ORIGINAL ARTICLE

Comparison between Tubularised Incised Plate Urethroplasty and Onlay Island Flap Repair in Mid and Proximal Penile Hypospadias

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Abstract

Objectives: To evaluate the surgical outcome of tubularised incised plate urethroplasty and onlay island flap repair for mid and proximal penile hypospadias.

Methods: The prospective study was conducted at the Bahawal Victoria Hospital, Bahawalpur from June 2011 to May 2013. A total of 60 patients with mid and proximal penile hypospadias in the age range of 02 to 06 years were included. Patients with hypospadias other than mid and proximal penile, with chordee and history of previous hypospadias repair were excluded. Patients were divided into two equal groups. Urethroplasty was done for group I and flap repair for group II. The follow-up period was 12-24 months. SPSS 16 was used for statistical analysis.

Results: The mean duration of surgery was 62±8.72 minutes for group I and 90±11.25 minutes for group II ($p<0.0001$). In group I, only 03 (10.0%) patients had complications, while in group II, 09 (30.0%) patients developed complications ($p=0.02$). Cosmetic results were also excellent in group I compared to group II.

Conclusion: Tubularised incised plate urethroplasty was better and superior than onlay island flap repair in terms of less operative time, complication rate and satisfactory cosmetic results for mid and proximal penile hypospadias.

Keywords: Hypospadias, Surgical procedures, Flap techniques, Urinary fistula, Cosmetic results. (JPMA 64: 415; 2014)

Introduction

Hypospadias is a common congenital anomaly of the male gender in which external meatus is located abnormally on the ventral surface of the shaft of the penis or even perineum.[1,2] It is classified into distal or anterior, middle and proximal or posterior hypospadias which are further sub-divided into different types on the basis of the location of the meatus.[1,3]

Hypospadias surgery remains one of the most challenging and controversial subject for surgeons for many centuries. Many procedures are reported for repair of distal, middle and proximal hypospadias, but each technique has its own advantages, limitations and complications.[4,5] For middle hypospadias, Snodgrass technique, or the tubularised incised plate (TIP) urethroplasty, mathieu's repair, onlay island flap (OIF) repair, Duckett's technique or the tubularised preputial island flap, are commonly used.[6] Since Duckett reported tubularised preputial island flap,[7] one-stage repair has been gaining popularity with several new one-stage techniques being mentioned. Current popular one-stage procedures are onlay island flap (OIF) and TIP urethroplasty.[8] Both procedures have low complication rates and yield satisfactory cosmetic results in distal penile hypospadias, but still there is controversy about the better and more reliable technique among the two in more proximal defects.[9]

Therefore, the current study was conducted to report our experience of surgical outcome between TIP urethroplasty and OIF repair techniques in mid and proximal penile hypospadias.

Patients and Methods

After approval from the institutional ethical review committee, the prospective, randomised controlled trial was conducted at the Department of Urology and Renal Transplantation, Bahawal Victoria Hospital/Quaid-e-Azam Medical College, Bahawalpur from June 2011 to May 2013. A total of 60 patients with mid and proximal penile hypospadias within the age range of 2-6 years were selected for the study which had 80% power of study and 5% level of significance. Patients with hypospadias other than mid and proximal penile were excluded. Also, patients with chordee and history of previous hypospadias repair were excluded. The selected patients were placed randomly into two groups i.e. group I and group II, by using random number tables. First, all patients were consecutively assigned to one group, and then to the next group. Before the procedure, informed written consent was taken from all patients' parents or guardians, explaining the nature of the disease, risks and complications of the procedures.

TIP urethroplasty was used in group I patients. The basic

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steps included degloving the penile shaft, and excising of tethering tissue lateral to the urethral plate. An artificial erection was performed in all cases to ensure straight penis and any residual chordee corrected. Then a U-shaped incision was made and extended along the edges of the urethral plate to healthy skin 2mm proximal to the meatus. Flaps were mobilised for a tension-free repair. Then an incision in urethral plate was added from native meatus upto glans and tube was made of local flaps created of urethral plate over a 8Fr or 10Fr folley's catheter, using the vicryl no. 5/0 sutures. The glandular wings were dissected laterally and re-approximated in the midline with two layers. Neourethra was then covered with a vascularised dartos flap harvested either from subcutaneous tissue of dorsal prepucial skin or the penile shaft and ventral skin closure was achieved by Byars' flaps.

Among the group II patients, OIF repair was used in which after performing the basic steps as in TIP, a flap of appropriate width and length was then made on the dorsal inner prepucial skin and rotated on ventral side. The flap was then stitched with the urethral plate over a 8Fr or 10Fr Foley's catheter with a running inverting stitch of vicryl no. 5/0 sutures. Glanuloplasty and ventral skin closure was done the same way as TIP.

All procedures were performed by same surgeon and operative time was noted for both procedures. Prophylactic IV antibiotics i.e. inj. co-amoxiclav (40mg/kg/day) and inj. gentamycin (5mg/kg/day), were given and continued for 3 days postoperatively in every patient. Sandwiched dressing i.e. phallus was placed between two gauze pieces and placed over anterior abdominal wall with compression tapes applied over gauze, used which was removed after 24-48 hours postoperatively. The indwelling urethral catheter was kept for 2 weeks in every patient. Patients were visited in the ward after 24 and 48 hours of surgery to assess early complications i.e. repair disruption, and after discharge from ward, each patient was followed after 15 days, 1 month, 6 months and 1 year for subsequent complications i.e. urethrocutaneous fistula, meatal stenosis, urethral stricture and for cosmetic results. Minimum follow up period was 12 months and maximum 24 months.

Data was analysed using SPSS version 16. The outcome variables of the two study groups were compared for difference. Student 't' test was applied to compare quantitative variables, while Chi Square was applied to compare the complication rate. P value ? 0.05 was considered significant.

Results

The overall mean age of the patients was 3±0.65 years for group I and 2±0.45 for group II (p<0.0001). Mid penile hypospadias was present in 36 (60.0%) and proximal penile in 24 (40.0%) patients (Table). Mean operative time was 62±8.72 minutes for TIP urethroplasty, and 90±11.25 minutes for OIF repair (p<0.0001).

Table: Comparison of hypospadias site and outcome between two groups.

Outcome	Group I (TIP) (n=30)	Group II (OIF) (n=30)	P value
Site of Hypospadias:			
Mid Penile	19 (63.33%)	17 (56.67%)	
Proximal Penile	11 (36.67%)	13 (43.33%)	
Complications:			
Complete Disruption	01 (3.33%)	03 (10.0%)	0.3
Urethrocutaneous Fistula	02 (6.67%)	03 (10.0%)	0.64
Meatal stenosis	0 (0.0%)	01 (3.33%)	0.31
Proximal Stricture	0 (0.0%)	02 (6.67%)	0.15
Total	03 (10.0%)	09 (30.0%)	0.02
Cosmetic Results:			
Vertical external meatus	22 (73.33%)	11 (36.67%)	<0.0001
Rounded external meatus	07 (23.33%)	15 (50.0%)	<0.0001

p-value for overall complication rate is = 0.02 which is statistically significant.
p-value for cosmetic results <0.0001 which is statistically significant.
TIP: Tubularised Incised Plate. OIF: Onlay Island Flap.

There was complete repair disruption in 01 (3.33%) and urethrocutaneous fistula in 02 (6.67%) patients in group I. In group II, 09 (30.0%) patients developed complications i.e. complete repair disruption in 03 (10.0%), urethrocutaneous fistula in 03 (10.0%), meatal stenosis 01 (3.33%) and urethral stricture in 02 (6.67%). Complete repair disruption and urethrocutaneous fistula were repaired again. Optical internal urethrotomy was performed for urethral stricture and bougie dilatation for meatal stenosis. Overall 03 (10.0%) patients of group I and 09 (30.0%) of group II developed complications post-operatively (p=0.02). In group I complicated cases, 01 (5.26%) patient with mid penile and 02 (18.18%) with proximal penile hypospadias developed complications, while in group II, 04 (23.53%) and 05 (38.46%) developed complications respectively (p=0.002 and 0.006 respectively).

Regarding the shape of the external urethral meatus, after TIP urethroplasty, vertically positioned and rounded external urethral meatus was seen in 22 (73.33%) and 07 (23.33%) patients respectively, while in 01 (3.33%) patient complete repair disruption had occurred. On the other hand, it was rounded in 15 (50.0%) patients and vertically positioned in 11 (36.67%) patients, while 03 (10.0%) patients had complete repair disruption and 01 (3.33%) had the meatal stenosis after OIF repair (p<0.0001). Minimum follow-up period was 12 months and maximum

24 months, with a mean follow-up of 13.33±2.70 months for group I and 14.19±4.60 months for group II. There was no patient who was lost to follow up in either group.

Discussion

The surgical aim of hypospadias repair is to construct a straight penis with normal looking shape and location of the external meatus which may not interfere with normal coitus and forward directed stream.[1,6,10] Hypospadias repair must be accomplished by the time a boy reaches school or may be by the age of 02 years.[1] The selection and outcome of the repair procedure does not change with age. Although patients have presented with a wide age range from 1 to 25 years, but in this study, we included only patients with 02-06 years of age (mean of 3 ± 0.65 years and 2 ± 0.45 for group I and group II respectively).

The type of urinary diversion after hypospadias surgery is still a controversial issue. We used transurethral urinary diversion with 8Fr or 10Fr Foley's catheter for 2 weeks. Transurethral catheterisation has produced more satisfactory results and patient compliance than the urethral stents. Osifo et al[11] reported shorter hospital stay in transurethral catheterisation compared to suprapubic urinary diversion. Sigumonrong et al[12] reported that the type of urinary diversion after hypospadias surgery did not affect surgical outcome. Almodhen F. et al[13] reported excellent results with stent-free TIP urethroplasty.

Unfortunately, the ideal dressing for hypospadias repair remains elusive, to judge by the varieties of dressings currently in use. In this study, sandwiched dressing was used which was removed 24 to 48 hours post-operatively. The advantages of dressing following the hypospadias repair are that of gentle compression for haemostasis and wound immobilisation while ischaemia, infection and pain during removal are some of the disadvantages. In a comparative study between non-dressed and dressed hypospadias repair, no major difference was seen in outcome.[14]

The mean operative time was 62±8.72 minutes for group I and 90±11.25 minutes for group II in our study which was much shorter for TIP urethroplasty compared to OIF repair which was also reported in many previous studies.[8,10,15] Sujijantararat et al[8] had observed urethrocutaneous fistula in 14.7% patients after TIP urethroplasty and 23.8% after OIF repair. Arc et al[16] had found this difference to be 9.5% and 14.3% respectively and we had come across this difference as 6.67% in TIP urethroplasty and 10.0% in OIF repair.

Meatal stenosis is reported as 0-6% after TIP urethroplasty and 3-9% after OIF repair in many previous studies,[8,15] while in this study it was found in 0% and 3.33% patients respectively. Incidence of proximal urethral stricture found in different studies range from 0-5% for TIP urethroplasty and 3-6% for OIF,[8,15,16] while in our study, it was 0% and 6.67% respectively. Stricture formation at native meatus and neo-urethra anastomotic site is common complication of hypospadias surgery. Optical internal urethrotomy or dilatation is the primary therapy but many cases may require open urethroplasty.[17]

In their study, Sujijantararat et al[8] observed complete repair disruption in 5.9% for TIP urethroplasty and 0% for OIF repair. Braga et al[15] reported its incidence as 8.6% and 5.0% respectively, while our experience was 3.33% and 10.0% respectively which was a little higher after OIF compared to previous studies.

The overall complication rate was 10.0% for TIP urethroplasty and 30.0% for OIF repair in this study, indicating a significantly lower rate of complications with TIP urethroplasty than with OIF repair for mid and proximal penile hypospadias repair.

Criteria for success of any hypospadias repair is glanular meatus, single forward directed stream, unimpeded voiding, absence of penile chordae, good cosmesis and no need for secondary procedure.[1] We had also come across highly satisfactory cosmetic results with the TIP urethroplasty compared to OIF repair. Regarding shape of the external urethral meatus, after TIP urethroplasty, 73.33% patients had centrally and vertically positioned external urethral meatus that resembled the normal urethral meatus, as compared to the onlay island flap repair after which only 36.67% patients had vertically and centrally located meatus. So, TIP urethroplasty created a centrally and vertically positioned, slit-like meatus that resembled the normal urethral meatus as was also found in many previous studies.[3,8,10,15,18]

Conclusion

TIP urethroplasty is a more effective and reliable method for mid and proximal penile hypospadias repair because of its less mean operative time and complications rate compared to OIF repair. Moreover, cosmetic results are also excellent and highly satisfactory with TIP urethroplasty.

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