

Original Research Article

Complications of Tubularized Incised-Plate (TIP) Urethroplasty in Anterior Hypospadias Repair: Interrupted VS Continuous Suture

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Abstract: Introduction: Hypospadias is a congenital defect that affects the development of the urethra in males, causing the urethral opening to be located on the underside of the penis rather than at the tip. Repair of hypospadias is a surgical procedure that aims to create a normal-appearing and functional penis that allows for normal urination. The tubularized incised-plate (TIP) technique is a widely used surgical approach for correcting distal hypospadias. TIP urethroplasty can be performed using either continuous or interrupted suture techniques. The present study aims to compare the complications of these two techniques in TIP urethroplasty for the repair of hypospadias. **Aim of the Study:** The aim of the study was to compare the complication rate among continuous and interrupted suture in TIP urethroplasty for anterior hypospadias repair. **Methods:** This Prospective Randomized comparative study was conducted at the Department of Pediatric Surgery, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh. The study duration was 5 years, from July 2017 to June 2022. After some drop-out patients, a total of 68 patients had been left, with Group-1 having 35 continuous suture TIP urethroplasty, and Group-2 having 33 interrupted sutures TIP urethroplasty. **Result:** The mean age of participants was 41.15 ± 24.46 months in Group-1 and 38.05 ± 25.14 months in Group-2. The mean weight of participants was 17.79 ± 6.37 kg and 19.14 ± 9.19 kg in Group-1 and Group-2 respectively. Operation time in group 1 and group 2 was 66.86 ± 3.51 minutes and 79.38 ± 5.04 minutes respectively, with statistically significant difference. But none of the post-operative complications had significant difference between the groups. **Conclusion:** The study showed that although operative time was significantly lower among patients undergoing continuous suture for TIP urethroplasty instead of interrupted suture TIP urethroplasty, the overall complications rate had no significant difference between the groups.

Keywords: Anterior Hypospadias, Continuous Suture, Interrupted Suture, Complications.

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INTRODUCTION

Hypospadias is a congenital abnormality in which the opening of the urethra, the tube through which urine is expelled from the body, is located on the underside of the penis instead of at the tip. It is one of the most common abnormalities of external genitalia in boys [1–3]. It can occur in approximately 1 out of every 125 live male births globally [4]. Hypospadias can vary in severity, with some cases involving only a small deviation of the urethral opening and others involving more significant abnormalities of the urethra and

surrounding tissue. The severity of hypospadias is often classified based on the location of the urethral opening and the complexity of the repair [5, 6]. Distal hypospadias, which is the most common type, usually involves a relatively simple repair. More severe forms of hypospadias, such as proximal hypospadias and penoscrotal hypospadias, may require more complex surgery. The cause of hypospadias is not fully understood, but it is thought to be due to a combination of genetic and environmental factors [7, 8]. In some cases, hypospadias may be associated with other abnormalities of the reproductive system. The main

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treatment for hypospadias is surgical repair, which is usually performed in infancy or early childhood. The specific surgical approach will depend on the severity of the defect and the specific needs of the patient. The goal of surgery is to create a normal-appearing and functional urethra that allows for normal urination. Hypospadias is a grave deformity that requires the utmost surgical efforts to correct. The reconstruction of the urethra is a challenging task that is considered one of the most difficult in the field of surgery. When successful, the benefits of the procedure are invaluable. The gratitude of a boy who has undergone this surgery is truly moving and must be experienced firsthand to be believed. This sentiment was eloquently expressed by London surgeon Twistington Higgin in 1941 [9]. In general, the success rate for surgical repair of hypospadias is high, with most patients achieving good results. However, there is a risk of complications, including bleeding, infection, and scarring. In some cases, additional surgery may be needed to correct any complications or to address any residual abnormalities. There are several different surgical procedures that can be used to repair hypospadias, also known as urethroplasty [10, 11]. The specific procedure used depends on the severity of the hypospadias and the specific needs of the patient [11]. Tubularized incised plate (TIP) urethroplasty is one of the most common surgical procedures, which involves creating a tubularized flap of skin from another area of the body and attaching it to the urethra to create a new urethral channel [12]. Continuous suture and interrupted suture are two techniques that can be used to close the incision in the urethra and/or to attach the tubularized flap of skin [13, 14]. Continuous suture is a technique in which the surgeon uses a single, uninterrupted suture to close the incision and/or attach the flap. Continuous suture is often preferred in TIP urethroplasty because it can provide a more secure closure and may result in a stronger repair. Interrupted suture, on the other hand, is a technique in which the surgeon uses multiple short sutures to close the incision and/or attach the flap. Interrupted suture may be used in situations where a continuous suture may not provide adequate strength or support, or when a continuous suture is not practical. In

general, interrupted suture is considered to be a more time-consuming technique compared to continuous suture, but it can be an effective way to close certain types of incisions. The present study was conducted to observe the post-operative complications of TIP urethroplasty under both suturing method, in the hopes that the rate of complications can provide a better answer on which suture technique is better for the patients.

METHODS

This Prospective Randomized comparative study was conducted at the Department of Pediatric Surgery, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh. The study duration was 5 years, from July 2017 to June 2022, during the period a total of 76 children with anterior hypospadias who operated for the first time included in this study. A random sampling was done to divide them into two groups (38 in each group). However, 8 patients had dropped out due to various reasons, resulting in 35 patients in group-1 who had continuous suturing technique, and 33 patients in group-2 who had interrupted suturing technique tubularized incised plate (TIP) Urethroplasty was done. When a patient with primary anterior hypospadias got admitted for treatment at the study place, parents of the participants were informed about the surgery and informed consent was obtained. Each patient was thoroughly examined, investigated and all relevant information was noted. Ethical approval regarding the study was also obtained from the ethical board of the hospital. Data were collected in a pre-designed, semi-structured questionnaire after taking consent from guardians in the consent form. Patients were discharged from the hospital if they did not have any significant pain, have a healthy wound and were able to void spontaneously, and 4 follow up were done in total, at the 14th post-operative day, 1 month, 3 months and 6 months after operation.

RESULTS

Table 1: Mean comparison of variables (N=68)

Variables	Group-1 (n=35)	Group-2 (n=33)	P Value
Age (months)	43.45±34.06	40.20±20.34	>0.05
Weight (kg)	19.81±6.40	19.27±8.13	>0.05
Penile length (millimeter)	33.86±6.19	31.35±6.14	>0.05
Operation time (minutes)	70.06±2.55	80.37±7.03	<0.05
Hospital stay (days)	8.2±0.49	8.1±0.4	>0.05

Comparing the mean variables of the participants among both groups, among the participants, mean age was 43.45 months in group-1 and 40.20 in group-2. There was no significant difference between the two groups in terms of age. Among Group-1 participants, minimum age was 12 months and maximum age was 96 months. Among Group-2

participants, minimum age was 13 months and maximum age was 108 months. Mean penile length was 33.86mm in Group-1 and 31.35mm in Group-2 participants. Among Group-1 participants, minimum penile length was 22 mm and maximum was 47 mm, while in Group-2, it was 23 mm and 49 mm respectively. The difference between the two groups

was statistically insignificant in terms of penile length. The mean hospital stay duration was almost similar in both groups with no statistically significant difference.

The mean operation time was only statistically significant difference between two groups.

Table 2: Comparison of complications among participants (N=68)

Complications	Group-1 (n=35)		Group-2 (n=33)		P Value
	n	%	n	%	
Superficial Wound Infection	3	8.57%	1	3.03%	>0.05
Partial glans dehiscence	2	5.71%	1	3.03%	>0.05
UC Fistula	4	11.42%	5	15.15%	>0.05
Meatal stenosis	2	5.71%	1	3.03%	>0.05
Total	11	31.42%	8	24.24%	>0.05

Total 19 complications, 11 (31.42%) in Group-1 and 8 (24.24%) in Group-2, occurred in 13 (20%) patients, which was not statistically significantly different ($P > 0.5$). The most common early complication was urethro cutaneous (UC) fistula, occurring in 9 patients (Four in Group-1 and five in Group-2), after removal of the catheter, but no statistically significant difference between the groups. Another important early postoperative complication included superficial wound infection, 3 in group-1 and one in group-2. Partial glans dehiscence occurred 2 in group-1 and 1 in group-2. There was no occurrence of complete wound dehiscence in any of the patients in either group. Late complications included meatal stenosis, 2 in group-1 and 1 in group-2. Meatal stenosis managed with regular daily meatal dilatation for 3 to 6 month.

DISCUSSION

Hypospadias repair continues to challenge surgeons, with over 300 different procedures having been developed to address this condition. Despite the many available options, there is no single procedure that is universally considered the best. Options for urethroplasty in children with hypospadias can be broadly classified into three categories: tubularization of the urethral plate, skin flaps, and grafts. In the past, skin flaps have been the most commonly used approach, but in recent years, the tubularized incised-plate (TIP) technique has gained widespread popularity for correcting distal hypospadias [10, 15, 16]. The goal of hypospadias repair is to create a normal-appearing and functional penis that allows for normal urination. This typically involves creating a straight penis that is normal in appearance and function when erect, with a vertically slit-like meatus (urethral opening) located at the tip of the penis. The repaired urethra should have an adequate caliber (diameter) to allow for a single, coherent urinary stream when the patient is standing. In addition to these functional goals, hypospadias repair also aims to achieve good cosmetic results, with minimal scarring and a normal appearance of the repaired area [13]. TIP Urethroplasty can occur through both continuous and interrupted suture techniques, and the present study hoped to observe any difference in post-operative complications between these two

suturing techniques. In our study, we used 6/0 polyglactin atraumatic suture in both groups in order to exclude suture-related factors as a variable. Ulman *et al.*, previously compared the use of 6–0 polyglactin in a single layer, full-thickness, uninterrupted fashion to subcuticular suturing in an uninterrupted fashion with 7–0 polydioxanone. They found that the use of a subcuticular 7–0 continuous suture was associated with a lower incidence of complications compared to full-thickness suture urethroplasty in hypospadias repair [17]. Type of suture was selected randomly for the participants of the present study. Among the present study participants, penile length was had been significantly higher among Group-1 participants, while operation time was significantly shorter in Group-1. However, the main focus of the study was on the post-operative complications, and there was no significant difference in terms of complications among the groups. Wound infection was present in only 1 patient among those who had undergone interrupted suturing, and had 8.57% prevalence among Group-1 participants, but the incidence rate was too small to have a significant value. On the other hand, UC fistula had an increased incidence among Group-2 participants (15.15%), but no significance was observed in this case either. There was no occurrence of complete wound dehiscence in any of the patients in either group, but partial glans dehiscence was observed in 5.71% of Group-1 and 3.03% in Group-2, with no statistical significance. Late complications included meatal stenosis, 2 in group-1 and 1 in group-2. Meatal stenosis was managed with regular daily meatal dilatation for 6 months. For comparison, the study of El-Sherbiny *et al.*, found that, on univariate analysis, suturing technique was a significant risk factor that could affect the outcome of hypospadias repair [18]. They found that, on univariate analysis, the use of a running suture was significantly associated with a higher fistula rate (23%) compared to an interrupted suturing technique (9%). However, on multivariate analysis, they found that the suturing technique had no independent significance [18]. In another univariate analysis study, Sarhan *et al.*, found no significant difference in the fistula rate after an interrupted (15%) or continuous suture (12.5%) technique in hypospadias repair [19]. Our findings in this study were also consistent with these previous findings. 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.

Limitations of the Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

The study showed that the type of suture technique had no significant effect on the occurrence of complications after Tabularized Incised-Plate (TIP) Urethroplasty in Anterior Hypospadias Repair. The overall complication rate had no significant difference between the groups. The suture technique depends on surgeon's choice.

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Conflict of Interest: None declared.

Ethical Approval: The study was approved by the ethical board of the hospital.

RECOMMENDATION

For a better understanding of the effect of suture technique, a larger multi-center study needs to be conducted with a much larger sample size.

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