

## Pattern of presentation and management of undescended testes in adolescent and adults

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### Abstract

**Background:** Undescended testis may present in adolescent and adults due to torsion, hernia or infertility. We present our experience in the management of undescended testes in adolescent and adult patients.

**Methodology:** This is a retrospective study of 30 patients above the age of 10 years managed for undescended testes by our hospital from January 2011 to December, 2020. Data was collected via proforma and analysed using SPSS version 25.0 for windows.

**Results:** The mean age of the patients was  $31.1 \pm 14.1$  years with a range of 12-70 years. There was infertility in 15 patients (50%), groin swelling  $\pm$  pain in 15 patients (50%). Orchidopexy  $\pm$  herniorrhaphy and orchidectomy was done for 20 patients (66.7%).

**Conclusion:** Undescended testes in adult and adolescent may present due to infertility, torsion, hernia or malignant transformation. Orchidopexy with or without orchidectomy is done depending on the location, bilaterality and status of the testes.

**Keywords:** undescended testes, adults, adolescent, groin swelling, orchidopexy, orchidectomy

### Introduction

Undescended testis is pathological condition where the testis is absent at or below mid-scrotal position [1, 2]. It is predominantly a congenital condition but it may be acquired. Acquired cases may be caused by orchidopexy and inguinal surgeries such as herniorrhaphy that may tether the cord allowing the testis to assume higher position [1]. It is palpable in 80% and non-palpable in 20% of the cases [3]. It might be bilateral or unilateral. It is found in 3% of full-term infants which reduces to 1% by 6-12 months of age [3]. The incidence in preterm infants is 30% [3]. The risk factors for undescended testes include prematurity, intrauterine growth restriction, toxemia of pregnancy, perinatal hypoxia, caesarian delivery and seasonal variations [4]. The aetiological factors can be anatomic, hormonal or genetic [5]. The anatomic factors include patent processus vaginalis and abnormal gubernaculum testis [6]. The hormonal factors include gonadotrophin deficiency, androgen deficiency, antimullerian hormone (AMH) deficiency or its receptors, deficient insulin 3 production or its receptors and disorder of genitofemoral nerve causing calcitonin growth receptor peptide factor (CGRP) deficiency. The genetic factors include androgen receptor gene deficiency, 5-alpha reductase gene deficiency, HOXA10 gene mutations and heterozygous mutations of *insl3* and *lgr8* gene [6].

These factors affect either the trans-abdominal or inguino-scrotal phases of testicular descent. The factors that facilitate the Trans abdominal migration include androgen, gonadotrophin, mullerian inhibitory substance (MIS), gubernaculum and cranio-caudal growth of the fetus [2, 6]. Gubernaculum anchors the testis to its destination. Thickening of gubernaculum is influenced by insulin-like 3

protein (INSL3) and its receptor leucine-rich repeat-containing G protein couple receptor 8 (LGR8). And the factors that affect the trans-inguinal phase include androgen, genitofemoral trough the secretion of calcitonin-growth related peptide and increase abdominal pressure due to rapidly growing abdominal viscera. Congenital anomalies like Prune-Belly Syndrome and gastroschisis are associated with UDT due decrease in abdominal pressure [7]. The pathophysiologic changes that occur in UDT include intratesticular hyperthermia that causes thermal injury to germinal epithelium and Sertoli cells via reactive oxygen species, decrease conversion of gonocytes to adult dark spermatogonia at 3-9 months, and decrease program cells death [8]. These lead to pooling of abnormal germ cells which are stimulated by androgen at puberty to form intratubular germ cell neoplasia [8, 9]. There is 40 times increase in risk of testicular tumour in UDT and 10% of the tumour develop from UDT [10]. Decrease conversion of type A spermatogonia to spermatids correlate with decrease sperm count and infertility [10, 11].

Even though predominantly a congenital problem, presentation in developing countries may be late during adolescence or adult hood [12, 13]. The presentation may be due to trauma, torsion, epididymo-orchis, hernia, infertility or malignant transformation. The testis can be palpable in 80% and non-palpable in 20% [3]. The gold standard method of localization of the non-palpable testis is laparoscopy [2]. But also, inguinal or abdominal explorations are acceptable when the laparoscopy is not available [2].

The treatment of UDT in children is straight forward by

orchidopexy either one stage or staged Fowler- Stephen procedure. But in adolescent and adult the treatment is complex depending on the age, location and state of the testis [1]. Orchidectomy is done when the UDT is unilateral, abdominal and or atrophic [14]. In bilateral disease a more conservative approach is followed more especially in inguinal testis where orchidopexy with or without orchidectomy can be done depending on the age, state of the testes, fertility and patient interest [10, 13]. The patients with recurrent torsion, hernia and palpable testis accept orchidopexy with or without orchidectomy [10, 15]. But patients with infertility reject orchidectomy for abdominal testis as the treatment will not restore their fertility but rather prevent malignant transformation.

No study was done in our environment on undescended testes in adolescent and adults. The objective of this study is to document our experience in the management of undescended testes in adolescent and adult patients. It must be in English. Authors whose English language is not their own are certainly requested to have their manuscripts checked (or co-authored) by an English native speaker, for linguistic correctness before submission and in its final version, if changes had been made to the initial version. The submitted typeset scripts of each contribution must be in their final form and of good appearance because they will be printed directly. The document you are reading is written in the format that should be used in your paper. This document is set in 12-point Times New Roman. If absolutely necessary, we suggest the use of condensed line spacing rather than smaller point sizes. Some technical formatting software print mathematical formulas in italic type, with subscripts and superscripts in a slightly smaller font size. This is acceptable. References should be like this [1, 2, 3].

### Materials and methods

This is a retrospective study of patients who above the age of 10 years managed for undescended testes by Urology Unit of our hospital from January 2011 to December, 2020. Data was collected from the case notes and operation Registers. Information Retrieved Included Biodata, Presentation, Examination Findings, Results of Imaging and laboratory investigations, treatment and outcome. Data was analysed using SPSS version 25.0 for windows. Results were reported in percentages, mean and standard deviation (SD).

### Results

There were 30 patients with UDT within the study period with mean age of  $31.1 \pm 14.1$  years and a range of 12-70 years. Fifteen (15) patients (50%) were married and 15 patients (50%) were single.

The most common presentation were absent testes in the

Scrotum in 28 patients (93.3%) and infertility in 15 patients (50%). Other presentations are shown in Table 1. It present with bilateral groin swellings (figure 1) when the testes are in superficial inguinal (Denis Brown) pouch or inguino-scrotal swelling when there is associated hernia (figure 2). The testes were palpable in 21 patients (70%) and non-palpable in 9 patients (30%). The UDT was bilateral in 28 patients (93.3%) and unilateral in 2 patients (6.7%). Surgical treatment was done in 20 patients (66.7%) and 10 patients (33.3%) with bilateral non-palpable testes and primary infertility decline treatment and absconded. The commonest treatment offered was orchidopexy by sub-dartos pouch (figure 3). Other treatments offered, location, status and histology of the testes are shown in table 2.

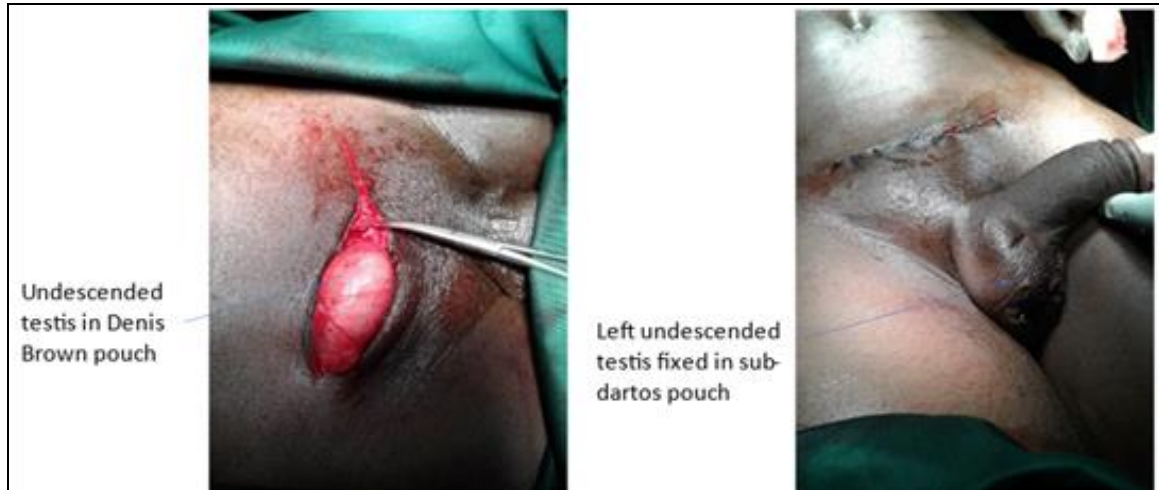
### Tables and Figures



**Fig 1:** Bilateral Groin Swellings in Denis Brown Pouch Testes



**Fig 2:** Left Inguio-scrotal Swelling in Patients with Bilateral Undescended Testes and Associated Left Inguinal Hernia



**Fig 3:** Orchidopexy by Sub-Dartos Pouch for the Testes in Superficial Inguinal (Denis Brown) Pouch

**Table 1:** Presentations of the Patients with Undescended Testes

| Presentation         | Number of patients | Percentage (%) |
|----------------------|--------------------|----------------|
| Absent testes        | 28                 | 93.3           |
| Infertility          | 15                 | 50.0           |
| Primary              | 14                 | 46             |
| Secondary            | 1                  | 14             |
| Groin swelling       | 15                 | 50.0           |
| Inguinal hernia      | 8                  | 26.7           |
| Recurrent groin pain | 5                  | 16             |

**Table 2:** Treatment, Location, Status and Histology of Testes in the Operated Cases

| Parameter                               | Number of patients | Percentage (%) |
|---|--------------------|----------------|
| Treatment                               | 20                 | 66.6           |
| Orchidopexy                             | 15                 | 50.0           |
| Orchidectomy                            | 5                  | 16.6           |
| ± herniorrhaphy                         | ± 8                | ± 26.6         |
| Location of testes                      | 20                 | 66.6           |
| Superficial inguinal pouch              | 10                 | 33.3           |
| intra canalicular                       | 5                  | 16.6           |
| intra abdominal                         | 3                  | 10             |
| Neck of the scrotum                     | 2                  | 6.7            |
| Status of testis                        | 20                 | 66.6           |
| Normal                                  | 12                 | 39.9           |
| Atrophic                                | 6                  | 20             |
| Testicular mass                         | 2                  | 6.7            |
| Histology                               | 3                  | 10             |
| Seminoma                                | 2                  | 6.7            |
| Intratubular Germ Cell Neoplasia (ITGN) | 1                  | 3.3            |

**Discussion**

Undescended testis occurs when the testis is absent at or below the midpoint of the scrotum<sup>[1]</sup>.

The incidence is 1-3% of term neonates at birth which reduces to 1% at 6-12 months of age<sup>[3]</sup>.

Presence of testis in the scrotum is necessary for regulation of testicular temperature 2-7 degrees below the body temperature by counter current heat exchange mechanism and scrotum for normal cellular mechanism, sperm maturation, apoptosis and spermatogenesis at puberty<sup>[1]</sup>.

With testis in the abnormal position there is hyperthermia leading to thermal injury to germinal and sertoli cells. The development of fetal gonocytes to adult dark spermatogonia, primary spermatocytes, spermatids at 3-9 months, 5-6 years is impeded this has negative impact on the onset of spermatogenesis puberty leading to infertility(8). With

impaired apoptosis there is retention of abnormal cells which is stimulated by androgen at puberty to develop into intratubular germ cell neoplasia and subsequent malignant transformation (8). The abnormal position of the testis may predispose it to trauma and torsion.

The mean age of the patients in this study was 31.1 years which was similar to the 31.1 years reported by Chan Jeong *et al*<sup>[12]</sup> in adults population in Korea but higher than 25.4 years reported by Viljoen *et al*<sup>[13]</sup> in similar study of adolescent and adults' patients with undescended testes in South Africa. The two studies with similar mean age have fewer number of patients as compared to study with lower mean age which had larger than of patients. This reflected higher incidence of the condition in their society or the facility where the study was carried out is a regional or country referral center. The oldest patient in our study was 70 years which was higher than 60 years and 41 years reported in the previous studies<sup>[12, 13]</sup>. The UDT was bilateral in 93% contrary to the findings of the previous studies where 15% and 17% were bilateral<sup>[12, 13]</sup>. Most (70%) of the testes in the present study were palpable which is agreement with the previous studies were most of the UDT (82% and 66%) were palpable<sup>[12, 13]</sup>. The pattern of presentation of our patients which included infertility (50%),groin swelling (50%), hernia (26.7%) and groin pain (16%) were absent in the previous studies<sup>[12, 13]</sup>. Can Sener *et al* (15) reported testicular torsion in 13 intracanalicular testes and the patients presented with groin swelling and pain. The was associated hernia in 92% of their patients. This is in agreement with the findings of our study, except that our patients did not present as emergency but presented later with testicular atrophy. Orchidopexy was the commonest treatment offered in this study as most patients are less 50 years and the testes were intracanalicular and superficial inguinal (Denis Brown) pouch<sup>[1]</sup>. This is in agreements with some previous studies that intracanalicular and superficial inguinal pouch testes have some fertility potentials more especially by using assisted reproductive technique of intracytoplasmic sperm injection<sup>[10, 11]</sup>. The patients with the secondary infertility have the testes located in the superficial inguinal pouch. Orchidectomy was done for few patients (16.6%) with atrophic testes, unilateral pathology and a 70-year-old man with bilateral intra-abdominal testes. This is in agreement with some previous studies<sup>[1, 10, 13]</sup>. Most of our patients with bilateral non-palpable testes and infertility declined orchidectomy with or without

orchidopexy as the surgery is mainly to prevent malignant transformation and will do nothing for their infertility which is their chief complaint. This is in agreement with some studies [10-12]. Herniorrhaphy was done for 26.6% of the patients with associated hernia as reported by the previous studies [1, 2].

We have not offered staged Fowler- Stephen technique as this may be favored in younger children [16]. In adolescent and adults, the testes are mostly small or atrophic, the cord and the testicular vessels are very short. These may not be amenable to extensive mobilization and manipulations. So even bringing out intrabdominal testis to the inguinal region or inguinal to the neck of the scrotum might suffice as the Sertoli function was already lost for abdominal testis and compromised for inguinal testis [11]. The Leydig cells function (production of androgens) is present even in abdominal testis (11). So, advancing UDT to more accessible position for self-testicular examination and early detection to of malignant transformation is adequate for adolescent and adult testis even if is not intra scrotal.

We recorded malignant transformation in the 2 patients (6.7%) and premalignant transformation in 1 patient (3.3%). Our findings are in agreement with was reported in the literature that undescended testis predisposes to developed intratubular germ cell neoplasia and seminoma when the testis in the ectopic position [2, 8, 9, 13].

### Conclusions

Undescended testes in adolescent and adult present with one of one its complications which include infertility, recurrent torsion, inguinal hernia and malignant transformation. Most of the testes were intracanalicular or superficial inguinal pouch. The commonest treatment offered was orchidopexy with or without orchidectomy. The treatment of bilateral intraabdominal testes is challenging as the patients may decline treatment as it will not improve his chance of fertility but rather prevent malignant transformation.

### Conflict of interest

None to declare

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