



Analysis of Factor Influencing Delayed Referral of Undescended Testis

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Abstract

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BACKGROUND: The rate of delay in the referral of patients with undescended testis (UDT) to health facilities in Indonesia is still relatively high due to delays in the handling of urological surgery. Hence, it requires rapid and appropriate identification and early detection of patients with UDT in the community.

AIM: The study aims to analyze the factors of delay in referral in cases of UDT management.

METHODS: This study used a cohort design with a retrospective review approach to analyze various factors that cause delays in referring patients with UDT. Collecting identification was done by tracing UDT case-patient documents from January 2016 to November 2021. Data analysis used the Mann-Whitney and Chi-square comparison test, with significance achieved if the $p < 0.05$.

RESULTS: Delay by doctors/paramedics who were not followed up, ignorance of the risk of delaying surgery, and undiagnosed UDT by parents/health-care providers showed a significant difference where the percentage of patients who were delayed was greater on these factors. In addition, the reference source is also known to have a significant difference with a significant value ($p < 0.005$).

CONCLUSIONS: Factors that played a significant role in the delay in operative procedures for treating UDT were delays in referral from doctors ($p < 0.025$) (primary care physicians and pediatricians) and undiagnosed UDT conditions in patients ($p < 0.005$).

Introduction

Jember, a city in East Java, Indonesia, has become a referral choice for at least four other re agencies in East Java province. Demographic characteristics of residents around Jember are working as farmers and having low education [20]. They need to long distances travel to get urology services. Moreover, there was a lack of the incidence and prevalence of undescended testes (UDT) in Indonesia. During this study process, we could not find any available data on the epidemiology of UDT in East Java, the region around Jember, or Jember regency itself. Conducting a study in Jember could provide a better chance to collect data than other hospitals in East Java, Indonesia.

UDT or cryptorchidism is a testicular disorder in children due to the cessation of the descent of one or both testes in its path between the abdominal cavity and the scrotum [1]. UDT is a genital disorder that often occurs in boys. The incidence rate is 4–5% in male infants at term and increases in male neonates born prematurely and with low birth weight. With increasing age, the testis spontaneously descends in about 70% at 3 months of age and at 6 months, it becomes 8% [1].

Delayed UDT treatment will increase the risk of infertility and malignancy [5], [6], [7]. There are many clear guidelines and consensus recommendations for the appropriate timing and therapy for UDT. However, it is an evident that doctors in almost all countries still find it difficult to comply with the protocol [8], [9].

The rate of delay in referring patients with UDT to health facilities for correction is still relatively high [2]. This incident is not only in developing countries such as Indonesia, developed countries such as Canada, Germany, and New Zealand also face the same problem [2], [3], [4].

Materials and Methods

The study design was a cohort with a retrospective approach from a single-center tertiary hospital in Jember, Indonesia. The research was conducted after ethical approval by the hospital ethics committee. The data collection process was carried out by tracing and identifying medical record data from January 2016 to November 2018 of patients with

UDT cases. The sampling technique used was total sampling, where the entire population of UDT cases who went to the hospital was used as a sample in the study with a total of 37 patients. Identification variables of UDT patient data included patient demographic variables, birth history, results of physical examination, age at referral, the origin of referral, and insurance used (Figure 1). Exclusion criteria were patients who had their first surgery outside this hospital. At the time of referral, the patient's age was when he first came to see the urological surgeon. Age at referral was divided into two categories: delayed (> 18 months) and non-delayed (< 18 months). A physical examination performed by a urologist was also noted, which assessed palpable or non-palpable testes. The genitourinary malformations included in the study were anomalies, either requiring surgery or not requiring surgery.

The data analysis was performed in the SPSS 21.0 statistical software (IBM, Chicago, IL, USA) application. Comparative test analysis used Mann-Whitney and Chi-square tests for normally distributed data. Results are said to be significant if the $p < 0.05$. Furthermore, to find out the factors that cause delay, this study also conducted a regression test to observe which factors have the most prominent role in the occurrence of delayed referrals.

Results

During the study period from 2016 to 2021, 37 patients came to our hospital with UDT, the average age was 3.8 years. From the graph below, it can be seen that the highest number of patients with the age at referral was 1.25 years (1 year, 3 months) (8.1%), 2 years (10.8%), and 3 years (8.1%) (Table 1). Said to

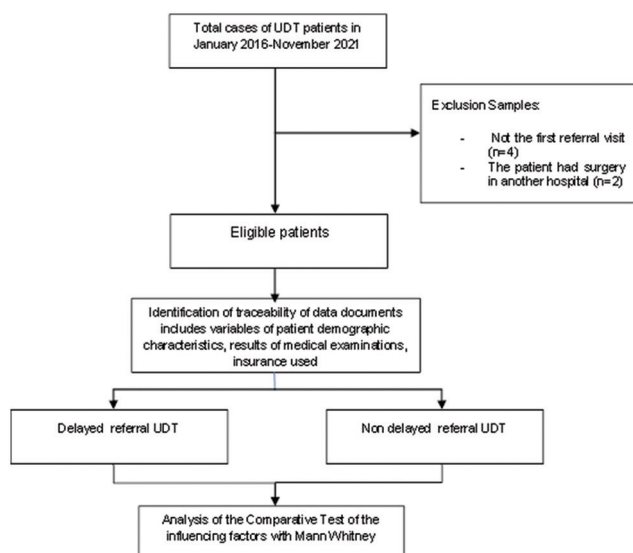


Figure 1: UDT patient document identification flow. UDT: Undescended testis

be delayed is when the age when referred is more than 18 months. It was found that 16 patients were referred over the age of 18 months or 43%.

Table 1: Demographic characteristics of patients with undescended testis

Demographic characteristics	Frequency (%)
Age at referral (years), mean \pm SD	3.8 \pm 3.87
Age at orchidopexy (year), mean \pm SD	3.55 \pm 3.81
Operation waiting time (mean \pm SD)	1.5 \pm 1.09
Unilateral/bilateral testis	
Unilateral	33 (89.20)
Bilateral	4 (10.80)
Right/left UDT	
Left	19 (51.40)
Right	15 (40.50)
Bilateral	3 (8.10)
Pre-operative examination	
Non-palpable	7 (18.90)
Palpable	30 (81.10)
Congenital versus acquired	
Acquired	7 (18.90)
Congenital	30 (81.10)
Intraoperative testis site	
Inguinal	31 (83.80)
Intraabdominal	5 (13.50)
Pre-pubic	1 (2.70)
Accompanied by genitourinary malformation	
Hypospadias	1 (2.70)
Hydrocele	2 (5.40)
Management UDT	
Orchidopexy	35 (94.60)
Orchidectomy	2 (5.40)
Referral source	
Health-care provider	25 (67.60)
Come alone	12 (32.40)

Source: Primary data (2021). UDT: Undescended testis. SD: Standard deviation.

The average waiting time for surgery was 1.85 ± 1.09 months from when the patient was referred for the first time. The majority were unilateral UDT (89%), with the most common side being the left side (51%). On pre-operative examination, the testis was still palpable (81%). Three patients came with genitourinary malformations, namely, hydrocele and 8.1% hypospadias. The most common location of the testis is in the inguinal area, which constitutes 84% of the samples. It is known that, from 37 UDT patients, two patients underwent orchidectomy.

Based on the test results in table, it can be seen that the comparison of UDT types, congenital versus

Table 2: Comparative test results delayed and non-delayed

UDT Category	Frequency (%)		p
	Non-delayed	Delayed	
UDT type			
Unilateral	17 (81.00)	16 (100.00)	0.338
Bilateral	4 (19.00)	0	
Congenital versus acquired			
Acquired	1 (4.80)	6 (21.50)	0.095
Congenital	20 (95.20)	10 (62.50)	
Accompanied by genitourinary malformation			
(-)	18 (85.70)	16 (100.00)	0.475
(+)	3 (14.30)	0	
Financial/insurance problems			
(-)	9 (42.18)	7 (43.75)	0.372
(+)	12 (57.14)	9 (56.25)	
Get advice to wait for a spontaneous descensus by a doctor or medical staff medic			
No	21 (100.00)	6 (21.50)	0.025
Yes	0	10 (62.50)	
Ignorance of the risk of delaying surgery by parents			
No	18 (95.20)	5 (31.25)	0.032
Yes	2 (4.80)	11 (68.75)	
Misdiagnosis by doctors/medical staff			
No	21 (100.00)	4 (25.00)	< 0.005
Yes	0	12 (75.00)	
Referral source			
Pediatrician	9 (42.90)	1 (6.30)	< 0.005
General practitioner at health facility 1	12 (57.10)	3 (18.80)	
Come alone	0	12 (75.00)	

Source: Primary data (2021). Description: Tested with Mann-Whitney. If the value of $p < 0.05$ with 95 confidence level significance level. UDT: Undescended testis.

acquired, the presence of genitourinary malformations and financial problems has a non-significant p-value (Table 2). Therefore, it can be concluded that there is no significant difference between these factors. Delay by doctors/paramedics left not followed-up, parents' lack of knowledge in the risk of delaying surgery, and undiagnosed UDT by the parents/healthcare providers showed a significant difference where the percentage of patients who were delayed was more significant on these factors.

Discussion

In 1929, the recommended correction age for treatment in patients with UDT was 2 years [10]. This UDT recommendation continues to change, one of which was in 1996 based on the findings of changes in the germinal epithelium. Hence, the correction recommendation was changed to 1 year [11]. At present, based on clinical evidence, the recommended age for orchidopexy is between 6 months and 12 months, according to the European Urology Association [8], [9]. The biggest reason for recommending an earlier age for UDT is increased awareness about the risk of infertility and malignancy in later life [7], [12], [13]. Infertility itself has an immense social and psychological impact on a man. Many studies have shown that earlier orchidopexy is associated with a reduced risk of infertility and malignancy [12].

This study confirms that the average patient who comes is 3.8 years old, classified as a late referral. Doctors have an important role in providing early detection services for UDT cases. It can be seen from the results of the comparison test on referral sources. Significant differences show that primary care doctors refer many non-delayed patients. However, this is still not optimal when looking at other factors indicating limitations in conducting a screening system for UDT diagnosis in the community, providing information about UDT in the community, and following up on parents of UDT patients.

This study found that the factors that played a significant role in the delay in the operative procedure for treating UDT were delays in referral from a prior doctor (primary care physicians and pediatricians) and undiagnosed UDT conditions in patients with $p < 0.005$. These factors depend on the doctor or health worker receiving the patient before the patient meets the urological surgeon. For example, the advice from the doctor is to wait first until a spontaneous density occurs ($p < 0.025$), which makes the awareness of the patient's parents decrease and then causes a loss to follow-up. Misdiagnosis by doctors and health workers is an influential factor causing delays in UDT case referrals to urologists. It supports the risk of delay in referral as in the

study by Seddon *et al.*, which said that misdiagnosed/undiagnosed UDT at birth and advice by medical personnel ($p < 0.005$) to wait for spontaneous descensus which was subsequently not followed up were the most significant factors causing a delay in referral [14].

Some parents lack awareness regarding the risks of delayed surgical interventions, which played a significant role in the incidence of delays in referral to the hospital with $p = 0.032$. The lack of knowledge around the disease and wrong assumptions in the patient's parents about surgery performed at an early age are also risk factors in causing delays in patient referral with UDT. The two factors that rely on doctors/health workers and those that rely on parents are interrelated.

It has previously been reported that the presence of genitourinary malformations is a factor that causes the parents of patients to be aware of the presence of UDT in their children. In this study, genitourinary malformations were not significantly influenced by referrals. The results we found may be due to the limited number of samples, that is, only three out of 37 patients had abnormalities of genitourinary formation. Our findings contrast to the study by Bayne *et al.*, which reported that the presence of malformations led to an earlier age of referral due to greater awareness of the disorder by the patient's family. Obvious malformations to carry out a more comprehensive examination [18]. However, in contrast to our study, the number of data samples in Bayne *et al.* was larger.

All of these findings show that a dearth of examination and diagnosis at the primary health-care facilities of birth has a significant role in the late's presentation for care. Thus, it is necessary to perform awareness campaigns and reorient doctors on the importance of thorough examinations of neonates to optimize the possibility of initial detection and referral. An effective way to raise awareness is to use doctors' Continuing Medical Education activities to promote a program emphasizing thorough examination, increasing the health education ability, and early referral of patients with UDT [17]. Moreover, This study was conducted in Jember, a city surrounded by a wide rural area. The majority of the population is rural and has less health education [20]. In several situations in a rural area in Indonesia, ignorance and lack of health education have been implicated in influencing health-seeking behavior. This condition has a significant impact on delayed referral UDT patients. Culture-based awareness-raising efforts among parents may be quite effective in raising community awareness about UDT.

The results of this study can be useful for anticipating and preventing early UDT occurrence in children in the community through the provision of health education programs for the community. Early identification of UDT symptoms is very helpful in the prevention and management of UDT. This research also contributes to assisting hospitals and local governments in improving public health and competency programs

for medical personnel and medical staff at health service centers in rural areas in improving the flow of misdiagnosis and early detection of UDT before being referred to a urologist at the hospital.

The limitation of this study is that the number of UDT cases is not large enough that the population coverage needs to be expanded to several cases in areas that have similar sociodemographics and the same health service referral system so that they are more representative of the results of research on UDT cases.

Conclusions

Factors that played a significant role in the delay in operative procedures for treating UDT were delays in referral from doctors (primary care physicians and pediatricians) and undiagnosed UDT conditions in patients. Perform education training for primary health-care practitioners, raise the public awareness of UDT, conduct routine UDT screening are necessary.

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