

# Predictors of delayed consultation in undescended testis patients at a Rwandan referral hospital

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## Research Article

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# Abstract

## Purpose

To identify the causes of delayed consultation of patients with undescended testis (UDT) at a Rwandan referral hospital.

## Methods

This was a retrospective descriptive study of patients with delayed UDT from 2012 – 2016. Delayed UDT was defined as any patient presenting with UDT at >1 year of age. Relevant data was extracted from patients' files.

## Results

Over the study period, there were 44 cases of delayed presentation of UDT. Most patients (n=35, 80%) were born at a hospital and 9 (21%) were born at home. Most (n=29, 65%) parents had primary level of education, 6 (14%) secondary level, 1 (2%) university level, and 8 (18%) never went to school.

Overall, 16 (36%) patients reported that they delayed due to ignorance, 12 (27%) due to poor physical examination at birth, 7 (16%) due to poor guidance, 4 (9%) due to poverty and 5 (11%) due to long appointments. Patients born at home were more likely to identify ignorance as a reason for delayed presentation (p=0.007). Of the 16 patients who delayed due to ignorance, 12 parents had primary level of education and 3 had no education.

Most (n=34, 77%) patients were fertile during their adulthood, but 9 (21%) presented with infertility and 1 (2%) presented with testicular torsion.

## Conclusion

A number of reasons are responsible for delayed consultation in patients with UDT including ignorance, poor physical examination at birth by physicians, poor guidance, and poverty. Most causes are preventable. Henceforth, urgent need for population awareness on UDT and collaboration between physicians is paramount for early consult and timely management.

## Introduction

The testes are specialized paired organs that produce spermatozoa and androgenic hormones. By the 35th to 40th week of gestation they descend from intra-abdominal region into the scrotum where they function optimally at 33°C, 3–4°C less than core body temperature. Testes located in the inguinal canal or abdomen are exposed to higher temperatures with consequent progressive alteration in morphology and physiologic functions as well as an increased risk of complication.(1) Undescended testes (UDT) present at a rate between 3 to 5% in term male babies which reduces to 1% between 6 months and 1 year

of age due to spontaneous descent in first year of life. The prevalence increases to 33% in premature babies.(2)

The exact causes of failure to descend is not well understood, but there is possible risk factors including prematurity, low birth weight, small for gestational age, twins, and exposure to estrogen in last trimester. (3) Mullerian-inhibiting substances (MIS) are important in the descent of gonads through the internal inguinal ring. Gubernacular growth factor and exposure to prenatal estrogen disrupt testicular descent.(4) Exposure to endocrine-disrupting chemicals like pesticides or diethylstilbestrol have been shown to increase the incidence of UDT. Gubernaculum and intra-abdominal pressure moves testes between 23rd and 36th weeks of gestation, hence abdominal defects like gastroschisis, omphalocele, cloacal extrophy, and prune belly syndrome can also be associated with increased risks of developing UDT.(5, 6)

International guidelines recommend surgery (orchidopexy) between 6 and 18 months of age. The Swiss(7), Nordic(8) and European Association of Urology/European Society for Paediatric Urology(9) guidelines recommend an ideal deadline of 12 months, with 18 months being the very latest. These recommendations are based on evidence suggesting an increased risk of testicular malignancy and impaired fertility later in life.

Despite these recommendations, these guidelines are not achieved in many settings(10–12). A study done in Sudan Teaching Hospital found that in 61 patients who consulted with UDT, 44% presented after 24 months. In a study from Nigeria in patients with UDT, orchidopexy was done before 2 years in 11% of patients(13). Overall, 42% of cases of orchidopexy were performed before 5 years and 58% after 5 years of age. Another study of patients with UDT from Lagos University Teaching Hospital (LUTH) found that the median age at operation was 3 years (range: 1 to 11 years)(14). In Tanzania study found that 50% of patients presented for orchidopexy after 5 years of age (15). A study from the United States reported that mean age at consultation for UDT was 20.3 months and for surgery was 28.9 months.(16)

Causes of delayed presentation in UDT are very diverse. In Sudan, the causes included ignorance, poor follow up, and lack of health facilities(3). A study from India identified common causes for late consultation in patients with UDT: 9% were due to ignorance and 42% were due to shyness(17). Others delayed because they consulted first traditional healers or poor guidance.

There is no data in Rwanda concerning causes of delayed consultation in patients with UDT. Therefore, the aim of this study was to identify the causes of delayed consultation of patients with UDT presenting to a tertiary referral hospital in Rwanda.

## Methods

This was a retrospective descriptive study of patients with delayed presentation of UDT who consulted the Urology Unit of University Teaching Hospital of Kigali (CHUK) from January 2012 to January 2016. We defined delayed presentation of UDT as any patient with UDT presenting to CHUK Urology unit at greater than 1 year of age.

CHUK is a national tertiary referral hospital. It has a surgical department combining both clinical and academic activities. This hospital is located at the centre of Kigali, the capital city of Rwanda, and serves a catchment area of approximately 6 million people. The Urology unit is composed of 3 urologists who seen patients in clinic 5 days each week, seeing an average of 180 patients in clinic each week.

Patients' identification numbers were obtained, and then relevant data was extracted from patients' files which were retrieved from archives. We collected data on patient demographics, reason of consult, level of education (of the parents), and reason of delay to consult. We collected data on complications including infertility and testicular torsion. Infertility was defined as failure to impregnate his wife after 1 year of frequent and unprotected sex and azoospermia on semen analysis.

Reasons for delayed consult was extracted from the chart and organized thematically. Reasons for delayed consult were categorized based on examples from other studies as missed diagnosis, poor guidance, ignorance, poverty and long appointment. Missed diagnosis included cases where diagnosis was not made at birth. Poor guidance included cases where the diagnosis was made, but the patient was not referred or managed. Ignorance was defined as lack of information about the right time of orchidopexy by the mother. Poverty included any instance of financial challenges limiting treatment or referral. Long appointments were any instance where treatment or management was delayed due to long delays in appointment scheduling.

Data was entered into EPI-DATA and then exported to SPSS (version 16.0 statistical package for analysis). We reported frequencies and percentages. Chi square test was used to determine association between variables and reasons for delayed consultation.

This study was approved by the CHUK Ethics and research Committee.

## Results

During the study period, 87 patients consulted CHUK Urology Unit for UDT. Among the 87 patients with UDT, 22 (25%) consulted before one year of age, 21 (24%) had incomplete files, and 44 (50%) patients consulted after 1 year of age (delayed UDT). Nineteen (43.2%) patients presented with left UDT, 16 (36.4%) had bilateral UDT, and 9 (20.5%) had right UDT.

Of the 44 patients with delayed UDT, 16 (36.4%) were from Kigali city, 11 (25%) were from Eastern Province, 10 (22.7%) were from Northern Province, 4 (9.1%) were from Southern Province, and 3 (6.8%) were from Western Province (Table 1). Most (n = 29, 65.4%) parents had a primary education, 6 (13.6%) had a secondary education, 1 (2.3%) studied at university and 8 (18.2%) were illiterate.

Table 1  
Patient characteristics

		Frequency	Percent
Place of origin	Kigali	16	36.4
	Eastern province	11	25.0
	Northern province	10	22.7
	Western province	3	6.8
	Southern province	4	9.1
Place of birth	Hospital	35	79.5
	Home	9	20.5
Parents education level	Primary	29	65.9
	Secondary	6	13.6
	University	1	2.3
	None	8	18.2
Diagnosis	Left undescended testis	19	43.2
	Bilateral undescended testis	16	36.4
	Right undescended testis	9	20.5
When patients/parents were aware of diagnosis	At birth (< 1 year)	20	45.5
	1 to 2 years	9	20.5
	2 to 5 years	7	15.9
	6 to 10 years	6	13.6
	11 to 15 years	1	2.3
	Above 15 years	1	2.3
Consulted other health facility	Yes	9	20.5
	No	35	79.5
Age at urology consultation	1 to 2 years	8	18.2
	2 to 5 years	9	20.5
	6 to 10 years	11	25.0
	11 to 15 years	5	11.4

		Frequency	Percent
	16 to 20 years	2	4.5
	21 to 25 years	4	9.1
	26 years or more	5	11.4
Reason for delay	Ignorance	16	36.4
	Missed diagnosis	12	27.3
	Poor guidance	7	15.9
	Long appointments	5	11.4
	Poverty	4	9.1
Complications	None	34	77.3
	Infertility	9	20.5
	Testicular torsion	1	2.3

Most (n = 35, 79.5%) patients were born at the hospital and 9 (20.5%) patients were born at home. Many parents (n = 20, 45.5%) recognized the condition at birth. Others, (n = 9, 20.5%) before the age of 2 years, 7 (15.9%) between 2 and 5 years, 6 (13.6%) between 6 and 10 years, 1 (2.3%) between 11 and 15 years, and 1 (2.3%) at 26 years. Eleven (25%) patients consulted between 6 and 10 years, 9 (20.5%) between 2 and 5 years, 8 (1. 2%) before 2 years, 5 (11.4%) between 11 and 15 years, 5 (11.4%) at 26 years or more, 4 (9.1%) between 21 and 25 years and 2 (4.5%) between 16 and 20 years.

Most (n = 34, 77.3%) patients presented without complication, 9 (20.5%) with infertility, and 1 (2.3%) with testicular torsion. Of the 9 cases with infertility, 4 came between 21 and 25 years, 5 came at 26 years or above. The patient with testicular torsion came after 25 years.

Overall, 16 (36.4%) patients were delayed due to ignorance, 12 (27.3%) due to missed diagnosis at birth, 7 (15.9%) due to poor guidance 5 (11.4%) due to long appointments and 4 (9.1%) due to poverty (Table 2). There was an association between home birth and reasons for delay (p = 0.007) with patients born at home more likely to identify ignorance as a reason for delayed presentation. Of the 16 patients who delayed due to ignorance, 12 parents had primary level of education, 3 had not any level of education and only 1 had secondary level of education.

Table 2  
Characteristics of patients and reasons for delay

		Reason for Delay					
		N (%)					
		Ignorance N = 16	Missed diagnosis N = 12	Poor guidance N = 7	Poverty N = 5	Long appointment N = 4	Pvalue
Place of origin	Kigali	4 (25)	6 (50)	2 (29)	2 (50)	2 (40)	0.664
	Outside Kigali	12 (75)	6 (50)	5 (71)	2 (50)	3 (60)	
Home birth		8 (50)	0	1 (14)	0	0	0.007
Parents education level	None	3 (19)	1 (8)	1 (14)	3 (60)	0	
	Primary	12 (75)	9 (75)	6 (86)	1	1 (25)	
	Secondary	1 (6)	2 (17)	0	0	3 (75)	
	University	0	0	0	0	1	
Complications		8 (50)	2 (17)	0	0	0	0.019

For 7 patients who reported poor guidance, 6 parents had primary level of education and 1 had no education. For 5 patients with long appointment time, 1 had primary level of education, 3 had secondary level of education and 1 had university level of education. Of the 4 patients who reported poverty, 3 had not any level of education and only 1 had primary level. For the 12 patients who delayed due to missed diagnosis at birth, 9 of them had primary level, 2 secondary level and 1 had not any level of literacy.

There was an association between reason for delayed consultation and complications ( $p = 0.019$ ). Patients with a complication commonly noted ignorance and missed diagnosis as reasons for delayed presentation.

## Discussion

Almost half of all UDT presenting to CHUK were in patients with delayed presentation and almost half of all patients with delayed UDT were recognized at birth. Despite this, these patients delayed for consultation by a urologist. This suggests a failure in the healthcare system to adequately identify, educate, and refer these patients appropriately.

Overall, ignorance was cited as a common reason for delayed consult, occurring in 36% of patients. Some of these patients reported that they delayed to consult because they thought that the condition would resolve itself or could not adversely affect them. This is similar to other studies. One study done in Sudan

Teaching Hospital showed that in 61 patients with UDT, 44% presented after 24 months(3). They reported the reasons of delay as ignorance of the initial consulting doctor and midwives. A study from India showed that for the late consultation in patients with UDT, 9% were due to ignorance and 42% due to shyness(17). Ignorance should be addressed through education measures. As many of these patients delivered at home, they may have limited interaction with the health care system. Community healthcare workers need to be educated on recognition of UDT and may need to be more proactive in these populations to help minimize the risks of delayed identification and referral for UDT.

The strength of the healthcare system can have a significant impact on the management and outcomes of patients with UDT. Several patients in this study had a delayed presentation due to a missed diagnosis or poor guidance from healthcare workers. Missed diagnosis, poor guidance, and long appointment time suggest a need for further healthcare system improvements. A study from India showed that for the late consultation in patients with UDT, some patients delayed because they consulted first traditional healers or poor guidance(17). Education of healthcare workers to identify and manage if they have the skill or refer to another facility if they cannot safely handle patients with UDT within the first year of life is necessary. This can be through training of doctors, healthcare workers, midwives, and local community healthcare workers. Healthcare workers should understand and communicate the importance of referring patients early to minimize risk of complications later in life. Currently, there are only 10 urologists in Rwanda for a population of 13 million. However, there are currently efforts underway to scale up the urologic capacity within the country, helping to ease the burden of urological disease(18).

Financial reasons are often cited as impacting delays(19)(20)(21)(22). Innovative ways to mitigate and minimize costs and improve patient access are vital. Most Rwandans use a community-based health insurance program. However, without this insurance, patients or caretakers may delay to present to the healthcare facility. Another commonly cited financial reason for delay are the costs associated with transportation(23). Some programs have incorporated travel vouchers to decrease costs to patients. Other alternatives are to increase the access and reach of surgical care. This can include placing surgeons at the district hospitals. Another option is to develop surgical outreach camps within the country whereby surgeons working in the major cities will spend a week operating at a more rural hospital. Currently, these surgical camps deal with surgeries of already diagnosed patients, but do not involve awareness of population about disease conditions. Thus the public health aspect should be emphasized geared towards having a population that seeks treatment at the right time.

Complications were present in 23% of patients with UDT. These complications were identified primarily in patients who presented at an older age which is to be expected based on the types of complications associated with UDT. Early identification and management of UDT has been shown to reduce complications such as torsion and infertility(24, 25). The incidence of azoospermia in unilateral cryptorchidism is 13% and this figure increases to 89% in untreated bilateral cryptorchidism, making cryptorchidism the most common etiologic factor of azoospermia in the adult(26). Over the past decade, the rapid development of novel management approaches for male factor infertility has enabled many of these men, previously believed to be infertile, the ability to become fathers(27). Micromanipulation

techniques, such as intracytoplasmic sperm injection applied to sperm and ova in vitro, allow sperm with limited intrinsic fertilizing capacity to produce viable embryos(27).

This study has several limitations, though provides important data on the topic of delayed presentation for UDT. As a single center retrospective study, there are limitations in collection of data, number of subjects, and generalizability of data. However, this study was performed at the largest tertiary referral hospital in Rwanda, serving a catchment area of approximately half of the Rwandan population. As there are few urologists in Rwanda, with most residing in the capital of Kigali, this represents the majority of patients who are managed by trained specialists within the country. Therefore, this study does provide a perspective of the specialist care that patients are receiving.

## **Conclusion**

Good physical examination at birth is the key in early diagnosis of UDT and if the patients are educated about their condition and well guided to the next health facilities, early consult and hence timely management can be achieved. Urgent need for population awareness on UDT and collaboration between physicians and urologists for newborn examination is key to timely consultation and treatment of UDT.

## **Declarations**

### **a. Ethical approval and consent to participate**

This study was approved by the CHUK Ethics and research Committee.

All methods were carried out in accordance with relevant guidelines and regulations.

As this was a retrospective review of information in patient files, informed consent was waived by the CHUK ethics committee.

### **b. Consent for publication**

All authors have consented for publication of this article

### **c. Availability of data and materials**

The datasets analyzed during the current study are available in the “related files” under the name “UDT RAW DATA”.

### **Competing interest**

The authors have no competing interest to disclose

### **d. Funding**

No funds, grants, or other support was received for this study.

The authors have no relevant financial or non-financial disclosures to report.

#### **e. Authors Contributions**

A Bonane: project development, data management, data analysis, manuscript writing/editing

A Nshimiyimana: project development, data management, data analysis, manuscript writing/editing

I Nzeyimana: project development, manuscript editing

A Nyirimodoka: project development, manuscript editing

E Muhawenimana: project development, manuscript editing

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