



A MODIFIED TWO-STAGE ORCHIOPEXY (TOTAL CANAL MOBILIZATION) FOR BETTER PRESERVATION OF VASCULATURES AND PREVENTION OF TESTICULAR ATROPHY IN HIGH LOCATED TESTES

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ABSTRACT

Aims: We want to introduce a modified technique of two stage orchiopexy which has good safety margin, regarding vascular damage and testicular atrophy.

Methods and Material: From March 2002 to July 2005, 195 testes underwent Orchiopexy in patients with mean age 2.5 years (range, 1-4).

Thirty six of 195 were impalpable, 16 of 36 had modified two stage orchiopexy. In first stage testis anchored to the pubic tubercle, then in the second stage redissected with wide inguinal canal mobilization. All were followed with P/E, sonographic measurement, testosterone level for 6-12 month.

Statistical analysis used: Data analysed with one sample test in SPSS13.

Results: Two of 16 developed atrophy, 14 of 16 had increase in volume, mean volumes (pre op, 1.6 month) (0.69 ± 0.22 , 0.84 ± 0.26 , 1.06 ± 0.33), respectively. All testes were in scrotum after 6-12 month and they had normal testosterone level for age. There were no abnormality of vas deferens in exploration or wound infection and hematoma post operatively.

Conclusions: Modified Two-Stage orchiopexy is acceptable method for all kind of undescended testis (UDT) with short cord. It obviates the need of dissecting the exact tissue which become scared together in first operation and protect vasculatures from damage and resulted testicular atrophy.

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INTRODUCTION

Highly located testes have always been a major problem for surgeons, regarding the way that it should bring down and how can prevent injuries during orchiopexy. Bevan et al originally described the principles of UDT surgery but many different techniques, e.g. (2stage-orchidopexy, Fowler-Stephens)

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(success rate 73% v 77%) respectively, have been described because of the high rate of testicular atrophy in high located testis orchiopexy. Fortunately, in recent studies, new techniques have made remarkable results in these orchiopexies (Cimo, 1995; Dbole, 2001; Ark, 1999 and A, 2003). Our aim in this study is to show how wide mobilization of cord and walls of inguinal canal in the second stage of orchiopexy can facilitate the operation and preserve the vasculatures of cord intact for prevention of testicular atrophy.

MATERIAL AND METHODS

Between March 2002 and July 2005, 195 orchiopexies were performed in this center. Thirty-six of 195 testes (18.4%) were impalpable. Sixteen of 36 testes (14 Patients) underwent this modified Two- Stage orchiopexy because of short cord. Parental consent was taken before operation and all patients examined under anesthesia for preoperative detection of testis. They underwent inguinal canal exploration via inguinal incision in longer line. In the first stage through exploration, testis which was found high in the canal (short cord) was made free and attached sac was dissected until the bifurcation of vas deferens and gonadal vessels, then ligated. Also testicular size measured by caliper and testicular volume was calculated by modified Lambert formula ($0.71 \text{ length} \times \text{width}$ and all data were written in their chart) and testis was fixed to the pubic tubercle or inguinal ligament with low tension on the cord by prolene 3/0. After 4-6 months, the second stage started with making the testis free. Two parallel incisions were made on the medial and lateral of the roof (inguinal canal). The lateral incision deepened through reflex ion of inguinal ligament and medial incision through conjoined tendon into the retro peritoneum. Afterward testis and floor of the canal (Transversalis fascia) were brought up to the inferior border of internal ring by blunt (peanut) and sharp dissection with great care of underlying vessels. Internal ring circumferentially was incised and total inguinal canal with cord were mobilized (TCM). The defect of the canal was repaired by simple stitches of 4/0 PDS through inguinal ligament and conjoined tendon. Testis (tunica vaginalis) was fixed intra-scrotal to dartos and all patients were followed by routine physical examination, sonographic measurement (8 MHz linear probe using [Length \times wide \times 0.71] of testicular diameter and testosterone level 1, 6 - 12-month post operatively.

RESULTS

The mean age of patient was 2.5 years (range, 1 - 4 years). Twelve of 16 were right sided and 4 in left. There was no congenital abnormality in their genitourinary tract. All testes can be fixed in scrotum in the second stage. Mean operations times for stage (1, 2) were 32 and 67 minutes, respectively. There was no wound hematoma or infection. All testes were in scrotum in 6-12 month follow up and no recurrence happened. All patients had testosterone level in normal range for age. Two of 16 testes (12.5%) showed atrophy (compare to the volume of previous measured) and 14 of 16 (87.5 %) Testes had increase in volume compare to measured volume in first and second operation ($p < 0.05$) [Table 1].

Table 1. Mean preoperative testicular volume with testicular volume

Volume (ml) (n=16)	Pre-op.	1-month	6 months follow up	p- value
n=14	0.69 \pm 0.22	0.84 \pm 0.26	1.06 \pm 0.33	<0.05

DISCUSSION

Orchiopexy in high located testes with short cord (palpable or impalpable) are very demanding operation regarding the expertise which are needed and the plan on which the testis should have brought down. They are very prone to be damaged by surgeon and the method are used. Surgeons usually use the

basic principle (Cimo, 1995), but sometimes several maneuvers are needed to fix testis intrascrotally. The Fowler-Stephens orchidopexy which is performed open and laparoscopic in one or two -stages by division of the internal spermatic artery allows the testis to survive on the blood supply of the vas deferens and the cremasteric attachments. Before performing this method, you need, having the idea in mind because this may be employed only if extensive dissection of the vas and cord has not already occurred (Koo, 1998). The controversy on region of transection of the spermatic artery is still debating. Fowler and Stephens determined that the spermatic artery is an end artery. So, the parenchyma of the testis would become ischemic if it were transected close to the testis and it should ligated as far from the testis as possible to maximize collateral blood flow (Youngson, 1991). This method usually preferable for those impalpable testes that their planning has been determined preoperatively, but in those testes with short cord that have under gone extensive dissection in hope of achieving the adequate length, carries too much risk. Two stage orchidopexy may be used without division of the spermatic vessels when the other manoeuvres have failed to gain adequate length. The testis is anchored in its lowest as possible position (high scrotum or pubic tubercle) with or without the cord covered by a silastic sheath. Anchoring and traction on cord structures may cause some testicular damage and redissection of cord are very demanding and has a high risk of testicular damage vs. proning an extensively dissected cord to vascular ligation in fowler-Stephen technique in first operation (Hazebroek, 1992). Dissection of cord with attached fascia in second sage has been proposed but never encountered such extensive mobilization and this clear plan of operation that every surgeon is able to accustom with it easily (Hutson, 1998). In rare circumstances testicular auto transplantation by microvascular anastomosis of the testis to the ipsilateral inferior epigastric artery and vein may be employed (Levitt, 1978).

Our modification of Two stage orchiopexy not only anchors the testis with lowest traction (prevent vascular damage) but also keeping a wide margin of surrounding structure that help the surgeon not dissecting in the site of previous operation. This method has the danger of bleeding from underlying vessels in preperitoneal space and femoral canal which if be concern of them when dissecting, there is no real danger. This method can easily be mastered by surgeon because of precise dissection plane, although it is a tedious operation. Success of orchiopexy is mostly evaluated in terms of scrotal position and lack of atrophy. Normal testicular volume is reported to be less than 2 ml up to 11 years of age rising to 5 ml by 12 years and 12-14 ml by 15 years (Zerella, 1991). Cortes et al (Cortes, 1996) has reported 68.75% of impalpable testes were in the scrotal position in Follow up at 6 months and Riebel et al (Riebel, 1999), revealed that 19% of the impalpable had atrophied and 3% of cases had wound infection with dehiscence, which healed with antibiotics and dressing (Hutson, 1998). Two of 16 cases (12.5%) in our series, had atrophy as compare to recent studies (19%). There was no wound infection or dehiscence. Fourteen of 16 cases (87.5 %) had increase in volume of testes in follow up which shows the important of vascular preservation.

Conclusion

This method helps dissecting easier in untouched area and preventing vascular damage by thick surrounding tissue. The

modification of Two Stage orchiopexy is very safe and easy learned whenever surgeon facing a testis which has short cord, despite extensive dissection does not reaches the scrotum vs. high risk of testicular atrophy in fowler Stephen method after wide dissection of cord.

Disclosure: The authors declare no conflicts of interest.

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REFERENCES

- Ah, A., Shah, A.V. 2003. The Impalpable Testicle - Peeping through the Key Hole. *J Indian Assoc Pediatr Surg.*, 8: 208-212.
- Ark, D.A., Borzi, P.A. 1999. Laparoscopic orchidopexy for the intra-abdominal testis. *Pediatr Surg Int.*, 15: 454 - 456.
- Cimo, S.G. 1995. The results of surgical therapy for cryptorchidism: a literature review and analysis. *J Urol.*, 154(3): 1148-52
- Cortes D, Thorup JM, Lindenberg S. 1996. Fertility potential after unilateral orchiopexy: an ageindependent risk of subsequent infertility whenbiopsies at surgery lack germ cells. *J Urol.*, 156: 217-220.99
- Dhole, P.P., Najmaldin, A.S. 2001. Laparoscopic orchidopexy in children. *J Endourol.*, 15: 251 - 256.
- Hazebroek, F.W.J., Molenaar, J.C. 1992. The management of the impalpable testis by surgery alone. *J Urol.*, 148: 629-631.
- Hutson, J.M. 1998. Undescended testis, Torsion and Varicocele. In O'Neill JA, Rowe MI, Grosfeld JL, et al. *Pediatric Surgery* 5th ed., MosbyYear Book, Inc, 1087-1090
- Koo, H.P., Bloom, D.A. 1998. Laparoscopy for the nonpalpable testis. *Semin Laparosc Surg.*, 5(1): 40-6
- Levitt, S.B., Kogan, S.J., Engel, R.M., et al. 1978. The impalpable testis: a rational approach to management. *J Urol.*, 120: 515-520.
- Riebel, T., Hermann, C., Wit, J. et al. 1999. Ultrasonographic late results after surgically treated cryptorchidism. *Minerva Pediatr.*, 51:145-148.
- Youngson, G.G., Jones, P.F. 1991. Management of the impalpable testes: Long term results of the preperitoneal approach. *J Pediatr Surg.*, 26: 618-620.
- Zerella JT, McGill LC. 1991. Survival of nonpalpable Undescended testicles after orchiopexy. *J Pediatr Surg* 26:618-620.
