Surgery of Undescended Testis by Scrotal Approach; Benefits and Limitations

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Abstract

Introduction: The term of undescended testis refers to the cessation of the natural descent of the testis into the scrotum. Due to the advantages of the scrotal orchiopexy method over inguinal orchiopexy in some studies, we decided to conduct a similar study on children in Hazrat Masoumeh Hospital in Qom in 2016-2019 and we evaluated the effect of scrotal surgery in the treatment of UDT.

Materials and Methods: In this study, children with palpable UDT between 2016-2019 who had been undergone scrotal or inguinal surgery in Hazrat Masoumeh Hospital in Qom, were selected and divided into two groups. One group underwent traditional inguinal surgery and the other group received scrotal surgery.

Results: The mean operation time for type of incision above the scrotum and in the inguinal region were 8.27 ± 2.51 and 3.14 ± 12.08 minutes, respectively. The highest location in scrotal surgery was 70 (52.67%) in the external ring area and 101 (60.47%) was inguinal canal in inguinal surgery. In the scrotal method in no case and in the inguinal method only one case of secondary UDT was observed. In the scrotal method in no case and in the inguinal method only one case of wound infection was observed.

Conclusion: Finally, our study showed that the scrotal method has more advantages than the inguinal method, the only limitation in this method is the location of the testis.

Keywords

- Cryptorchidism
- surgical method
- scrotal
- inguinal

Introduction

The term of undescended testis or cryptorchidism refers to the cessation of the natural descent of the testis into the scrotum. The testes may remain in the posterior of the perineum, the internal inguinal ring, the inguinal canal, or even in the external ring. At birth, approximately 95% of infants have testes which normally are located in the scrotum. The prevalence

of this disease in premature infants is approximately 30% and 1-3% in term infants.[1] According to the practical reasons for classifying patients and determining the type of treatment, UDT is divided as follows:

- Congenital and acquired
- Touchable and untouchable
- Unilateral or bilateral

About 80% of UDTs are palpable and 20% are untouchable. The palpable UDTs are located in the inguinal-scrotal descending pathway. The word of untouchable means that the testis is not found during the examination, in which case either the testis is intraabdominal or we face missing of testis (anorchia). Unilateral UDT is four times more common than bilateral type. According to the 2150 orchiopexy analysis that is reported in 7 studies in Denmark, the incidence rate of bilateral type was 23%, on the right side 46%, and on the left side 31%.[2] Today, it has been proven that the risk of malignant degeneration increases in immature testes. Besides, UDT is associated with decreasing fertility, increasing risk of torsion, and effects of empty scrotum on male development. Therefore, placement of the testes in the scrotum (orchiopexy) is indicated. Today, it is recommended that undescended testes be corrected by surgery until one years old. There are two basic treatments for UDT that have been accepted around the world for many years: hormonal and surgical interventions, which can be used alone or as complements to each other. The main goal of UDT treatment is to place the testis in the scrotum for the following reasons:

- Prevention of spermatogenesis defects
- Prevent or decrease TGCN risk at least
- To facilitate future testicular examinations (touch/ultrasound)
- To correct an inguinal hernia, which is sometimes associated with UDT
- To reduce the risk of testicular torsion, which increases in children with UDT due to more movement in the inguinal testis and patent vaginalis process.[2]

In patients with bilateral undescended testes, placental gonadotropin administration may be helpful. The combination of micropenis and bilateral UDT is an indication for hormonal evaluation and, if necessary, treatment with testosterone. If after one month of hormonal treatment no descending in the testis is observed, surgical repair should be performed. In unilateral UDT, surgical repair must also be performed. Surgery is usually performed by a combined incision of the inguinal and scrotal areas. The

vessels of the spermatic cord are completely displaced and the testis is placed in a dartos dead-end pouch inside the scrotum. There is often an inguinal hernia with undescended testis that needs to be repaired during orchiopexy. The treatment of people whose testis are untouchable is controversial. The most common treatment in this case is laparoscopy to determine the location of the testis. If the spermatic cord has passed through the internal ring or the testis is seen at the ring site and can be moved into the scrotum, an incision is made in the groin, and orchiopexy is performed. If the intraabdominal testis is detected in a location farther away to reach to the scrotum, the two-step Fowler Stephens action is used. In the first step, we ligate the testicular vessels by laparotomy or laparoscopy, which increases neovascularization in vas deferens.

A few months later, the second step is performed, in which the testis is moved inside the abdomen along the peritoneal strip with collateral blood flow near to vas deferens. This can also be done via laparoscopy.[1] Orchiopexy with a single scrotal incision (SSIO) was first described by Bianchi and Squire in 1989. They showed that if the UDT was palpable, it often had a normal vascular base but its vaginal process is shorter. Therefore, the hernia sac can be accessed with a cut higher than the normal single scrotal incision. The testis is detached from the sac, the sac is transfixed in the highest possible position, and the testis is fixed in the dartos dead end. It also allows us to identify the atrophic testis or its remnants and seems as the primary replacement method for untouchable UDT. Because only a single incision is done, it is less painful, has better cosmetic results, and has less operating time than traditional orchiopexy.[3] Various studies have been performed in which orchiopexy with single scrotal incision has been performed and this method has been compared with the inguinal approach. Parameters such as surgery time, incidence rate of open vaginalis process, and postoperative complications such as wound infection, testicular atrophy, testicular re-elevation, hernia, or hydrocele have been compared between the two methods. According to these studies, scrotal orchiopexy (SO) is safe and is a good alternative to surgery for inguinal orchiopexy (IO) in children with UDT and also reduces the time of operation. Also, the incidence of postoperative wound infection in the SO method was slightly

lower.[4] Due to the advantages of the SO method over IO in some studies, we decided to conduct a similar study on children in Hazrat Masoumeh Hospital in Qom in 2016-2019 and we evaluated the effect of scrotal surgery in the treatment of UDT.

Materials and Methods

The present study was performed as a retrospective cohort. Number of samples in each group according to the following formula and due to the amount of first type error □= 0.05 and the amount of test power 0.90 =β and standard deviation of operating time 10.42 and 2.96 in two groups and d = 3 based on the results of similar studies,[5] 152 people were calculated in each group, which due to the possibility of incomplete studying files, 167 people in each group and a total of 334 people were included in the study. After obtaining the code of ethics from the ethics committee of Qom University of Medical Sciences, the researcher, after coordination with the director of the center and confirmation of the protection, evaluated the files of patients who underwent UDT surgery and entered variables in the researcher-made checklist. Then, among the files of children with palpable UDT between 2016-2019 who underwent scrotal or inguinal surgery in Hazrat Masoumeh Hospital in Qom, the sample size was selected and they were divided into two groups. One group underwent traditional inguinal surgery and the other group underwent scrotal surgery. Patients' follow-up visits were done three times, 1 week, one month, and three months later, and all variables were recorded in the patients' follow-up file, entered in the checklist. It should be noted that the method of selecting patients to determine the type of surgical procedure was the surgeon's experience for this operation based on the patient's clinical condition, which was obtained by the doctor. Also, all surgeries were performed by a surgeon. Due to the lack of random assignment, confounding variables are investigated and will be considered in the analysis. Inclusion criteria were male children with palpable UDT, and exclusion criteria were abdominal UDT, fixed ectopic testis, patients who had previous surgery for UDT, impossibility of continuing scrotal surgery and conversion to inguinal, and non-referral of patients at designated times for follow-up. For data description, descriptive statistics such as mean, standard deviation, and frequency tables

were used, and for comparing, the chi-square test was used for qualitative data and an independent t-test was used for quantitative data. The results were analyzed using SPSS software version 20. The significance level will also be considered as 0.05.

Result

In this study, the mean operation time in the surgical method with an incision above the scrotum was 8.27 ± 2.51 and the meantime in incision in the inguinal region was 3.14 ± 12.08 minutes and there was a statistically significant relationship between the operation time and the type of surgery. The postoperative hernia was not observed in any of the surgical procedures. The highest location in scrotal surgery was 70 (52.67%) in the external ring area and 101 (60.47%) was inguinal canal in inguinal surgery and there was a significant difference between the two surgical methods in terms of incision location.

Table 1: relationship between incision location and type of surgical method

P value	Type of surgical method		
	Incisional surgery on inguinal area	**Incisional surgery on the top of the scrotum**	
0.000	40 (23.95 %)	70 (52.67%)	External
	101 (60.47 %)	58 (43.6 %)	Inguinal
	26 (15.56 %)	6 (4.51 %)	Internal Ring
0.000	134 (100%)	167 (100 %)	Total

In the scrotal method in no case and in the inguinal method only one case of secondary UDT was observed and no statistically significant relationship was found between the two surgical methods. In the scrotal method in no case and in the inguinal method only one case of wound infection was observed and no statistically significant relationship was found between the two surgical methods. Postoperative satisfaction in the inguinal method was less than the scrotal method and based on the statistical results between the two statistical methods, a significant difference was obtained between the satisfaction in the two surgical methods.

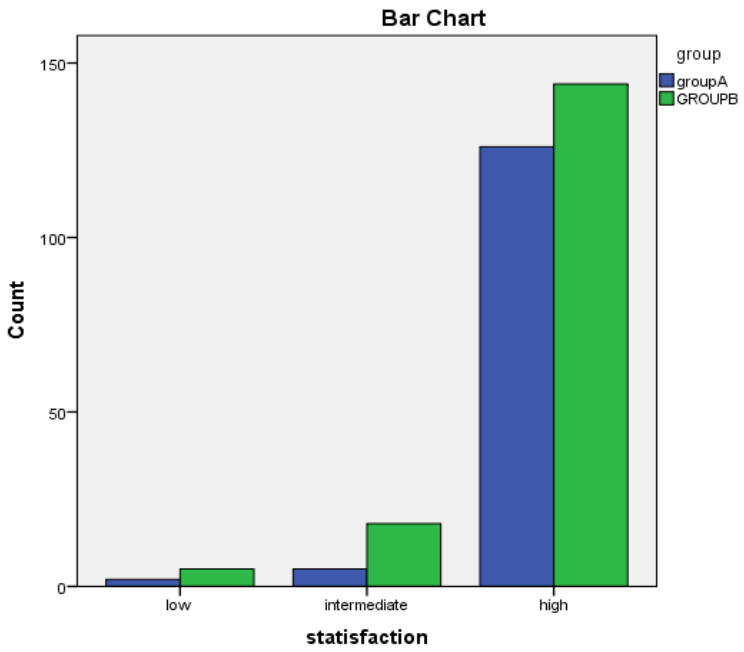

Figure 1: satisfaction rate after surgery in both surgical methods

Discussion

A typical UDT management technique requires making two cuts. Groin incision to identify, separate, and fix the testes and scrotal incision to remove the test is below the pouch. Some authors believe that this method is associated with more tissue disorders, more discomfort, and postoperative pain. Scrotal orchidopexy is associated with less pain, suitable for daily surgery with excellent scar appearance. This technique is also necessary for treatment. Traditional inguinal incision in orchiopexy surgery for UDT is acceptable by many pediatric surgeons. This method can provide a direct path to observe the structure of the cord and its components for sac hernia ligation. However, about 80% of UDTs are located in the distal of the inguinal canal. Also, due to the anatomical difference between children and adults regarding the inguinal canal, there is a shorter distance from the external ring to the internal inguinal ring in children.

Besides, the skin and subcutaneous tissue of children are more mobile and thinner than adults.[6-7] These points indicate that one incision in the scrotal region instead of two inguinal incisions may be available for children with UDT. Trans scrotal orchiopexy has shown excellent success and few complications in several studies.[8-10] This method is a safe and effective surgical procedure regardless of the location of the testis or caries of the vaginalis process.[11] Single trans scrotal orchiopexy has several advantages, including beauty and shorter operating time with fewer incisions. Also, bilateral unpalpable testes can be processed through the same incision, which may reduce the operating time even further.[6]

A meta-analysis showed that trans scrotal orchiopexy was associated with a shorter operating time than usual inguinal orchidopexy. However, no significant difference was observed between SO and IO in the incidence of patent processes vaginalis and postoperative complications such as wound infection, testicular atrophy, testicular bulge, and hernia or hydrocele. These results suggest that SO is an effective and safe surgery with similar postoperative outcomes compared to IO. There was a significant difference between SO and IO at the time of SO in practice.

Besides, the incidence of postoperative wound infection may be slightly lower in SO compared to IO slightly (1.1 vs. 2.5, respectively), although this difference was not significant. The conversion rate of trans scrotal incision to the inguinal method in

studies varies from 0 to 13%.[12] Based on our review, we find that trans scrotal orchiopexy is highly successful. Other studies suggest that sclerotomy orchiopexy is performed safely and efficiently in most pediatric UDTs. However, it is recommended to consider the conversion to traditional inguinal when the palpable testis is located above the inguinal canal or the length of the arteries is insufficient.

According to the results of our study and similar studies, it seems that the inguinal incision should be used less because the incision in this area in terms of beauty is more visible, while if the same incision is in the scrotum area, it is not much visible. In practice, the inguinal area also increases the duration of the operation due to the longitudinal incision, as based on the results of our study, the duration of the operation in the two types of methods was statistically significant. Of course, it is necessary to pay attention to several points. The first point is that in the scrotal method, the surgeon may not have access to the testis that is stuck in the internal canal, while in the inguinal method, this access to the testis location will be easier, therefore, this method will prevent access to the testis in the distal area. So, in the external ring, it is better to perform the scrotal method and in the internal ring, the inguinal method.

Conclusion

Finally, our study showed that the scrotal method has more advantages than the inguinal method, the only limitation in this method is the location of the testis, which if the testis is not palpable, we must use the inguinal method, and if the testis was palpable, use the scrotal method to have more benefits and satisfaction for the patient.

Ethical Consideration

This study received ethical code from the ethical committee of Qom university of medical sciences (IR.MUQ.RICH.REC.1399.079).

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Conflict of interests

There is no conflict of interest

References

1. Charles F: Schwartz's Principles of Surgery Absite and Board Review. McGraw-Hill Education; 2016.

2. Niedzielski JK, Oszukowska E, Słowikowska-Hilczer J: Undescended testis–current trends and guidelines: a review of the literature. Archives of medical science: AMS. 2016;12(3):667.

3. Jiang D, Acevedo A, Bayne A, et al: Factors associated with delay in undescended testis referral. Journal of Pediatric Urology. 2019;15(4):380. e1-. e6.

4. Nazem M, Hosseinpour M, Alghazali A: Trans-scrotal Incision Approach versus Traditional Trans-scrotal Incision Orchiopexy in Children with Cryptorchidism: A Randomized Trial Study. Advanced Biomedical Research. 2019;8.

5. Na SW, Kim S-O, Hwang EC, et al: Single scrotal incision orchiopexy for children with palpable low-lying undescended testis: early outcome of a prospective randomized controlled study. Korean journal of urology. 2011;52(9):637-41.
6. CARUSO AP, WALSH RA, WOLACH JW, et al: Single scrotal incision orchiopexy for the palpable undescended testicle. The Journal of urology. 2000;164(1):156-9.
7. Parsons JK, Ferrer F, Docimo SG: The low scrotal approach to the ectopic or ascended testicle: prevalence of a patent processus vaginalis. The Journal of urology. 2003;169(5):1832-3.
8. Dayanc M, Kibar Y, Irkilata HC, et al: Long-term outcome of scrotal incision orchiopexy for undescended testis. Urology. 2007;70(4):786-8.
9. Dayanç M, Kibar Y, Tahmaz L, Yet al: Scrotal incision orchiopexy for undescended testis. Urology. 2004;64(6):1216-8.
10. Russinko PJ, Siddiq FM, Tackett LD, et al: Prescrotal orchiopexy: an alternative surgical approach for the palpable undescended testis. The Journal of urology. 2003;170(6):2436-8.
11. Bassel YS, Scherz HC, Kirsch AJ: Scrotal incision orchiopexy for undescended testes with or without a patent processus vaginalis. The Journal of urology. 2007;177(4):1516-8.
12. Gordon M, Cervellione RM, Morabito A, et al: 20 years of transcrotal orchidopexy for undescended testis: results and outcomes. Journal of Pediatric Urology. 2010;6(5):506-12.