

COMPARATIVE STUDY OF INVERTING SUTURELINE VERSUS OVER AND OVER CONTINUOUS SUTURING IN HYPOSPADIAS REPAIR

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Background: Hypospadias is one of the most common congenital anomalies of the male newborns affecting 1 in 300. Urethral meatus lies ectopically on the ventral surface of penis proximal to its normal position. There is defective development of urethral spongiosum and ventral prepuce. Various degrees of chordee may be associated. Objective of the study was to study the incidence of urethrocutaneous fistula formation after hypospadias repair employing two different suturing techniques. This Prospective Randomised Descriptive Clinical Trial was conducted in Department of Surgery, Fauji Foundation Hospital, Rawalpindi and Basharat Hospital, Rawalpindi, during a period of five years from January 2005 till December, 2009. **Methods:** A prospective study of 100 patients of glanular/penile hypospadias requiring repair was completed from January, 2005 till December, 2009. Fifty of these patients had urethral tube reconstruction using conventional over and over continuous suturing technique (Group-1). In another group of fifty patients continuous inverting sutures (Connell technique) commonly used in intestinal anastomosis was employed (Group-2). Polyglycolic acid sutures 4/0 to 6/0 as appropriate were used for all the repairs in both the groups by the same surgeon. **Results:** Six (12%) urethrocutaneous fistulas formed in the Group-1 of fifty patients with over and over continuous suturing as compared to 4 (8%) in Group- II with equal number of patients where inverting suture technique was used. **Conclusion:** Inverting sutures reduce the incidence of urethrocutaneous fistula formation in hypospadias repair.

Keywords: hypospadias, urethroplasty, urethrocutaneous fistula

INTRODUCTION

Hypospadias is one of the most common congenital anomalies of the male newborns affecting 1 in 300. Urethral meatus lies ectopically on the ventral surface of penis proximal to its normal position. There is defective development of urethral spongiosum and ventral prepuce. Various degrees of chordee may be associated.¹

The purpose of hypospadias repair is to construct a urethra which enables the patient to urinate adequately and to have a penis with satisfactory cosmetic result and adequate for sexual intercourse.² Repair of hypospadias is a challenging undertaking and there is a learning curve for every surgeon. Different techniques for hypospadias repair have been described and newer methods continue to evolve. The most common and significant complication after hypospadias repair is formation of urethrocutaneous fistula.³ This study observes the incidence of urethrocutaneous fistula in hypospadias repair where an inverting suturing technique is compared with the over and over continuous suture line urethroplasty.

PATIENTS AND METHODS

This prospective study was conducted at Fauji Foundation Teaching Hospital, Rawalpindi and Basharat Hospital, Rawalpindi, from January, 2005 till December, 2009. Patients of all age groups having glanular, coronal or penile hypospadias requiring single stage hypospadias repair were included in the

study. Patients with history of previous hypospadias repair or those with scrotal or perineal hypospadias or requiring multistage repairs were excluded from the study. Informed consent was obtained from parents of all patients included in the study.

A total of 100 consecutive patients assigned to have urethral reconstruction were included in the study. They were selected for urethroplasty by one technique or the other on alternate basis. Their age range was from 6 months to 28 years. Fifty patients had urethral tube formation by over and over continuous suturing by polyglycolic acid of appropriate size ranging from 4/0 to 6/0 depending upon the age of the patient and thickness of the skin (Group-1). In another group of 50 patients continuous inverting suture technique originally described by Connell for intestinal anastomosis was used to form urethral tube (Group-2). All the patients were operated by the author using similar operative and postoperative principles of hypospadioplasty and urethroplasty. Vascularised prepuce onlay or tubularised flap or tubularised incised urethral plate was used in all the patients. Urethral tubes were formed over a stent to be removed after five days during the first dressing procedure. Suprapubic catheterization was employed in all the 100 patients for one week. All the patients had perioperative antibiotic prophylaxis with cefuroxime in appropriate dose for 48 hours. Patients voided through neourethra following removal of suprapubic catheter after one

week. All the patients were reviewed monthly for three months after operation and formation of urethrocutaneous fistulae recorded.

RESULTS

Urethrocutaneous fistula formed in six patients (12%) out of the fifty in Group-1 where continuous over and over suturing was used (Table-1). On the other hand

in Group-2 with inverting suture line 4 patients (8%) developed urethrocutaneous fistula (Table-1). There was no major dehiscence or mortality in this study. All the fistulae were single and less than 5 mm in diameter and subsequently were repaired successfully. The group with inverting suture line had a lower incidence of urethrocutaneous fistula formation.

Table-1: Incidence of urethrocutaneous fistula formation in Age Groups

Age	Group-1 (over and over continuous suturing)			Group-2 (continuous inverting suture technique)		
	Number	Fistulae	%	Number	Fistulae	%
6 month-2 years	8	-	0	6	1	17.0
2-4 years	17	2	12.0	20	2	10.0
4-6 years	9	-	0	10	1	10.0
6-8 years	8	1	12.5	6	-	0
8-10 years	5	1	20.0	6	-	0
10-12 years	2	1	50.0	1	-	0
>12 years	1	1	100	1	-	0
Total	50	6	12	50	4	8

DISCUSSION

Hypospadias is the commonest congenital anomaly of penis. The urethral meatus lies proximally on the ventral surface. Although the dorsal surface of penis is normal there may be ventral curvature called chordee.⁴ It is classified into Anterior (65%), Middle (15%) and Posterior (20%) hypospadias. The anterior group includes Glanular (19%), Coronal (47%) and Distal Penile (34%) hypospadias.⁵ The anterior, middle and posterior penile group was mainly included in the study.

The exact aetiology of hypospadias remains unknown and may be multifactorial. There is a world wide increase in the incidence of hypospadias. This may be due to environmental factors modifying the hormonal and genetic factors influencing embryological development of urethra. Interferences with the androgen metabolism and androgen receptors, gene defects and estrogen excesses are proposed possible etiological factors.⁶

First description of hypospadias is traceable to Heliodorus and Antyllus (100-200 AD). Thereafter numerous mostly unsuccessful primitive procedures for repair of hypospadias were practiced. Dennis Brown and Vander Muelen⁷ promoted multistaged repairs. Then came the era of one stage repairs which are better and more desirable. Over 250 reported methods of hypospadias repair have been described and newer techniques continue to evolve. Different types of urethroplasty techniques include adjacent skin flaps, free skin and buccal mucosal grafts, mobilised vascular flaps mostly utilising inner face prepuce and more recently tubularised incised plates. Familiarity with the principles of hypospadias repair and most of the techniques can help the surgeon plan and individualise an operation according to the situation in a particular urethral defect. The main components of surgical repair

of hypospadias are meatoplasty and glanuloplasty, orthoplasty, urethroplasty, skin cover and scrotoplasty. After chordee correction the urethral meatus retracts proximally. Incidence of urethrocutaneous fistula have been reported to be 1% to 30%, meatal stenosis 7% to 10%, and incomplete chordee correction (1% to 6%).^{8,9} Haemorrhage, haematoma, total disruption of repair, Infection, urethral stricture are other possible complications.

We compared over and over continuous suturing with an equal number of patients where Connel principle was employed to invert the suture line. Inverting suture lines initially described by Connel in 1893 are commonly used in intestinal anastomosis. It has been widely accepted that intestinal wounds heal more reliably when an inverting suture line is constructed. This helps the outer serosal surfaces to come in close apposition. Also it is less likely to jeopardize the blood supply of suture line as compared to a continuous over and over suturing technique.¹⁰ Inverting suture lines in the 50 patients in Group-2 of our study resulted in a reduction in the number of urethrocutaneous fistulae. The possible reason could be that over and over continuous suturing does leave areas of pouting skin margins. This may in the end result in facilitation of urethrocutaneous fistula formation. If the suture line is inverted cutaneous epithelium has less probability to grow out and communicate with the covering skin thus establishing an urethrocutaneous fistula. The incidence of fistula formation may further be minimised if inverting suture technique is combined with double dartos flaps in expert hands.

CONCLUSION

Modern operating materials and newer surgical techniques have improved the results in hypospadias

repairs and reduced the incidence of complications. However a larger study is required to establish if the improvement in the results with an inverting suture line are statistically significant.

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