Original Article

Short Term Outcome of Orchiopexy for Undescended Testis in Children

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Abstract

This prospective study was conducted in the department of pediatric surgery, BIRDEM General Hospital and other Private Hospital in Dhakato evaluate the morphological parameters after orchiopexy in Undescended testis (UDT). Fifty five children of cryptorchidism in the age group of 6 months to12 years were included in the study from September 2012 to March 2017. Patients' clinical characteristics, age at the time of orchiopexy, pre-operative ultrasonogram finding and intraoperative findings were recorded. On follow up postoperative complications and scrotal ultrasonogram findings were also recorded. Total 45 patients received regular ultrasound follow-up in next 6 months. Testicular length, width, position of the testes and any abnormal findings were documented. The testicular volume was then calculated with Hansen formula:Testicular volume= length (L) x width $(W)^2$ x 0.52. The mean age at operation was 4.15 years. Sixty eightpercent of undescended testes were palpable, 97% of which could be initially placed in the scrotal position by surgery. Ninety threepercent remained in the scrotum at 6-month follow up. In 32% of cases, the testes were impalpable, 47% were intra-abdominal and 15.7% were absent. Eighty seven percent of all impalpable testes could be placed in the scrotum. At 6 months follow up, only 69% were in the scrotal position. Eighteen percent of impalpable testes and 2.4% of palpable testes underwent atrophy. The volume of scrotalized testis increased significantly after orchiopexy though the volume of undescended testis was smaller than that of normal descended testis in all age subgroups and revealed a slow growing trend.

Keywords: Cryptorchidism, Orchiopexy, Testicular position, Testicular volume.

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Introduction

Undescended testes (UDT) is one of the most common congenital urological diseases. The prevalence of cryptorchidism at birth varies from 1% to 9%. The majority of UDTs descend spontaneously, typically during the first 6 months of life[1,2]. Beyond the age of 1, the percentage of boys with congenital UDT remains relatively stable at 0.8% to 1.1%[1]. UDT has been linked to abnormal testicular development, semen motility, and morphology[3-5] and may lead to long-term infertility issues[6]. In addition, there is a three- to eightfold increased relative risk of testicular cancer in boys with UDT[7]. The mainstay of management for undescended testes is operative treatment. The first successful orchiopexy was described by Annandale in The British Medical Journal in 1879 and performed in a 3-year-old boy with an ectopic testis[8]. Today, operation is often performed within the first years of life. Though more evidence is needed, the argument for this strategy is preservation of testicular germ cell maturation[9]. Probably induced by the so called 'minipuberty', the neonatal gonocyte transforms into a type A spermatogonium at 3-12 months of age, a step that is now postulated to be crucial for subsequent fertility, as the stem cells for spermatogenesis are created in this structure[9,10]. This step may be blocked in undescended testis and, hence, to avoid this and hypothetically facilitate normal maturation orchiopexy is currently performed at 6-12 months of age[9,10]. At time of birth cryptorchid patients harbour germ cells in the testes, but from about 15 months of age germ cells may lack.

Anyway, the trend towards earlier surgery for minimizing the histopathological changes and preventing infertility is described in the literature[10]. The volume of the testes is significantly related to the semen profile and the testicular function, since 80-90% of the testes were composed of seminiferous tubules and germ cells. Bahket al reported that the testicular size reflects the degree of spermatogenesis, testosterone level, and semen profile[11]. Therefore, accurate measurement of the testicular size is crucial for evaluating the development of testes. Several kinds of tools were applied to evaluate the size of testes, such as orchidometer, use of rulers and calipers, and ultrasound. Ultrasound is more preferable and accurate means of measuring testicular volume[12]. We recorded the testicular position and volume after orchiopexy to determine the postoperative outcome of UDT.

Materials and Methods

Fifty five children of cryptorchidism in the age group of 6 month to12 years were included in the study from September 2012 to March 2017. All the children were admitted in the hospital. Informed consent was obtained from all parents. Patients' clinical characteristics, concomitant diseases, age at the time of orchiopexy, pre-operative ultrasonogram finding and intraoperative findings were recorded. On subsequent follow up postoperative complications and postoperative scrotal ultrasonogram findings were also recorded. Patients without pre- and postoperative scrotal ultrasound were not included in the testicular volume analysis. A total of 55 boys received preoperative testicular ultrasound and 45 of them received regular ultrasound follow-up in next 6 months. High-resolution ultrasound was applied. Testicular length, width, position of the testes, and any abnormal findings were well documented. The testicular volume was then calculated with Hansen formula:[13]

Testicular volume= length (L) x width $(W)^2$ x 0.52.

The pre and postoperative measured volume of the testes was calculated and analyzed with SPSS statistic software, version 22.0

Results

A total of 55 patients underwent surgery. Out of these, 50 patients were unilateral UDT and 5 patients were bilateral, so total number of UDT 60. Of these 60 testes 41 (68%) were palpable and 19 (32%) were not palpable before surgery. There were 34 (57%) undescended testes on the right side and 26(43%) on the left side. The median age at surgery was 4 years (range 0.6 --12years) and the mean age was 4.15 years. The highest number of orchiopexies were performed on children between age of 2-3 years (25%) and 22.9% at less than 2 years of age. The operative findings with respect to palpable testes correlated with the findings of clinical examination. The location of impalpable testes at surgery were canalicular 7(36.8%), intra-abdominal 9 (47.3%), and absent 3 (15.7%). The standard inguino-scrotalorchiopexies were performed in 56 undescended testis. Laparoscopy done in 4 children, of them one laparoscopic orchiopexy was performed and remaining 3 boys (impalpable group) the testes was absent. A total of 10 patients (18%) had other medical conditions or anomalies in addition to their cryptorchidism, where the most common was phimosis (4) followed by Hernia (3), hypospadias (2), Downs syndrome (1).

At the end of surgery, 90% (37) of the palpable and 56.2% (9) of the impalpable testes could be placed at the bottom of the scrotum. 31.2 %(5) of the impalpable and 7.3% (3) of the palpable testes mid-scrotal in position whereas 12.5 %(2) of the impalpable and 2.4% (1) of the palpable testes were in the suprascrotal position.

Total 10 patients including 3 patients with absent testes were not followed up postoperatively. 45 patients were under regular follow up in next 6 months. No perioperative complications occurred. Postoperative complications occurred in two patients. One of them came four days after the surgery due to a wound infection.The infection was successfully treated and no further complications followed. Another patient experienced moderate pain in his operation site two weeks after surgery which improved after conservative treatment. Of the children followed up at 6-months, 92.6% (38) of palpable testes and 69% (11) of impalpable testes were in the scrotal position. At 6 months follow up, 8.8% of all undescended testes, 18% (3) of impalpable testes and 2.4% (1) of palpable testes were atrophic. No recurrence was noted.

Of the 45 children followed up, in case of right undescended testes there was a highly significant increase in the mean testicular volume at 6-months follow up as compared to preoperative volume ($p<0.01$) (Table I). Left undescended testes there was alsohighly significant increase in the mean testicular volume at 6-months follow up ($p<0.01$) (Table I).The mean testicular volume showed significant increase($p<0.01$) in all the age groups.

Table-I: Comparison of mean preoperative testicular volume with postoperative testicular volume at 6-month follow up (n = 45).

	Preoperative Volume (ml)	Postoperative 6-mo Volume (ml)	p-value
Right UDT	0.304±0.114	0.381±0.126	P<0.01
Left UDT	0.317±115	0.419±0.121	P<0.01

Discussion

Orchiopexy is one of the most common operations performed in children with UDT. The mean age at operation in our series was 4.15 years, most being below 3 years of age. In our study, 68% of all operated undescended testes were palpable in the groin. Testes may be impalpable when they are intracanalicular, intraabdominalor absent[14,15]. In our patients, 32% of undescended testes were impalpable. Intraoperatively, we found that more than 47.3%, of our impalpable testes were intraabdominal and around 36.8% intracanalicular. Sixteen percent of all impalpable testes were absent.

Traditionally, the success of operative treatment of cryptorchidism is defined as the percentage of testes that remains in the scrotum and does not atrophy. In adulthood estimation of the fertility potential is an additional parameter, especially when comparing the results of early and late surgery[16,17]. The success rate of the operative treatment is related to the type of undescended testis (palpable and non-palpable), the choice of operative procedure and the age at time of surgery. It is generally accepted that the success rate in respect to atrophy and recurrent cryptorchidism in childhood cannot be estimated until 1-year postoperative follow-up. The success rate of the operative treatment at follow-up in childhood relies on clinical evaluation in most investigations.

In our study 92.6% of all palpable testes and 69% of impalpable testes were in the scrotal position. This corroborates closely with other studies[18,19]. Success rates by anatomical testicular position were 74% for abdominal, 82% for peeping and 87% for canalicular testes, and 92% for those located beyond the external ring[20]. Success rates by procedure were 89% for inguinal, 67% for Fowler-Stephens, 77% for staged Fowler-Stephens, 81% for transabdominal, 73% for 2-stage and 84% for microvascular orchiopexy. The significant failure rate for proximaltestes suggested that efforts to improve orchiopexy should be continued. In the past decade, success of orchiopexy for inguinal testes has been>95%. For abdominal testes, success for orchiopexy has been >85-90% in most series with single stage orchiopexy or two stage Fowler-Stephens orchiopexy, both with open surgical or laparoscopic technique[20]. Follow up at 6 months or later revealed that 18% of the impalpable and 2.4% of the palpable testes had atrophied.The cause for the postoperative atrophy could be the difficulty in mobilizing the undescended testes. The analysis of the available literature reveals an atrophy rate of up to 8% for palpable and of up to 25% for non-palpable testes[20,21]. In our study only 2% of cases had wound infection which healed with antibiotics and dressing.

Normal testicular volume is reported to beless than 2 ml up to 11 years of age rising to 5ml by 12 years and 12-14 ml by 15 years[22]. We measured the testicular volume preoperatively as well as at follow up by ultrasonogram and analyzed the outcome of orchiopexy in terms of testicular volume. It was seen that the mean testicular volume of the undescended testes showed a highly significant increase ($p<0.01$) when reviewed at 6 months. Chi-Shin et al observeda significant ($p= 0.001$) increase of UDT volume after orchiopexy at a median operative age of 1.25 years and with a mean follow-up of 2.5 years[23]. The testicular size grew from 0.228 mL to 0.356 mL. Kim et al reported that orchiopexy performed at least 2 years from birth showed significant recovery of testicular volume at follow-up 2 years after surgery[24]. Kollin et al reported an increase in testicular volume when orchiopexy was performed at the age of 9 months rather than at the age of 3 years[25]. This result also supports the beneficial effect of early orchiopexy from the viewpoint of testicular growth. A comprehensive literature review by Murphy et al revealed the morphology and ultrastructural changes in UDT as early as 36 months of age[26]. Cortes et al reported thatbetween the ages of 2-12 years the timing of unilateral orchiopexy might vary without effect on subsequent fertility potential[22]. Laparosocpy may be useful to identify the location of intra-abdominal or high testes, to confirm an absent testis (3out of 55 or 5.4% of our cases) thereby avoiding anunnecessary inguinal incision.

In conclusion, orchiopexy is essential and safeprocedure for the children of undescended testis. All undescended testis are targeted to make scrotal by surgery. The volume of testis increases significantly compared with the preoperative testicular volume along with the growth and development of child. It is worth noting that the volume of undescended testisis smaller than that of normal descended testis in all age subgroups and revealed a slow growing trend.

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