

ORIGINAL ARTICLE

Hypospadias with Severe Chordee: Single versus Two-Stage Repair: A Comparative Study

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ABSTRACT

Keywords: Hypospadias, Severe Chordee, Parent Satisfaction.

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Background: A great number of surgical techniques have been developed to adequately correct hypospadias with curvatures greater than 30°. **Purpose:** to compare the final outcome for repair of hypospadias with severe chordee using single versus two-stage repair and to measure the degree of parent's satisfaction for both procedures. **Materials & Methods:** a total of 40 patients with hypospadias associated with severe chordee were divided into 2 groups; 20 patients each repaired with single stage in group I and two stage in group II. Eligible patients included hypospadias with severe chordee and age from 6 months to 12 years. patient were evaluated regarding postoperative complications, cosmetic appearance and parent's satisfaction at 1,3 and 6 months. **Results:** Patients age ranged from 6 month's to 12 years, fistula was in 6 cases in group I (30%) while group II had no cases of fistula ($p=0.039$), meatal stenosis was in two cases in each group ($p=1$). Post-operative complications were 50% versus 10% for single-stage and two-stage repair, respectively. parent satisfaction was excellent in 4 cases in group I (20%) and 7 cases in group II (35%) ($p=0.219$), very good in 4 cases in both groups ($p=1$), good in 5 cases in group I (25%) and 9 in group II (45%) ($p=0.115$) and poor in 7 cases in group I (35%) and 0 cases in group II ($p=0.34$). There was statistically significant better parents' satisfaction for the two-stage repair than single stage repair. **Conclusion:** Two-stage repair was associated with statistically significant less postoperative complications and more parents' satisfaction than single stage repair.

INTRODUCTION

Penile curvature is a frequent feature associated with hypospadias with also a great variability of severity among each patient. While the low-grade curvature ($<30^\circ$) can be relatively easily corrected by simple techniques like penile degloving and dorsal plication, severe cases often demand more complex maneuvers to manage them. A great number of surgical techniques have been developed to adequately correct curvatures greater than 30° ; however, each one of them should be individualized to different patients and local conditions encountered.[1] For penile curvatures $<30^\circ$, the most used technique is based on the plication of the dorsal albuginea at the point of maximum curvature.[2] Penile elongation techniques include execution of multiple transverse incisions on the ventral aspect of the tunica albuginea (fairy cuts) or, performing a

single transverse incision and applying a graft of tunica vaginalis, small intestinal submucosa graft, or dermis.[3] Urethroplasty takes the form of one or two stage repairs. One-stage options include the tubularized incised urethroplasty (TIP) or various graft or flap-based techniques. Two-stage options also include grafts or flaps, including oral mucosal and perpetual skin grafting. One stage repairs are an attractive option in that they may reduce cost, hospital stay, anesthetic risks, and time to the final result.[4] The aim of this study is to compare the final outcome for repair of hypospadias with severe chordee using single-stage repair versus two-stage repair and to measure the degree of parent's satisfaction for both procedures.

MATERIALS AND METHODS

This was a comparative study, carried out in the department of urology, Aswan University Hospital, Egypt from January 2019 to July 2020. Forty patient with hypospadias and marked chordee were included in the study. Eligible patients included hypospadias with severe chordee and age from 6 months to 12 years. Patient of hypospadias associated with lower urinary tract anomalies those without chordee, with mild to moderate chordee or re-do hypospadias were excluded from the study. Eligible patients were classified into two groups; Group I underwent single stage repair and Group II underwent two stage repairs, each group included 20 patient. Patients were evaluated regarding post-operative complication at 1,3 and 6 months and parent's satisfaction evaluated by Likert scale questionnaires which used to assess six outcomes: overall penile appearance, cosmeses of meatus and skin, penile size, straightness during erection, and voided stream, These were answered by parents of boys 6 months following the repair. Statistical analysis of the collected data was done using (SPSS 25). Student T Test was used to assess the statistical significance of the difference between two study group means. Chi-Square test was used to examine the relationship between two qualitative variables.

Surgical technique: A single dose of third generation cephalosporin was administered with induction of anesthesia. Patient was sterilized from the umbilicus to above the knee and draped. The procedure was done under general anesthesia.

Two-stage repair: *The first-stage surgical technique:* after complete degloving of the penis, release of all of the tethering tissues around the urethral plate was performed. Artificial erection was performed to measure the degree of residual chordee. If the degree of chordee was between 30 and 50, the urethral plate was divided at the maximum point of curvature. If the persistent chordee was less than 50 degree, the tunica albuginea of the corpus cavernosum was excised at the maximum point of curvature, taking care not to injure the central corpus cavernosum artery, to achieve a straight penis. The defect of the corpus cavernosum was measured and the same size of the defect was replaced with a diamond-shape dermal graft. The preputial skin was incised as a Bayer's flap. In cases repaired with bracka graft, proximal cutaneous urethrotomy was created, scarred tissues distally were excised and buccal graft was quilted into place for subsequent urethroplasty. A nelaton catheter was left in the meatus for 5 days and a compressive circular dressing was applied for the penis postoperatively.

The second-stage surgical technique: It was performed after 6–9 months from the first stage. Tubularization of the urethral plate was performed around urethral stent with 6/0 polyglactin in two layers; dartos flap was created from the surrounding penile tissue to cover the sutures line of urethroplasty. The neourethra was covered with tunica vaginalis flap harvested from the scrotum in all cases. the urethral catheter was kept for 7 days postoperatively.

Single stage repair :artificial erection was done after complete degloving if there was residual chordee below 15°degrees it didn't not require any correction. If the residual chordee between 15–30° it was managed with dorsal plication. When curvature was corrected and the urethral plate was preserved, urethroplasty was done by TIP or Onlay urethroplasty. If the chordee was completely corrected after urethral plate division. Single stage urethroplasty was done using tubularized transverse preputial island flap.

Follow up: Early post-operative evaluation and follow up for 48 hours to early diagnose bleeding and hematoma which managed by evacuation and compression. All the patients were discharged from the hospital at the second day post-operative to return for the first visit of follow up after another 3 days to remove the dressing (fifth day post-operative). The urethral catheter was removed at the seventh day. The next visit was after one month , after 3 months and after 6 months. Patients were evaluated at each visit for presence of complications e.g. fistula, meatal stenosis and evaluation of parents satisfaction.

RESULTS

from January 2019 to July 2020, 40 patient were included in this study with age ranging from 6 months to 12 years.

Table (1) demographic data of the patients: Mean age was (4.250 ± 2.35) in group I and (4.275 ± 2.31) in group II ($p=0.973$) , mean degree of chordee was (39.55 ± 6.64) in group I and (41.20 ± 6.28) in group II ($p=0.418$).

		Group I (single stage)	Group II (two stage)	P value
Age				
Mean \pm SD		4.250 ± 2.35	4.275 ± 2.31	0.973
Types of hypospadias	DPH	4 (20 %)	0 (0%)	0.623
	Midshaft	6 (30%)	5 (25%)	0.870
	Proximal Penile	4 (20%)	6 (30%)	0.325
	Penoscrotal	3 (15%)	4 (20%)	0.521
	Scrotal	3 (15%)	5 (25%)	0.325
Degree of chordee				
Mean \pm SD		39.55 ± 6.64	41.20 ± 6.28	0.418

Table (2): surgical techniques in both groups: Tubularized incised plate(25%), onlay preputial island flap(45%) and ducketts tube(30%) was used in group I. Byars flap(30%) and bracka graft(70%) was used in group II.

Surgical technique	Group I	Group II	P value
Snodgrass	5 (25%)	0(0%)	0.275
Onlay	9(45%)	0(0%)	0.115
Duckett	6(30%)	0(0%)	0.229
Bracka	0(0%)	6(30%)	0.180
Byars	0(0%)	14(70%)	0.097

Table (3) postoperative complications: fistula was in 6 cases in group I (30%) while group II had no cases of fistula (p=0.039), Meatal stenosis was in two cases in each group (p=1). postoperative complications were 50% versus 10% for single-stage and two-stage repair, respectively.

Postoperative Complications	Group I	Group II	P value
Fistula	6(30%)	0(0%)	0.039
Meatal Stenosis	2(10%)	2(10%)	1.0
Penile Torsion	0(0%)	0(0%)	1.0
Hematoma	1(5%)	0(0%)	0.311
Edema	1(5%)	0(0%)	0.311
Total	10(50%)	2(10%)	0.026

Table (4) Parent's satisfaction in both groups: parent satisfaction was excellent in 4 cases in group I (20%) and 7 cases in group II (35%) (p=0.219),very good in 4 cases in both groups (p=1),good in 5 cases in group I (25%) and 9 in group II (45%) (p=0.115) and poor in 7 cases in group I (35%) and 0 cases in group II (p=0.34).

Parent satisfaction	Group I	Group II	P value
Excellent	4(20%)	7(35%)	0.219
Very Good	4(20%)	4(20%)	1.0
Good	5(25%)	9(45%)	0.115
Poor	7(35%)	0(0%)	0.034

DISCUSSION

Penile curvature is a frequent feature (approximately 25%) associated with distal hypospadias with a great variability of severity among each patient. While the low-grade curvature ($<30^\circ$) can be relatively easily corrected by simple techniques like penile degloving and dorsal plication, severe cases often demand more complex maneuvers to manage. A great number of surgical techniques have been developed to adequately correct curvatures greater than 30° ; however, each one of them should be individualized to different patients and local conditions encountered.[1] More recently, tubularization of the urethral plate, usually in combination with a midline releasing incision, has become the most popular technique.[5] However, preputial onlay urethroplasty and TIPU require the urethral plate to be preserved. Therefore, the underlying assumption is that the urethral plate is not involved in the curvature and that penile curvature persisting after ventral dissection needs to be addressed by dorsal plication of the corpora cavernosa. [6] Our study included 40 patients of hypospadias with severe chordee , patients were divided into 2 groups each 20 patients, group I had single stage repair , 10 patients (50%) were successfully repaired and 10 patients (50%) developed a postoperative complications (6 fistula, 2 meatal stenosis, 1 hematoma, 1 oedema. The success rate was higher for patients repaired with 2 stages urethroplasty. As regard postoperative complications, 18 patients (90%) were successfully repaired and 2 patients (10%) developed a postoperative complication (2 meatal stenosis).Incidence of postoperative urethral fistula was 30 versus 0 % for single-stage and two-stage repair, respectively, which may be attributed to the aggressive dissection around the urethral plate to release the chordee as much as possible, which is not required in the two-stage repair. fistula was surgically repaired after 6 months. Meatal stenosis was observed in 2 cases (10%) in group I, The incidence of meatal stenosis in group II was also 10% , it was due to scab formation which was managed by scab removal ,careful cleaning and dilatation (no surgical intervention was needed) but in group I it was in addition to fistula in one case. Meatal stenosis usually results from the retraction of the meatus or scab formation after surgery or it may occur because of faulty technique (too many sutures applied for meatoplasty or sutures are applied tightly or deeper glans tissue is used for meatoplasty). Mild penile hematoma reported in 1 case in group I. postoperative edema was seen in 1 case (5%) in group I. In our study, there was statistically significant difference in postoperative complications between the two group. These results were similar to Johal et al. who reported their experience in 62 patients with midshaft and proximal hypospadias who underwent 2-stage grafts repair using degloving, urethral plate transection and dorsal approach for correction of curvature. Postoperative complications was found in only 18% patients with success rate about (82%) .[7] Also Chen et al., reported their experience in 87 patients with proximal hypospadias, staged transverse preputial island flap and 2-stage Byars urethroplasty using degloving, urethral plate transection and dorsal approach for correction of curvature. Postoperative complications were found in only (9.5%) with success rate (90.5%) in staged transverse preputial island flap and (33%) with success rate (77%) in 2-stage byars urethroplasty .[8] Ozturk et al., reviewed their 15-year experience with one-stage repairs and have come to a similar conclusion that severe chordee and proximal hypospadias are associated with higher complication rates.[9] Regarding degree of chordee, There was no statistically significant difference between group I (mean size was 39.55 ± 6.64) and group II (mean size was 41.20 ± 6.28) with p-value (0.418). Parents' degree of satisfaction post hypospadias repair is a very good landmark for the cosmetic appearance of the procedure used

from the parents' point of view as it was excellent in 4 cases in group I and 7 cases in group II ($p=0.219$), very good in 4 cases in both groups ($p=1$), good in 5 cases in group I and 9 in group II ($p=0.115$) and poor in 7 cases in group I and 0 cases in group II ($p=0.34$). This result of parents' satisfaction were similar to Mohamed E. Hassan who reported his experience in 39 patients with severe hypospadias with moderate chordee, 14 patients repaired with single stage and 25 patient with 2 stage repair, There were statistically significantly more parents' satisfaction for the two-stage versus single-stage repair. This result of parents' satisfaction indicates that the main concern for parents of hypospadias children is the cosmetic appearance regardless of the time required to reach this target. [10] Pope et al., showed an excellent parents' satisfaction with the use of dermal graft to correct the chordee in severe hypospadias. [11] Snodgrass et al., used a standardized questionnaire to parents and operating surgeon to determine their opinion regarding outcomes from tubularized incised plate hypospadias repair. [12] Tubularized incised plate, onlay preputial island flap and ducketts tube was used in single stage repair. Byars flap and bracka graft procedures was used in two stage repair. There was no statistically significant difference between two groups as regard the surgical techniques. Our study have some advantages, it was comparative study. Yet we have some limitations includes small number of patients, the questionnaire used for parents satisfaction is not a validated questionnaire, and short period of follow up. Further studies with larger number of patients are required and extended follow up especially after puberty, should be a scope of future studies as it may help confirming or denying our results.

Conclusion

Patients who have hypospadias with marked chordee should be repaired by two-stage repair rather than one stage, it had high success rate and less complication rate than one-stage repair with higher parent's satisfaction.

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