

Clinical Management of Undescended Testes in Adolescents and Young Adults

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Abstract

Background: Undescended testis (cryptorchidism) is one of the most common congenital anomalies of the male genitourinary tract. Although early diagnosis and surgical correction are recommended during infancy, many patients in developing countries continue to present during adolescence and young adulthood, increasing the risk of infertility, testicular malignancy, and other complications. This study evaluated the clinical presentation, management, and surgical outcomes of undescended testes in adolescents and young adults.

Methods: A hospital-based observational study was conducted among 150 adolescent and young adult males diagnosed with undescended testes at a tertiary care teaching hospital. Demographic characteristics, clinical presentation, anatomical location of the undescended testis, reasons for delayed presentation, associated anomalies, surgical approach, and postoperative complications were recorded using a structured proforma. Data were analyzed using SPSS version 26.0. Categorical variables were expressed as frequencies and percentages, and a p-value of <0.05 was considered statistically significant.

Results: Among the 150 patients, 48.0% belonged to the 15–19 years age group. The majority had secondary education (62.67%). The canalicular location was the most common site of undescended testis (60.0%), followed by the superficial inguinal ring (23.33%). Poverty (32.67%), shame (22.0%), and lack of awareness (20.0%) were the leading causes of delayed presentation. The transinguinal approach was used in 81.33% of patients. Postoperative complications occurred in 20.0% of cases, with scrotal hematoma (73.33%) being the most common complication among affected patients. Associated congenital anomalies were observed in 12.0% of participants, with umbilical hernia (61.11%) being the most frequent anomaly.

Conclusion: Delayed presentation of undescended testes remains common among adolescents and young adults, primarily because of socioeconomic and awareness-related factors. The canalicular testis was the most frequent anatomical location, and the transinguinal approach was the predominant surgical procedure with satisfactory outcomes. Early diagnosis, timely referral, and prompt surgical management are essential to preserve fertility potential, reduce postoperative morbidity, and minimize the long-term risk of testicular malignancy.

Keywords: Cryptorchidism; Undescended testis; Orchidopexy; Orchiectomy; Adolescents; Young adults; Testicular malignancy; Fertility.

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Introduction

Undescended testis (cryptorchidism) is one of the most common congenital anomalies of the male genitourinary system, affecting approximately 1–4% of full-term male infants, with a higher incidence among preterm births [1,2]. While most cases are diagnosed and treated during infancy, a significant number of patients in developing countries present during adolescence or young adulthood due to delayed diagnosis, lack of awareness, socioeconomic barriers, or limited access to healthcare services [3,4]. Delayed management of undescended testes is associated

with an increased risk of infertility, impaired spermatogenesis, testicular malignancy, torsion, trauma, and psychological distress [5–10]. The management of undescended testes in adolescents and young adults remains challenging, as treatment decisions depend on factors such as patient age, testicular viability, laterality, fertility potential, endocrine function, and the suspicion of malignancy [3,5,9]. Surgical options include orchidopexy for viable testes and orchiectomy for atrophic or suspicious testes, with individualized management based on clinical findings and current

guideline recommendations [2–4]. Evaluating the clinical presentation, operative management, and outcomes in this age group is important for optimizing treatment strategies and improving long-term reproductive and oncological outcomes.

Material and Methods

This hospital-based observational study was conducted in the Department of General Surgery at a tertiary care teaching hospital over a period of 18 months after obtaining approval from the Institutional Ethics Committee. The study aimed to evaluate the clinical presentation, management, and surgical outcomes of undescended testes in adolescents and young adults.

A total of 150 male patients aged 15 years and above who were clinically diagnosed with unilateral or bilateral undescended testes and provided written informed consent were included in the study. Patients with retractile testes, ectopic testes, previously operated cases of cryptorchidism, recurrent undescended testes, severe systemic illness precluding surgery, or incomplete clinical records were excluded from the study.

A detailed history was obtained from each participant, including age at presentation, presenting complaints, duration of symptoms, history of infertility, previous medical consultation, family history, and possible reasons for delayed presentation. A comprehensive physical examination was performed to determine the laterality and anatomical location of the undescended testis, associated inguinal hernia, hypospadias, or other congenital anomalies.

Routine laboratory investigations, including complete blood count, renal function tests, blood sugar levels, coagulation profile, and viral markers, were performed as part of the preoperative assessment. Ultrasonography of the abdomen and inguinoscrotal region was carried out in all patients to identify the location and characteristics of the undescended testis. Additional imaging such as computed tomography (CT) or magnetic resonance imaging (MRI) was performed only in selected cases where the testis could not be localized by ultrasonography. Tumor markers, including alpha-fetoprotein (AFP), beta-human chorionic gonadotropin (β -hCG), and lactate dehydrogenase (LDH), were assessed whenever malignancy was clinically suspected.

Patients underwent surgical management based on clinical findings, testicular viability, intraoperative assessment, and current management recommendations. Viable testes were managed by orchidopexy using either a transinguinal or transscrotal approach, whereas atrophic, dysplastic, or suspicious testes underwent orchidectomy. The choice of surgical approach was decided by the

operating surgeon according to the anatomical location of the testis and intraoperative findings. Excised specimens were sent for histopathological examination wherever orchidectomy was performed.

All patients were followed postoperatively to assess wound healing, testicular position, postoperative pain, hematoma, infection, testicular atrophy, recurrence, and other complications. Clinical findings, operative details, and postoperative outcomes were documented using a predesigned structured data collection proforma.

The collected data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0. Continuous variables were expressed as mean $\pm$ standard deviation, while categorical variables were presented as frequencies and percentages. The Chi-square test or Fisher's exact test was used to compare categorical variables where appropriate. A p-value <0.05 was considered statistically significant.

Results

Table 1 shows the age distribution of the study participants. The majority of patients belonged to the 15–19 years age group (48.0%), followed by those aged 20–24 years (27.33%). Patients aged 25–29 years accounted for 16.67%, while only 8.0% were aged 30 years or above, indicating that most cases presented during late adolescence.

Table 2 presents the educational status of the participants. Most patients had attained secondary education (62.67%), followed by tertiary education (25.33%). Only 12.0% had primary education, suggesting that delayed presentation occurred despite a moderate level of educational attainment.

Table 3 illustrates the anatomical location of the undescended testes. The canalicular location was the most common finding, observed in 60.0% of patients, followed by the superficial inguinal ring (23.33%). Intra-abdominal testes accounted for 12.0%, while 4.67% had absent or vanishing testes.

Table 4 demonstrates the reasons for delayed presentation. Poverty was the leading cause (32.67%), followed by shame (22.0%) and lack of awareness (20.0%). Advice from healthcare professionals accounted for 17.33% of delayed presentations, whereas fear was reported by only 8.0% of the participants.

Table 5 shows the surgical approaches used for management. The transinguinal approach was the preferred surgical technique, performed in 81.33% of patients, while the transscrotal approach was used in 18.67% of cases. Table 6 summarizes the postoperative complications among the affected patients. Scrotal hematoma was the most frequently

observed complication, accounting for 73.33% of all postoperative complications, whereas reduced testicular size (testicular atrophy) was noted in 26.67% of patients with complications. Table 7 presents the associated congenital anomalies

identified during the study. Umbilical hernia was the most common associated anomaly, observed in 61.11% of affected patients, followed by hypospadias, which accounted for 38.89% of the anomalies detected.

Table 1: Age distribution of study participants (N = 150)

Age group (years)	Frequency (n)	Percentage (%)
15–19	72	48.00
20–24	41	27.33
25–29	25	16.67
≥30	12	8.00
Total	150	100

Table 2: Educational status of study participants (N = 150)

Level of education	Frequency (n)	Percentage (%)
Primary	18	12.00
Secondary	94	62.67
Tertiary	38	25.33
Total	150	100

Table 3: Location of undescended testes (N = 150)

Location of testes	Frequency (n)	Percentage (%)
Intra-abdominal	18	12.00
Canalicular	90	60.00
Superficial inguinal ring	35	23.33
Absent/Vanishing testis	7	4.67
Total	150	100

Table 4: Reasons for late presentation (N = 150)

Reason	Frequency (n)	Percentage (%)
Advice from healthcare professional	26	17.33
Ignorance/Lack of awareness	30	20.00
Poverty	49	32.67
Shame	33	22.00
Fear	12	8.00
Total	150	100

Table 5: Surgical approach used (N = 150)

Surgical approach	Frequency (n)	Percentage (%)
Transinguinal	122	81.33
Transscrotal	28	18.67
Total	150	100

Table 6: Postoperative complications (Patients with complications, n = 30)

Complication	Frequency (n)	Percentage (%)
Scrotal hematoma	22	73.33
Reduced testicular size (atrophy)	8	26.67
Total	30	100

Table 7: Associated congenital anomalies (Patients with anomalies, n = 18)

Associated anomaly	Frequency (n)	Percentage (%)
Hypospadias	7	38.89
Umbilical hernia	11	61.11
Total	18	100

Discussion

The present study evaluated the clinical presentation and management of undescended testes in adolescents and young adults, highlighting the persistent challenge of delayed diagnosis and treatment. Most patients in the present study presented during late adolescence, reflecting inadequate early detection and delayed referral. Similar observations have been reported in previous studies, where delayed presentation was attributed to poor awareness, limited healthcare accessibility, and socioeconomic barriers, particularly in developing countries [11,12].

The canalicular region was the most common anatomical location of the undescended testis in the present study. This finding is consistent with previous literature, which has shown that the inguinal canal remains the most frequent site of arrest during testicular descent due to incomplete migration during fetal development [14]. A smaller proportion of patients had intra-abdominal testes, which are known to carry a greater risk of impaired spermatogenesis and malignant transformation if left untreated [15].

Poverty, lack of awareness, and social stigma were identified as the leading causes of delayed presentation. These findings emphasize that delayed management is influenced not only by medical factors but also by socioeconomic and cultural issues. Similar barriers have been reported in previous studies, where financial constraints and embarrassment prevented patients from seeking timely medical attention [11]. Improving community awareness and strengthening primary healthcare referral systems may reduce the number of patients presenting late.

The transinguinal approach was the most frequently employed surgical technique in the present study because most testes were palpable within the inguinal canal. Orchidopexy remains the preferred treatment for viable testes, whereas orchidectomy is generally reserved for severely atrophic or suspicious testes in post-pubertal patients [15]. Appropriate surgical intervention remains essential to minimize complications while facilitating long-term surveillance for malignancy.

Scrotal hematoma was the most common postoperative complication observed in this study, whereas reduced testicular size occurred less frequently. Overall, the complication profile was acceptable and comparable to previous reports evaluating surgical management in older patients [13]. Careful surgical technique and adequate postoperative follow-up remain important for reducing morbidity and preserving testicular function whenever feasible. Although fertility assessment was not the primary objective of the

present study, delayed correction of cryptorchidism is known to adversely affect spermatogenesis. Previous studies have demonstrated that men treated late for undescended testes have lower sperm counts and reduced fertility potential compared with those undergoing early orchidopexy [11,12]. Furthermore, delayed treatment has been associated with an increased lifetime risk of testicular germ cell tumors, emphasizing the importance of early diagnosis and timely surgical management [15].

The present study is limited by its single-center design and relatively short follow-up period, which prevented long-term assessment of fertility outcomes, endocrine function, and testicular malignancy.

Nevertheless, the study provides valuable information regarding the clinical characteristics, reasons for delayed presentation, and surgical outcomes among adolescents and young adults with undescended testes in a tertiary care setting.

Conclusion

Undescended testes in adolescents and young adults continue to present as a significant clinical problem because of delayed diagnosis and treatment. The canalicular testis was the most common anatomical location, while poverty, lack of awareness, and social stigma were the principal reasons for late presentation.

The transinguinal approach was the most commonly performed surgical procedure and demonstrated satisfactory postoperative outcomes with relatively few complications. Early identification, prompt referral, and timely surgical intervention are essential to preserve testicular function, improve fertility potential, and reduce the risk of malignancy.

Public health education and increased awareness among healthcare providers and the general population are necessary to encourage early diagnosis and appropriate management of cryptorchidism.

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