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Original Article

Comparison between tubularisation of an intact and laterally augmented urethral plate urethroplasty and tubularised incised plate (TIP) urethroplasty for hypospadias repair

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Abstract

Objectives: The aim of this study was to compare the outcome of hypospadias repair by tubularisation of an intact and laterally augmented urethral plate urethroplasty and TIP urethroplasty.

Methods: This prospective comparative study was conducted from July 2018 to January 2020 and included 35 patients with primary distal and mid penile hypospadias. All had urethral plate widths of 8–10 mm. Exclusion criteria were mega meatus intact prepuce, previous repair, circumcision, urethral plate of >10 mm or <8 mm in diameter, chordee >30°. In Group A underwent tubularisation of an intact and laterally augmented urethral plate urethroplasty and in Group B underwent tubularised incised-plate (TIP) urethroplasty. The follow up period was 06 months.

Results: The success rate without any complication was 88.89% and 76.48% in Group A and B respectively. Meatal stenosis occurred 0% and 11.76% in Group A and B respectively. Wound dehiscence rate was 5.55% and 5.88% in Group A and B respectively. Urethrocutaneous fistula occurred 5.55% and 5.88% in Group A versus Group B. Overall complication occurred 11.11 in Group A and 23.52% in Group B.

Conclusion: The outcome of tubularisation of intact and laterally augmented urethral plate urethroplasty was better than TIP urethroplasty.

Key words: Hypospadias, Urethroplasty, Fistula, Meatal stenosis.

Abbreviation: TIP- tubularised incised plate.

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Introduction:

Tubularised incised plate (TIP) urethroplasty brings significant change in postoperative complications.The tubularised incised plate urethroplasty includes creation of a raw area at the dorsal aspect of the neourethra. It heals by secondary intension, deposition of a thin layer of granulation tissue and epithelium to cover it with a susceptibility of fibrosis and stiffness of the neourethra. The two raw surfaces of the dorsal midline incision of the urethral plate have a natural tendency to contract and shrink to reapproximate and an epithelial covering is formed. Thus the width of the dorsal incision of the urethral plate decreases after complete healing, which can result in neourethral and meatal stenosis.Tubularisation of an intact urethral plate was first described by Thiersch and Duplay in the 19th century. Since then tubularisation of the intact urethral plate has been developed and used for urethroplasty of primary hypospadias[1]. King used tubularisation of the intact urethral plate for hypospadias up to the coronal sulcus but did not reach the tip of the glans[2]. Sadlowski et al extended tubularisation of the intact plate to the proximal part of the glans[3]. Firlit described tubularisation of the intact urethral plate up to the tip of the glans[4].The same procedure of tubularised intact urethral plate upto the glans tip was reported by Montfort et al[5]. These authors reported excellent functional and cosmetic results.Recently tubularised incised plate (TIP) urethroplasty is most commonly used hypospadias

repair technique especially for distal hypospadias. But it brings some post operative complications. Some authors have reported better outcome by tubularisation of an intact and laterally augmented plate technique because of avoiding the healing problems of the dorsal midline incision, providing a neourethra completely lined with healthy and intact epithelium with an optimal calibre and a single suture line.

Material and methods:

A total of 50 boys with mid penile and distal hypospadias with no or mild chordee were treated with the tubularisation of an intact and laterally augmented urethral plate urethroplasty technique and TIP urethroplasty technique between July 2018 and June 2020 in the Division of Paediatric Surgery, Bangladesh Institute of Child Health and Dhaka Shishu (Children) Hospital, Dhaka.They had no history of previous hypospadias repair or circumcision. Patients were divided into two groups. Patients were selected randomly for each group. In 25 patients (group A), urethroplasty was done by tubularisation of an intact and laterally augmented urethral plate urethroplasty technique. Other 25 patients (group B) were treated by TIP urethroplasty technique. Patient age, weight, type of hypospadias, urethral plate width, wound dehiscence, U-C fistula, meatal stenosis were determined. Test of significance was t-test and Chi square test.Ethical clearance was taken from ethical committee of Bangladesh Institute of Child Health and Dhaka Shishu (Children) hospital. Informed written consent was taken from all the parents or legal guardians of the patients after adequately explaining them the purpose of the study. They were assured of protection of patients' autonomy, privacy, confidentiality.

Surgical technique:

A 5–0 atraumatic suture is placed into the glans for traction and to later secure the urethral stent. The vertical parallel incisions were made 2 mm lateral to the border of the urethral plate and this maneuver adds 4 mm to the width of the urethral plate. This is the lateral augmentation of the plate. The lateral edges of the augmented plate are dissected and undermined. The whole thickness of underlying fascia including fibrovascular spongiosal bands were meticulously dissected off upto the corpora cavernosa, keeping a generous fascial backing as much as possible.The wider and intact plate was tubularised without tension around a suitably sized silicone urethral catheter (6–8 F) using subcuticular 6/0 polyglactin atraumatic suture. The glans flaps were remodeled by excision of a piece of glanular tissue at the inner aspect of the glans wings to facilitate glans closure without tension using 6/0 polyglactin transverse mattress suturing.

Figure 1: *Intact urethral plate.*

Figure 2: *Lateral augmentation.*

Figure 3: *After completion of urethroplasty.*

Results:

Table-I : Demographic data of the patients.

According to group (Position of meatus)	Number of patient	Percentage (%)
Distal	49	98
Mid penile	1	2

	Group A	Group B	P value
Age (months)	40.8±20.15	42.6±24.07	0.73(t-test)
Weight (Kg)	16.27±7.04	19.44±6.48	0.1(t-test)
Urethral plate (mm)	9.08±0.56	9.05±0.6	0.85(t-test)

Table-II : Post operative complications

	Group A	Group B	P value
Wound dehiscence	2(8%)	3(12%)	0.64 (χ^2 test)
U-C fistula	1(4%)	3(12%)	0.302 (χ^2 test)
Meatal stenosis	3(12%)	4(16%)	0.68 (χ^2 test)

Total 50 hypospadias patients were treated in the hospital during the study Period. Out of them 49 (98%) were distal variety. In group A the mean age of participants was 40.8±20.15 months; where the minimum age was 12 months and maximum age was 100 months. In group B the mean age of participants was 42.6±24.07 months, where the minimum age was 13 months and maximum age was 104 months.In group A the mean weight of participants was 16.27±7.04 kg where in group B the mean weight of participants was 19.44±6.48 kg. In group A the mean urethral plate diameter of participants was 9.08±0.56 mm whereas in group B the mean diameter was 9.05±0.6 mm. Table-II shows that wound dehiscence occurred in 2(8%) in group A and 3(12%) group B patients, 1 UC fistula in Group A and 3 in Group B, 3 meatal stenosis occurred in group A patients and 4 meatal stenosis in group B patients.

Discussion:

The goal of hypospadias repair is to create cosmetically and functionally normal penis that should be straight during erection with a vertically oval meatus. The success of the operation is determined by excellent cosmetic appearance and normal voiding in a straight forward direction from the tip of the glans[6].

In this study, the rate of different varieties of hypospadias was coronal 38%, sub coronal 20%, distal penile 40% and mid penile 2%. Grosos et al in 2014 reported in their study rate of coronal hypospadias 28%, sub coronal 15%, distal penile 49% and mid penile 8%. Thus, regarding rate of different types of hypospadias the findings of our present study are compatible with that study[7].

In this study the mean age for laterally augmented urethral plate uretrhroplasty was 40.8 months and 42.6 months for TIP urethroplasty. Acimi had shown mean age of patient 27 months in his study[8]. Grosos et al have reported mean age 28 months in their study[8]. Elbakry et al have reported that mean age of patient was 29 months for laterally augmented plate urethroplasty and 32 months for tubularised incised plate (TIP) urethroplasty in their study[9]. In our country lack of consciousness about illness and poverty is a vital factor for delayed coming in hospitals. So the mean age was more than the studies of other countries.

In this study the mean weight for laterally augmented urethral plate urethroplasty was 16.27 kg and 19.44 kg for TIP urethroplasty. Acimi reported that mean weight of patients was 28.34 kg in his study[8]. Though the mean age was higher than the previous studies but the mean weight was lower. That was due to comparatively lower growth rate in this subcontinent region.

In this study the mean width of the urethral plate for laterally augmented urethral plate urethroplasty was 9.08 mm and 9.05 mm for TIP urethroplasty and not statistically significant. Elbakry et al have reported mean width of the urethral plate 9.18 mm for laterally augmented urethral plate urethroplasty and 9.15 mm for TIP urethroplasty in their study and was not statistically significant. So in our study the width was less than their studies[9].

In our study wound dehiscence was detected in 2(8%) patients in Group A and 3(12%) in Group B and that was not significant. Acimi had shown wound dehiscence rate of 0% for both groups in his study[8]. Elbakry et al have reported wound dehiscence rate of 0% for laterally augmented urethral plate urethroplasty and 3.4% for TIP urethroplasty in their study and was statistically significant[9]. Grosos et al have shown wound dehiscence rate of 3.5% for tubularised incised plate group in his study and not significant[7]. Thus this study was not compatible to the study of Acimi and Elbakry et al[8,9]. Lack of hygiene may be a cause of increased wound dehiscence. These patients had to stay in hospital for longer time until wound healing. Broad spectrum antibiotics were used for a long time. The cases of wound dehiscence had more other complications rate.

In the present study, although there was no statistically significant difference in the rate of meatal stenosis, it was higher in Group B than in Group A; 4(16%) versus 3(12%). Wang et al have reported a meatal stenosis rate of 7.69% for TIP urethroplasty and 2.88% for the second one[10]. Acimi have published a study showing meatal stenosis rate of 7% for tubularisation by intact plate urethroplasty and 22% for TIP urethroplasty and was statistically significant[8]. Elbakry et al have reported a study showing a meatal stenosis rate of 3.4% for tubularisation of an intact and laterally augmented urethral plate urethroplasty and 7% for TIP urethroplasty and was not statistically significant[9]. Zaontz have reported a meatal stenosis rate of 0% for urethroplasty for first group[11]. Yang et al have reported a meatal stenosis rate of 13% for urethroplasty for first group[12]. Thus, regarding meatal stenosis the findings of our present study are compatible with the outcome of the Wang et al (2013) and Elbakry et al study but not compatible with the study of Acimi and Zaontz[8-11]. The patients of meatal stenosis were recovered by gradual meatal dilatation.

In our study, 1(4%) fistula was found in Group A and 3(12%) in Group B. Acimi have reported fistula rate of 8% for laterally augmented intact urethral plate urethroplasty and 3% for TIP urethroplasty and was not statistically significant[8]. Elbakry et al reported in their study a urethrocutaneous fistula rate of 9.8% for TIP urethroplasty versus 2.8% for the laterally augmented intact urethral plate urethroplasty that was statistically significant.[9] Zaontz have reported fistula rate of 8% for laterally augmented intact urethral plate urethroplasty was not statistically significant[11]. Yang et al have reported fistula rate of 3% for laterally augmented intact urethral plate urethroplasty[12]. So our study was not similar with reported fistula rates of their study[8-12]. These occurred more in the patients of wound dehiscence. All fistula occurred within 1.5 months. Majority of U-C fistula were closed by digital pressure during micturition and gradual dilatation. One fistula was repaired after 06 months.

In our study the chance of error in statistical analysis due to the presence of confounding factors might be minimized. More trials and large sample size are required to expand its indications for repair of different varieties of hypospadias.

Conclusion:

The rate of complications are lower in tubularisation of an intact and laterally augmented urethral plate urethroplastytechnique than TIP urethroplasty technique.

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