

Cryptorchidism: What's New?

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Undescended testis (UDT), also known as cryptorchidism, is defined as a condition in which testis cannot be made to reach the bottom of the scrotum. The testis may be arrested at any level along the path of descent of testis from the retroperitoneum to the scrotum. Theories on descent(1), pathology and management are more or less standardized but a few controversies in terminology, diagnosis and role of hormones in diagnosis and treatment of cryptorchidism exist.

Terminology

1. *Spontaneously descending testis*: A testis that was not present in the scrotum at birth but has descended with time.
2. *Truly undescended testis*: It is a testis that is arrested along the path of migration from the retroperitoneum to the scrotum.
3. *Retractile testis*: A retractile testis (i) is normal in shape and size; (ii) can be brought down to the base of scrotum; and (iii) stays in the scrotum for some time after the pull is released. The scrotum is normally developed.
4. *Ectopic testis*: A testis that has emerged

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from the external inguinal ring but fails to reach the scrotum is labeled as ectopic testis. It can be found in perineum, femoral area or contralateral scrotum.

5. *Ascended testis*: A testis documented to be present in the scrotum once, has attained a higher position at a subsequent examination and can not be brought down into the scrotum.
6. *Gliding testis*: An inguinal testis that can moved down to the upper scrotum under tension and retracts to the original position once the pull is released.

Studies conducted on the testis in various situations suggest that these may be part of same etiological process. Similar pathological findings in ectopic and undescended testis suggest that these are variations of same congenital anomaly and this spectrum of abnormal testicular position and its complications has been called undescended testis sequence(2).

Conventional teaching is that the retractile testis is a normal, physiological variant that descends spontaneously by puberty and does not require active treatment. The evidence suggests that retractile testis suffers pathological change similar to truly undescended testis if left to await spontaneous descent and it requires active treatment(3). Yearly follow-up with the primary care physician is recommended in patients with retractile testis. Likewise, the total germ cell count was similar in the undescended testis and the contralateral testis in patients with ascending and primary undescended testis(4).

Diagnosis of Undescended Testis

History of an absent testis is many a times

given by the parents. Examination with the hands in a relaxed calm patient in a warm atmosphere is the best way to diagnose undescended testis. After noting the size of the scrotum, palpation is begun from the inguinal region. The testis, if felt, is milked towards the scrotum to know the maximum descent possible. It helps to lubricate the fingers with powder or lubricating jelly and repeat the examination. An impalpable testis may mean an absent testis, a vanishing testis or an intra-abdominal testis. A retractile testis can be differentiated by examining the patient in a cross legged forward leaning seated position. Inter-observer variation may be a substantial source of bias in diagnosing undescended testis(5).

The presence of palpable ipsilateral scrotal appendages and a contralateral descended testis with no hypertrophy is associated with increased likelihood of successful orchiopexy (6). On the contrary, Huff, *et al.*(7) suggest that the volume of the contralateral descended testis is an unreliable criterion for distinguishing an absent from an undescended testis in boys with unilateral impalpable testis. Surgical exploration with identification of spermatic vessels is the method of choice for the diagnosis of an absent testis.

Human chorionic gonadotropin hormonal stimulation test and measurement of testosterone, follicle stimulating hormone and luteinizing hormone are valuable nonsurgical tests for the diagnosis of bilateral abdominal cryptorchidism. Failure of testosterone levels to rise after hCG suggest absent testes(8). According to Docimo(9) there is no existing data that suggests that hCG improves operative success, decreases surgical complications and is more economical for testicular localization.

Hormonal assays for anti-mullerian hormone (AMH) and inhibin help to assess the

existence of functioning testicular tissue in boys with no need for hCG stimulation test. Rey(10) suggests that the determination of testosterone, its precursors and dihydro-testosterone, after hCG stimulation should be reserved for situation in which leydig cell function needs to be specifically assessed. In a patient with bilateral impalpable gonads with severe hypospadias, karyotyping is required to rule out intersex-disorders.

Preoperative Localization of Testis

Utility of radiological investigations for pre-operative localization of the testis remains controversial. Ultrasonography is highly operator dependent and has a high false positive and false negative rate. Elder(11) found it successful in only 18% and when localized, it was palpable by the clinician. In a negative study, surgical exploration is still necessary because neither computed tomography (CT) nor magnetic resonance imaging (MRI) is reliable in diagnosing a vanishing testis. The accuracy of the radiological tests to be 44% while examination by referring physician and pediatric urologist was 53% and 84% accurate. Radiographic assessment did not influence the decision to operate, the surgical approach or the viability or salvagibility of the involved testis(12).

CT has a false negative rate of approximately 15% and exposes the child to significant radiation. MRI has come into vogue for localization of testis but is unable to identify all impalpable testes with false negative rates in the range of 7-13%. It requires sedation or anesthesia to be performed and the cost is prohibitive in many instances. The high false-negative and false-positive rates do not obviate the need of laparoscopic / surgical exploration(13). Gadolinium infusion MR angiography is helpful in allowing pre-operative planning of the surgical approach and avoiding unnecessary laparoscopy(14).

Key Messages

- Orchiopexy should be done by one year of age.
- Radiological investigations do not have much role in localization of testis.
- Laparoscopy has a role in management of impalpable testis.
- Hormonal treatment has a limited role in treatment of undescended testis.

Diagnostic imaging is useful for follow-up of (1) testis after orchiopexy, (2) normally placed testis for malignancy, (3) post-pubertal patients when decision not to operate has been taken and (4) for staging when malignancy occurs with an undescended testis(15).

Role of Laparoscopy

Laparoscopy, though minimally invasive can be used to localize an impalpable testis and guide further management(16,17). Siemer, *et al.*(13) advocate laparoscopic evaluation as method of choice in pediatric cases of impalpable testis. On the contrary, Ferro, *et al.*(18) concluded that preoperative laparoscopy does not provide any significant advantage over open surgery for treating impalpable testis and operating cost and time were higher with laparoscopy.

Age at Surgery

The traditionally recommended age for orchiopexy was after the age of 4 years but before age 6 unless symptomatic hernia is present(19). Spontaneous descent is unlikely after 6-9 months in term and 1 year in preterm babies and testis needs to be surgically fixed in the scrotum. Irreversible histological changes start occurring in the testis by the second year of life(20,21). The current recommendations are that the testis should be brought down and fixed in the scrotum by 12-18 months of age. The child may be operated upon for orchiopexy at a younger age if it is associated with

clinically diagnosed hernia. There are strong indications that deterioration of cryptorchid testis starts around 1 year of age. Earlier age at surgery prevents the development of psychopathological disturbances in the children(22). Perineal ectopic testis should be operated at an age of 6 months and surgery is indicated even if there is no hernia(23).

Role of Hormonal Treatment

Hormones have been utilized widely as it is believed that the hypogonadotropic hypogonadism is the commonest cause of cryptorchidism. The hormonal treatment is believed to induce the epididymal-testicular descent. hCG and GnRH have been used alone or in combination. LHRH spray may be useful when the testis can be manipulated at the scrotal root before treatment(24-26). Hormonal effect is transient and it helps to differentiate between retractile and truly undescended testis and to enlarge the testicular and vessel size to assist in the further surgical interventions. It is not effective in very young children and may harm the germ cells in 1-3 year old children(27). Rohtagi, *et al.*(28) found good response only in those gonads which were located in the inguinal canal and at the external ring. Majority of failures are due to anatomic anomalies and noncompliance.

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PERSONAL PRACTICE

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