Scrotal Ligament, Spermatic Cord, Genitofemoral Nerve.

Introduction

In the early fetal period the testes are located posteriorly in the abdominal cavity. During descent, testis reach the iliac fossa in third month, at deep inguinal ring in seventh month, pass through the inguinal canal during seventh month and are in scrotum by end of eighth month of intra uterine life. Descent to the scrotum is influenced by anatomical and hormonal control (gonadotropins and androgens), insulin-like hormone 3 (InsI3), calcitonin gene-related peptide (CGRP)[1]. Normally, Genitofemoral nerve originates from the L1 and L2 ventral rami and is formed within the substance of psoas major and divides above the inguinal ligament into genital and femoral branches. The genital branch enters the inguinal canal through deep inguinal ring and supplies cremaster and the skin of the scrotum in males. The femoral branch passes behind the inguinal ligament and enters the femoral sheath after piercing the anterior layer of the femoral sheath and fascia lata supplies the skin anterior to the upper part of the femoral triangle.

Clinically undescended testis (UDT) may be arrested at any point along its route into the scrotum i.e., in the abdomen, at the deep inguinal ring, in the inguinal canal, or between the superficial inguinal ring and the scrotum. UDT can be associated with a higher risk of infertility and testicular tumours, particularly seminoma. The risk is highest in abdominal testes. In this case we describe bilateral UDT and unusual supply of genital branch of GFN.

Case Report:

During routine dissection of inguinal region, at Department of Anatomy, Shri Ram Murthy Smarak Institute of Medical Sciences, Bareilly, in an adult male cadaver, both testis were found in inguinal region (Figure.1). The position of testis was obliquely placed above pubic crest and upper pole of testis were very closely placed at the superficial inguinal ring.

We dissected the region to see scrotal ligament. It was seen as a large band extending from lower pole of testis and was attached to pubic region and scrotal sac. The scrotal sac was opened and was found empty, containing only loose connective tissue. (Figure.2)

Figure.1: SIR- Superficial Inguinal Ring, T- Testis
Both testes along with spermatic cords were removed and measurements were taken (Figure.3). The measurements were as follows

**Right side:**
Length of spermatic cord- 7.0 cm, weight of testis- 6.9 gm. Dimensions of the testis- Length -3.0 cm, Breadth- 2.0cm, antero-posterior thickness – 2.0 cm

**Left side:**
Length of spermatic cord- 8.0 cm, weight of testis- 7.4 gm. Dimensions of the testis-Length-3.0 cm, Breadth-2cm, antero-posterior thickness-2.3cm.

We then traced the blood supply which was found normal by testicular arteries arising directly from abdominal aorta and testicular veins draining on the right side into inferior vena cava and on the left side into left renal vein.

Right genitofemoral nerve gives genital and femoral branch at much higher level, genital branch is not supplying motor to the cremaster muscle or sensory to the scrotum, it passes behind the inguinal ligament and provide cutaneous innervation to the upper part of femoral triangle (figure-4). Left side GFN bifurcate just above inguinal ligament but it doesn’t supply either cremaster or scrotum, which may be one of the strong reasons for UDT.

**Discussion**

The understanding of testicular descent has changed much in last 25 years. Undescended testes were reported in the literature. Kalyan et al reported a rare unilateral congenital undescended testis in the pelvic part of abdomen near the deep inguinal ring, such congenital testicular variations may lead to inguinal hernia, testicular cancer and testicular torsion infertility or low sperm count. Recent evidence suggests that undescended testis involves two phases, transabdominal and inguinocrotal, that are regulated by distinct morphological and endocrine factors. Descent of testis is proposed by different hypothesis. I. Two - stage hypothesis (Transabdominal phase & Inguinoscrotal phase) II. Genitofemoral nerve hypothesis.

I. Two - stage hypothesis

**Transabdominal phase:** Testis descent by its movement across the abdomen to the entrance of inguinal canal i.e. deep inguinal ring is influenced by anti Mullarian hormone (AMH) secreted by Sertoli cells.

**Inguinoscrotal phase:** Testis moves through the inguinal canal into the scrotum. During this phase normal attachment of gubernaculum (scrotal
ligament) plays important role in complete descent of testes into the scrotal sac. Calcitonin Gene Related Peptide (CGRP) a neuropeptide released by GFN plays an important role to act on CGRP receptors of gubernaculums \[^{5, 6, 7}\]. In present case, the scrotal ligament, which is remnant of gubernaculum, is attached to the pubic region. So this might be the cause for undescended testis.

II. Genitofemoral nerve hypothesis

As per the study by Lewis in 1948 \[^{8}\] and GFN hypothesis proposed by Hutson in 1987 \[^{9}\] cutting the GFN in neonatal rats caused undescended testes (UDT), due to denervation of cremaster muscle. Keeping these studies in view we traced genitofemoral nerve in this present case. In support of this view we found that genital branch is not supplying to the cremaster or cutaneous innervation to the scrotum. Genital branch is passing below the inguinal ligament to provide cutaneous innervation to the upper part of femoral triangle, which has been never reported anatomically in any other article previously.

The incidence of undescended testis among men is approximately one in 1,000 to one in 2,500 \[^{10}\]. Torsion of testis and inguinal hernia are common complications of undescended testis. It has been well documented that men with the history of undescended testis have 10 times higher chance of development of testicular cancer than the normal and the incidence goes on increasing with advance in age. The increased risk of malignancy in UDT may be caused by persistence of a few neonatal gonocytes and their subsequent mutation (caused by abnormally high temperature) into carcinoma in situ (CIS) cells and subsequent frank malignancy \[^{11}\]. Early detection of tumour by ultrasonography, Laparoscopy and MRI will help the surgeons to perform inguinal orchidectomy (the surgical removal of one or both testes).

Conclusions

A unilateral undescended testis is present in 3% of boys at birth and 1% of boys by 3 months of age. Bilateral maldescent is seen in just over 1% of male births. After 3 months of postnatal life, testis if found undescended is brought into scrotal sac by Orchidopexy. In this case bilateral UDT is found in adult male cadaver. We suspect the UDT in this case may be influenced by improper course of genital branch of GFN and pubic attachment of gubernaculum.

References


Source of support: Nil,
Conflict of interest: None Declared