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ORIGINAL ARTICLE

Comparative Study of Sondgrass and Bracka's Surgical Techniques for Hypospodias Repair

YASIR ARFAT MEMON[1], RIZWANA FAZLANI[2], IMRAN AHMED[3], KASHAN QAYOOM SHAIKH[4], SADIA RASHEED[5], GHULAM HUSSAIN[6]
[1]*Senior Registrar Plastic Surgery, Suleman Roshan Medical College, Tando Adam*
[2]*Senior Registrar Plastic Surgery, Bilawal Medical College for Boys, LUMHS, Jamshoro*
[3]*Assistant Professor Pediatrics, Suleman Roshan Medical College, Tando Adam*
[4]*Senior Registrar Plastic Surgery, LUMHS Jamshoro*
[5]*MS Plastic Surgery Assiatant Professor, LUMHS Jamshoro*
[6]*Associate Professor, Department of Community Medicine, Isra Univesity Hyderabad*
Corresponding author: Yasir Arfat Memon, Email: yasirmemon86@gmail.com

ABSTRACT

Objective: To compare the outcomes of Bracka's and Snodgrass techniques in hypospadias repair among the patients admitted at Liaquat University Hospital, Jamshoro.

Methods: Prospective study was conducted at the plastic surgery unit, Liaquat University Hospital, Jamshoro from January 2018 to December 2019. All male children aged between 6 months-15 years, given consent of participation, having distal hypospadias and were not previously operated for hypospadias (primary cases) with chordee, good prepuce and wide urethral plate were included. The study was ethically approved from university ethical review committee and informed consent taken from the parents / guardians. Study participant children were divided in two equal groups according to the surgical technique used. Group I (Snodgrass procedure) and Group II (Bracka's procedure). Pre and post-surgical examination of patients were performed to determine any complications and evaluate the cosmetic results.

Results: Total 100 participating pediatric patients of Hypospadias were included in the study. The mean age of study participants was 3.4±2.2 years with age range between 6 months and 15 years. Statistically significant difference ($p<0.05$) between operative time and length of postoperative hospital stay of Group I and Group II. Urethrocutaneous fistula and meatal stenosis were observed as the most common postoperative complications in study participants. A statistically significant difference in complications between group I and group II ($p<0.05$).

Conclusion: Bracka's technique is more beneficial compared to Snodgrass in terms of urethral fistula. While due to meatal stenosis Snodgrass technique is much advantageous because of higher scar amount results after Bracka's method.

Keywords: Congenital abnormalities, Hypospadias, Postoperative Complications

INTRODUCTION

Hypospadias is one of the common congenital abnormality effecting about 1 in 200-300 male children or 3 per 1000 live male births. There is an increase incidence of 13 times more among those with first‑degree relatives having family history of hypospadias compared to those without any family history.[1] The condition is characterized by incomplete or partial development of anterior urethra, abnormal location of opening of urethra, ventrally deficient prepuce and presence of chordee.[2] In over two third of cases of hypospadias, meatus is found in coronal, glanular, sub-coronal and distal part of penile shaft.[3]

Owing to the complexity, over 200 different types of surgical repair techniques available for the management of hypospadias but none of the procedure is accepted universally. The surgical management of hypospadias is mainly affected by the cultural preferences of the affected child's family.[4] Several children with distal hypospadias, basically do not have any deficiencies in their functional, deficient normal penile curvature, and able to void with a straight stream in the normal position. Hence, the major aim of reinstating the normal meatal position within the glans is primarily for cosmetic purpose. [5]

For achieving the successful outcome, hypospadias comprises of different basic phases i.e. Urethroplasty or straightening, Meatoplasty, Glanuloplasty, Scrotoplasty, and Skin cover. To attain the surgical success, these elements are applied successively in different combinations.[6]

In recent years, major advances have been made in the hypospadias surgery and several urethroplasty techniques showed an excellent outcomes of hypospadias repair by one-stage to two-stage procedures. The most commonly used repair methods are the Mathieu's technique or modified Mathieu's procedure (MMP), Anterior urethral advancement technique or Bracka's procedure, Thiersh- Duplay and Tubularized Incised Plate (TIP) urethroplasty or Snodgrass are widely been practiced.[4, 7, 8]

Bracka's technique is one of frequently used the procedure for the hypospadias repair. In the procedure, the urethra use to advance after mobilizing it up to 1.8 cm in children which a sufficient for repairing the penile variety of congenital hypospadias. The graft from the inner part of preputium and neourethra is molded as the tie-over dressing. Then the covering of upper part of neourethra done with the transposition flap. The aesthetic as well as functional outcome obtained by covering the skin properly.[9, 10]

Snodgrass or TIP is the most frequently used technique for rectifying the distal hypospadias with a low complication rate. This technique is executed by tubularizing the incised urethral plate for creating the vertical meatus. All techniques required to repair the distal hypospadias needs to be simple, easy, and the one that could result in satisfactory functional as well as cosmetic outcomes.[11] Despite constant enhancement of several repair techniques, there is no satisfactory technique in terms of complications and cosmesis.[12] The current study was designed with an aim to compare the outcomes of Bracka's and Snodgrass techniques in hypospadias repair among the patients admitted at Liaquat University Hospital, Jamshoro.

METHODOLOGY

After getting approval from the university ethical review committee, the prospective study was conducted at Department of Plastic Surgery, Liaquat University Hospital, Jamshoro from January 2018 to December 2019. All male children aged between 6 months-15 years, give consent of participation, having distal hypospadias (coronal or sub-coronal) and were not previously operated for hypospadias (primary cases) with mild or no chordee, with good prepuce and wide urethral plate were included. While patients not fulfilling inclusion criteria, with other associated anomalies, known recurrent cases, who had proximal hypospadias or had chordee were excluded.

After obtaining informed consent from the parents / guardians, all the study participant children were randomly divided in two equal groups according to the surgical technique used. Group I was comprised of participants undergoing the Tubularized incised plate urethra-plasty (Snodgrass procedure) while Group II was comprised of participants underwent to urethral advancement repair technique (Bracka's procedure). Last case in both groups were performed in June 2019. After surgery, patients were examined for any immediate post-operative complications. All the

participants were followed for 1 month (once every week) then for two months (once in two weeks) and later every month for three months to determine any complications and evaluate the cosmetic results.

Prior to the surgery, all participating children underwent the complete physical examination,

Laboratory tests, and abdominal ultrasound. The repair of the hypospadias was done under general anesthesia and endotracheal intubation.

Surgical procedure: Tubularized incised plate urethra-plasty (Snodgrass procedure) [9, 13]: In this procedure, we first made a longitudinal parallel incisions at the edges of the urethral plate to create glans wings and a midline incision was made in the urethral plate from native meatus up to glans. Afterwards, the tabularization of urethral plate over 8–10 Fr catheter using poly-glactin sutures with two-layers of local flaps. A two layered glanuloplasty was performed with 6.0 polygalactin and final meatoplasty with skin cover were completed. At the end, a small drain was placed and wound was closed.

Urethral advancement repair technique (Bracka's Procedure) [11, 12]: In this procedure, tourniquet was applied at the base of the penis for maintaining the bloodless field under general anesthesia. Then a circular (crescent-like) incision of about 0.5cm diameter proximal to the meatus was made with the skin around the hypospadias penile meatus at the volar aspect of root of the penis. Beginning from the lateral ends of sub-meatal incisions, two more vertical incisions were made to join at glans tip in a way it forming a triangular shape around the meatus and the glanular groove. A stay suture was applied at the meatal tip for facilitating penile traction at the glans using proline 4/0. Later the meatus was circumscribed and the dissection of corpus spongiosum and releasing the urethra distally was done so that the urethra was easily reached from the top of the triangular incision. Mobilization of the urethra was finished and its advancement was continued till it reached to the tip of glans at the normal position without applying tension. Lastly, suturing of the meatus at the tip of glans penis and reinserting the catheter. In the end, wound closure was done after keeping a small drain in the wound.

Statistical Analysis: Data was entered for analysis using SPSS ver. 24. Data of all quantitative variables was presented as mean and standard deviation while information of qualitative variable was expressed as frequency and percentage. Independent sample t-test was used for the comparative analysis between the two means while qualitative data was analyzed using Chi-square and Fisher's exact test. Significance level was set at $p < 0.05$.

RESULTS

Total 100 participating pediatric patients of Hypospadias were included in the study. The mean age of study participants was 3.4±2.2 years with age range between 6 months and 15 years. The mean age in the group-1 was 3.5± 2.4 (06 months–13 years) and in group-2 it was 3.3±2.4 (08 months–15 years). Difference in age in both groups is presented in figure1. The difference in age between the two groups was not significant. (Figure 1)

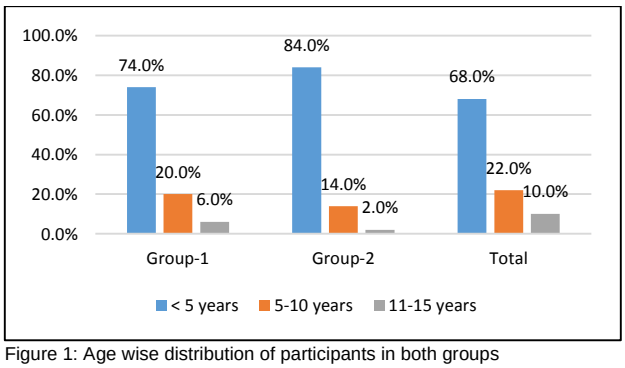

Figure 1: Age wise distribution of participants in both groups

Patient's pre-operative examination findings are presented in table I. No statistically significant differences on examination findings of site of the meatus, circumcision and presence of chordee was present between the two groups. (Table I)

Table 1: Patient's preoperative examination findings

Findings	n (%)	Group	
		Group 1	Group 2
		n (%)	n (%)
Meatal Position			
- Coronal	52(52.0)	21(24.0)	31(30.0)
- Sub-coronal	21(21.0)	16(14.0)	09(24.0)
- Distal Penile	18(18.0)	13(10.0)	10(14.0)
Circumcision			
- Circumcised	25(25.0)	11(22.0)	14(28.0)
- Uncircumcised	75 (75.0)	39(78.0)	36(72.0)
Chordee			
- Present (mild)	7 (7.0)	4(8.0)	3(6.0)
- Absent	93 (93.0)	46(92.0)	47(94.0)

Table II demonstrating the mean operative time of Group 1 and Group 2. There was a statistically significant ($p<0.05$) difference between duration of surgery of both procedures. Also, there was a statistical significant difference ($p<0.05$) between the length of hospital stay post operatively in both techniques. (Table II)

Table 2: Comparison of duration of surgery in both groups

Operative time (minutes)	Mean ± SD	Range	P value
Group I	71.5±8.10	61-94	<0.001*
Group II	66.1±7.23	50-74	
Length of hospital stay Postoperatively (days)	Mean ± SD	Range	P value
Group I	3.1±0.6	3-7	0.003*
Group II	2.3±1.8	2-7	

* Statistically significant $p<0.05$ (t-test)

The post-operative complications details and cosmetic appearance of penis along with finding of the shape of meatus are presented in table III. There was a statistically significant difference ($p<0.05$) between the studies procedures related to post-operative complications. (Table III)

Table 3: Comparison of Post-operative complications of surgery

Post-operative complications		Type of repair surgery		P value
	Total	Group I	Group II	
	n (%)	n (%)	n (%)	
• Complications	30(30.0)	20(40.0)	10(20.0)	0.029*
- Edema	4(4.0)	3(6.0)	1(2.0)	
- Hematoma	3(2.0)	2(4.0)	1(2.0)	
- Wound infection	4(4.0)	3(6.0)	1(2.0)	
- Urethrocutaneous Fistula	6(6.0)	4(8.0)	2(4.0)	
- Meatal stenosis	5(5.0)	3(6.0)	2(4.0)	
- Meatal retraction	3(3.0)	2(4.0)	1(2.0)	
- Urethral stricture	3(3.0)	2(4.0)	1(2.0)	
- Penile Torsion	2(3.0)	2(4.0)	0(0)	
• No Complications	70(70.0)	30(60.0)	40(80.0)	

* Statistically significant $p<0.05$ (chi^2 test)

DISCUSSION

Hypospadias, a congenital abnormality with several surgical treatment options but consensus yet not established in terms of safety which technique is much effective.[14] The existing operative management of hypospadias surgery is specifically based on concept of a perfect one stage repair of this congenital penile malformation with the excellence in functional outcome as well as a cosmetically normally looking penis.[13]

A number of complications like urethra-cutaneous fistula and even the complete breakdown of neo-urethra may develop after hypospadias repair surgery even by the most experienced surgeons.[15] This study was conducted with an aim to compare the outcomes of anterior urethral advancement and TIP (Snodgrass)

techniques in management of hypospadias among the pediatric patients. In the present study, majority (68.0%) of patients belongs to <5 years of age. Whereas, there was no statistically significant difference between in age of group 1 and group 2 patients (74.0% and 84.0% were <5 years age respectively). The mean age of patients in group 1 was 3.5± 2.4 years (06 months–13 years) and in group-2 it was 3.3±2.4 years (08 months–15 years). These findings are consistent with the findings reported by Alngaar Y et al et al., Hassouna AA et al. and Shah et al.[10-12] The present study demonstrated that there was no significant difference between the age groups of both group participants. In contrary of our study findings, Badr et al. reported a significant difference between the studied groups as regard to age.[13] This difference may be due to the inclusion criteria which is different from our study.

On pre-operative examination, 52% patients had coronal meatal position, 21% had sub-coronal and 18% had distal penile. While over two-third (75.0%) don't underwent circumcision these is similar to the results reported by Poondla et al. and Hashish MS et al.[7, 15]

In every surgery, the duration of the surgery is an important component that may vary from technique to technique and expertise to expertise of surgeon. As far as concern with the duration of surgery, there was a statistically significant difference ($p<0.05$) was observed between the two used surgical techniques, with the longer duration (79.7±15.6 minutes) in Snodgrass approach compared with the Bracka's technique (66.1±7.23 minutes). Our results for Snodgrass technique is supported by Hassouna AA et al. and Maitra et al. reported the similar duration of Snodgrass technique.[12, 14] Moreover, Hashish MS et al. reported the consistent findings of duration of surgery during Bracka's technique.[7]

Furthermore, the length of stay in hospital is also an important factor as longer stay in hospital not only poses economic burden but also increases the chances of hospital acquired infection. The mean length of postoperative stay in hospital among patients underwent the Snodgrass technique was 3.1±0.6 days, while the mean length of stay after Bracka's technique was 2.3±1.8 days. These findings are consistent with the findings of Hashish MS et al, Hassouna et al and Ali QA et al.[7, 9, 12]

Surgical management for hypospadias treatment having several operative and post-operative complications. These complications may result even if executed by experienced surgeons. The developing complications may results from the severity of deformity. Different most commonly occurring complications after the post hypospadias surgical procedures includes; "Urethrocutaneous fistula, stricture of urethra, meatal stenosis, and ventral chordee".[16]

In the present study the post-surgical complications were observed in 30.0% of patients of hypospadias. Among the patients in group I (Snodgrass), 40.0% developed different complications while 20.0% from group II (Bracka's) patients developed the complications. There was a statistically significant difference in complications between group I and II patients. Urethrocutaneous fistula was 4.0% in Snodgrass surgical technique, where as 8.0% in Bracka's technique. The prevalence of fistula in this study was in line with the findings reported by Hashish et al. and Poondla et al.[7, 15] Whereas, studies by Shah et. al. and Ali QA et.al. reported the rates of fistula higher among the Bracka's group patients compared with Snodgrass patients.[9, 10] While no complication of Urethrocutaneous fistula are reported in other studies.[11, 16, 17]

This variation in prevalence of both procedures may be due to the illiteracy of patient's families that leads to troubles during the follow-up post-surgical period because of improper handling of dressing and lack of hygienic care resulting in fistula formation.[17]

Moreover, Bracka's repair process in which the repair line is supported with a flap resulting in excess protection and rate of fistula are minimized.[4]

Furthermore, this may be due the location of hypospadias in our study participants were located were proximal and lesser in mid-penile location. While the surgical management results in more scars due to the broad higher defect area which required much graft that may leads to more fistula and stenosis occurrence.[18]

In the current study, for evaluating the meatal stenosis among the hypospadias patient parameters like meatal calibration with the help of catheter, appearance of meatus and urinary calibration during micturition were used. Based on the observation, meatal stenosis was prevalent in 4.0% of patients. It was also observed that after Snodgrass in 4.0% patients while 6.0% cases reported to have meatal stenosis after Bracka's procedure. These findings are consistent with Koçak ÖF et al., reported the same prevalence of meatal stenosis in their patients underwent the Snodgrass and Bracka's repair.[4]

Apart from Urethrocutaneous fistula and meatal stenosis, other complications like wound infection, edema, hematoma, meatal retraction, penile torsion and urethral stricture were observed in our study patients. Most of these complications were observed at early stages post-operatively while Urethrocutaneous fistula and meatal stenosis were demonstrated in late stages post-operatively. To the best of knowledge, no study have been carried out on comparision of Snodgrass and Bracka's surgical techniques for the management of Hypospadias in recent past in our setting. This study has observed some important surgical outcomes which can improved if treated in early stages. Our study was conducted in only one setting on a limited number of patients.

CONCLUSION

The study concluded that Bracka's technique for repair of hypospadias is more beneficial compared with the Snodgrass in terms of urethral fistula since it provides added potent repair. Due to meatal stenosis, Snodgrass technique is much advantageous because of higher scar amount results after Bracka's method.

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