Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Pediatric Surgery

Comparison of the Outcome of Interrupted Suture and Continuous Suture in Tubularized Incised-Plate (TIP) Urethroplasty Hypospadias Repair

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DOI: 10.36347/sjams.2023.v11i01.011 | **Received:** 30.11.2022 | **Accepted:** 05.01.2023 | **Published:** 13.01.2023

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Abstract **Original Research Article**

Introduction: The tubularized incised plate (TIP) urethroplasty has obtained worldwide acceptance for distal hypospadias repair due to its low complication rate, good cosmetic result, and technical simplicity. ***Aim of the Study:*** The aim of this study was to compare the surgical outcome between Continuous suture & interrupted suture in case of tabularized incised plate (TIP) urethroplasty. ***Methods:*** This prospective randomized comparative study was conducted in the Department of Pediatric Surgery, Bangladesh Institute of Child Health & Dhaka Shishu (Children) Hospital, Dhaka from July 2017 to June 2019. Total 40 patients were included in this study and divided in two groups which are Group A and Group B. ***Result:*** In the current study, the mean age of participants was 41.15±24.46 months in group A and 38.05±25.14 months in group B. There was no significant difference between ages of two groups as the p = 0.695. The mean penile length of participants was 31.90±7.04 mm in group A and 27.95±5.04 mm in group B. There was significant statistical difference between penile lengths of two groups as the p value was 0.049. Operation time in group A and group B was 66.86±3.51 minutes and 79.38±5.04 minutes respectively. The result showed that there was strong statistical difference between operation time in two groups as the p=0.0001. Operation cost in group A and group B was 18810.00±818.79 TK and 18385±1962.08 TK respectively. The result showed that there was no statistical difference between operation cost in two groups as the p=0.377. Hospital stay in group A and group B was 8.1±0.45 day and 8.0±0.0 day respectively. The result showed that there was no statistical difference between hospital stay in two groups as the p=0.324. There is no wound infection occurred in group B patient. There was no significant statistical difference between wound infection of two groups as the p value was >0.05. There was no significant statistical difference between occurrence of UC fistula of two groups as the p value was >0.05. Probably this is due to regular meatal dilatation. In this study more than half (55%) had distal penile hypospadias, 25% had coronal hypospadias and 20% had sub-coronal hypospadias. ***Conclusion:*** There is no statistical significance of continuous suturing technique over interrupted suturing technique in tabularized incised plate urethroplasty but continuous suturing is less time consuming & decrease operation cost.

Keywords: Interrupted Suture, Continuous Suture, Tabularized Incised-plate Urethroplasty (TIP), and Hypospadias.

I. INTRODUCTION

Hypospadias is one of the most common abnormalities of external genetalia in boys [1]. Incidence is 1 in 250 newborn or roughly 1 in 125 live male births [2]. The term hypospadias is derived from two Greek words, 'Hypo' means under & 'Spodon' means a rent or fissure [3]. Hypospadias can be defined as, an arrest in normal development of the urethra, foreskin, and ventral aspect of the penis [4]. It also can be defined as, incomplete virilization of the genital tubercle that causes an insufficient development of the tissue forming the ventral aspect of the penis [5]. Hypospadias is classified as mild, moderate and severe. Mild include glanular, coronal & distal penile hypospadias. Moderate includes hypospadias along the middle third of the penile shaft. Severe includes proximal, penoscrotal, scrotal and perineal hypospadias [6]. The goal of hypospadias repair is to create cosmetically and functionally normal penis that should be straight during erection, with a vertically oval meatus, without any U-C fistula. 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 [4]. There are more

than 300 procedures described to perform urethroplasty but the treatment yet has not been perfected. It often results cosmetically and functionally inadequate outcome. So, outcome varies with types of anomaly and associated other complications [7]. Most common complication of urethroplasty is urethrocutenious fistula. It may associate with distal stricture [8]. Other complications are meatal stenosis and wound infection. In 1994 Warren Snodgrass introduced Tubularised incised plate (TIP) urethroplasty. It is performed by a longitudinal cut on the urethral plate with tabularization and placing a flap on it [9]. The procedure consists less complication. Several European countries including Norway, Sweden, England, Wales, Hungary, Denmark, Finland, Italy and France published independent reports of incidence of hypospadias. A Dutch study reported a higher prevalence of 3.8 per 1,000 [10]. A German study of 500 adult men found that 13% had hypospadias (equivalent to a rate of 65 per 1,000 births) of whom 75% had glanular hypospadias, 98% coronal or glanular [11]. Surgical repair of hypospadias is a frequently discussed topic in pediatric surgery [12]. More than 300 technique been described for hypospadias repair but without any definitive privilege of one technique over the others [13]. The choice of technique largely depends upon judgement & personal experience of the surgeon [14]. Snodgrass tubularized incised plate (TIP) urethroplasty is the currently most commonly used hypospadias repair technique, especially for distal hypospadias. It brought significant change in the outcome of hypospadias repair. Despite this, the incidence of postoperative complication is 1-24% [15]. Despite the obvious surgical success with the technique, some complication still exists like infection, urethrocutenious fistula, meatal stenosis [16]. Although there is a general agreement on the use of absorbable suture, the suturing method (continuous or interrupted) remains in debated [17]. TIP repair is more versatile then other repairs and has gained widespread acceptance for hypospadias repair especially for distal hypospadias. Use of absorbable suture for hypospadious repair has been universally accepted but there is no general agreement on the suturing technique (interrupted or continuous). This study will help to find out a better way for TIP repair of distal hypospadias.

II. OBJECTIVES

To compare the surgical outcome between Continuous suture & interrupted suture in case of tabularized incised plate (TIP) urethroplasty.

III. METHODOLOGY & MATERIALS

This prospective randomized comparative study was conducted in the Department of Pediatric Surgery, Bangladesh Institute of Child Health & Dhaka Shishu (Children) Hospital, Dhaka from July 2017 to June 2019. Total 40 patients were included in this study and divided in two groups. At first two cards were taken where one card was tagged with continuous suturing technique and another card was tagged with interrupted suturing technique. Twenty patients who had drawn the tagged card with continuous suturing technique group were included in Group-A and 20 patients who had drawn the tagged card with interrupted suturing technique group were included in Group-B. The collected data were analyzed using SPSS (statistical package for social science) version 23 statistical software. Associations of continuous data were assessed using student t- test. Associations of categorical data were assessed using Chi-square test. Value of $p<0.05$ was considered significant. Patients with primary anterior hypospadias, admitted for urethroplasty at Bangladesh Shishu Hospital & Institute were included in this study. An written informed consent were taken from the the parents. Patients with co-morbid medical and surgical conditions were excluded from this study.

IV. RESULT

Table I demonstrates the baseline information of the study subjects. In the current study, in group A, the mean age of participants was 41.15±24.46 months where the minimum age was 12 months and maximum age was 96 months. In group B, the mean age of participants was 38.05±25.14 months where the minimum age was 13 months and maximum age was 108 months. There was no significant difference between ages of two groups as the $p = 0.695$ (obtained by t- test). In group A, the mean weight of participants was 17.79±6.37 kg whereas in group B, the mean weight of participants was 19.14±9.19 kg. There was no significant statistical difference between weights of two groups as the p value was 0.591 (obtained by t-test). In group A, the mean penile length of participants was 31.90±7.04 mm whereas in group B, the mean penile length of participants was 27.95±5.04 mm. There was significant statistical difference between penile length of two groups as the p value was 0.049 (obtained by t-test). Table II shows the complications and outcome of the study subjects. Operation time in group A and group B was 66.86±3.51 minutes and 79.38±5.04 minutes respectively. The result showed that there was strong statistical difference between operation time in two groups as the p=0.0001(done by student t-test). Operation cost in group A and group B was 251.3±9.63 US$ and 236.3±23.08 US$ respectively. The result showed that there was no statistical difference between operation cost in two groups as the p=0.377 (done by student t-test).Hospital stay in group A and group B was 8.1±0.45 day and 8.0±0.0 day respectively. The result showed that there was no statistical difference between hospital stay in two groups as the p=0.324 (done by student t-test). There is no wound infection occurred in group B patient. There was no significant statistical difference between wound infection of two groups as the p value was >0.05 (obtained by chi-square test).There was no significant statistical difference between occurrence of UC fistula of two groups as the p value was >0.05 (obtained by chi-square test).Probably

this is due to regular meatal dilatation. Table III and figure 1 shows types of Hypospadias among study subject. In this study more than half (55%) had distal penile hypospadias, 25% had coronal hypospadias and 20% had sub-coronal hypospadias.

Table-I: Baseline information of the study subjects (N=40)

Variables		Group-A (n=20)	Group-B (n=20)	P Value
Age (Months)	Mean ± SD	41.15±24.46	38.05±25.14	>0.05
	Range	12-96	13-108	
Weight	Mean ± SD	17.79±6.37	19.14±9.19	>0.05
	Range	8.4-30.9	10.3-40.6	
Penile length	Mean ± SD	31.90±7.04	27.95±5.04	<0.05
	Range	22-45	21-42	

Table-II: Complications and outcome of the study subjects (N=40)

Variables		Group-A (n=20)	Group-B (n=20)	P Value
Operation time (Minutes)	Mean ± SD	66.86±3.51	79.38±5.04	<0.05
Operation cost (US$)	Mean ± SD	251.3±9.63	236.3±23.08	0.377
Hospital stay (Days)	Mean ± SD	8.1±0.45	8.0±0.0	0.324
Wound infection	n (%)	1 (5%)	0	>0.05
UC fistula	n (%)	3 (15%)	4 (20%)	>0.05
Meatal stenosis	n (%)	0	0	-

Table-III: Types of Hypospadias among study subject (N=40)

Types of hypospadias	Number of patients	Percentage
Coronal	10	25%
Sub coronal	8	20%
Distal penile	22	55%

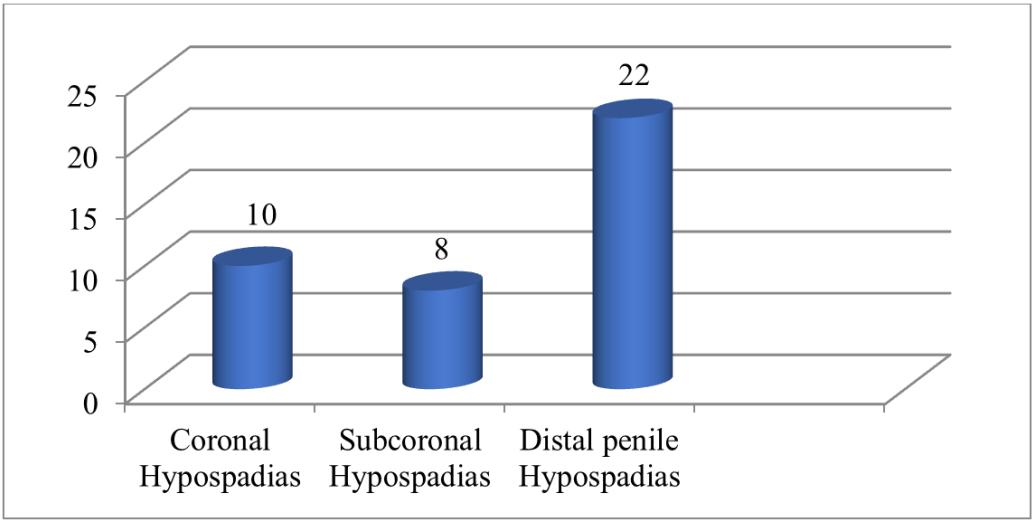

Figure 1: Bar diagram showing frequency of hypospadias (N=40).

V. DISCUSSION

Repair of hypospadias always remain a challenge for surgeons. There are more than 300 reported procedure of repair of hypospadias but no one is perfect till now. Options for urethroplasty in children with hypospadias can be classified as tubularization of the urethral plate, skin flaps and grafts. Throughout the history of surgery for this condition flaps have been most commonly used, but in the past 10 years incision and tubularization of the urethral plate (tubularized incised-plate, TIP) has rapidly gained popularity for correcting distal hypospadias [18]. The goal of hypospadias repair is to create cosmetically and functionally normal penis that should be straight during erection, with a vertically slit-like meatus at the tip of the penis and adequate calibre urethra promoting a single and coherent urinary stream in a standing position [19]. Snodgrass tubularized incised-plate (TIP) urethroplasty is the currently most commonly used hypospadias repair, especially for distal hypospadias. It has resulted in significant improvement in the outcome of hypospadias repair. Besides the surgical technique used for hypospadias repair, other factors affecting the

outcome of hypospadias repair may exist. Some of these factors including patient age, type of hypospadias, presence and degree of chordee, quality and width of urethral plate, type of suture, type of suturing technique, use of magnification during repair, type of dressing used after repair, use of catheter during repair, provision of soft tissue coverage over urethra, and use of antibiotics after repair have been reported in literature. However, the exact roles of these factors in the successful outcome of hypospadias repair are yet to be determined [19]. There is a general agreement of use of absorbable suture to perform hypospadias surgery in case of TIP urethroplasty but there is no agreement about using the suturing technique. Some prefer continuous suturing whereas some prefer interrupted suturing technique. So, we conduct the study to establish a better suturing technique for TIP urethroplasty.In our study we use 6/0 polyglactin atraumatic suture in both groups to exclude suture related factor. Ulman *et al.,* [20] compared the use of 6-0 polyglactin in a single layer, full thickness, uninterrupted fashion to subcuticular suturing in uninterrupted fashion with 7-0 polydioxanone. They found that use of a subcuticular 7–0 continuous suture was associated with a lower incidence of complications as compared to full-thickness suture urethroplasty in hypospadias repair [20]. El-Sherbiny *et al.,* [21] found that on univariate analysis suturing technique was a significant risk factor that could affect the outcome of hypospadias repair. They found that on univariate analysis, the use of a running suture was significantly associated with a higher fistula rate (23%) as compared to an interrupted suturing technique (9%). However, on multivariate analysis they found that the suturing technique had no independent significance. In another univariate analysis study, Sarhan *et al.,* [22] found no significant difference in the fistula rate after an interrupted (15%) or continuous suture (12.5%) technique in hypospadias repair. In this study our finding is also compatible with above findings. Snodgrass *et al.,* [23] in their study, also found no difference in urethroplasty complications in patients on the basis of sutures and suturing techniques. Our present study also supports the findings of these studies, as we found no significant difference between the fistula rate amongst the interrupted- (20%) and continuous suturing (15%) techniques in hypospadias repair. Similarly, there was no significant difference in overall outcomes of the interrupted and continuous suturing techniques in hypospadias repair. In our study we matched most of the factors that could affect outcome of hypospadias repair in both groups, to concentrate on the effect of the suturing technique on the outcome of hypospadias repair so that the chance of error in statistical analysis due to the presence of confounding factors might be minimized. Further studies with larger sample sizes are required to support these findings.

Limitations of the Study

In our study, there was small sample size and absence of control for comparison. Study population was selected from one center in Dhaka city, so may not represent wider population. The study was conducted at a short period of time and short follow up time. Operations were done by multiple surgeons.

VII. CONCLUSION AND RECOMMENDATIONS

There is no statistical significance of continuous suturing technique over interrupted suturing technique in tubularized incised plate urethroplasty but continuous suturing is less time consuming & decrease operation cost. More large-scale study should be performed to determine which technique is better. Suture technique has no influence on the outcome of TIP urethroplasty. The choice of suture technique is mainly dictated by surgeon preference.

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