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Original Research Article

The experimental study on the tubularized incised plate (tip) urethroplasty in children on the central India

Shobhita K. Mane, Santosh Kumar*

Department of Surgery, Lt. Lakhiram Agrawal Memorial Govt. Medical College and Associated Kirodimal Government Hospital, Raigarh, Chhattisgarh, India

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***Correspondence:**
Dr. Santosh Kumar,
E-mail: santosh.156kumar@gmail.com

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ABSTRACT

Background: The main objective of the present study is assessment of the tubularized incised plate (TIP) urethroplasty. The present study was done in experimental research design.
Methods: We had started Tubularized incised plate urethroplasty as developed by Warren Snodgrass in all boys having coronal sub-coronal, distal, mid, and proximal hypospadias where urethral plate is intact.
Results: Out of 37 patients 17 patients developed fistulas at different sites, 10 patients had coronal fistula, 2 distal penile and one mid-shaft fistula. 2 patients who had fistula closure with urethroplasty for distal urethra by TIP developed reopening of fistula. 7 patients had thinning of stream out of which 3 patients developed immediate post-operative. It was managed by meatal dilatation. 4 patients complained thinning of stream after l0 days to one month. All patients were advised meatal dilatation. Stream improved later on in 6 patients. In 7 patients fistulas also closed spontaneously.
Conclusions: It is also found and concluded that the total number of the complication rate between primary and re-operative in TIP method is very low; it means TIP method is very useful and effective.

Keywords: Hypospadias, Tubularized Incised Plate (TIP), Urethroplasty

INTRODUCTION

Hypospadias (Hypo-Below, Spades- opening) is a congenital anomaly in which, the Uretheral meatus is present on the ventral surface of penis instead of its tip. A number of procedures had been done and described for the correction of this anomaly. The first account of repair is found in 100-200 AD and consisted of amputation of the shaft distal to existing meatus. Many procedure were described in early 19th century but were not very successful. In 1869 Thiersch described the use of local tissue flap to repair hypospadias and buttonhole flap of prepuce to cover ventral surface.[1] Duplay in 1874 used the technique to release the chordee and create a central flap that was tubularized later on for urethral tube formation.[2] Mathieu in 1932 introduced meatal based flap raised from penile skin but it was useful only in distal penile and coronal Hypospadias.[3]

All procedures for other hypospadias were multi-staged, requiring chordee release, straightening of the penis, mobilization of skin to ventral surface and formation of the urethral tube. These procedures had problems of multiple operations, scarred skin and disrupted blood supply to the repair. Later on many authors described procedures for the one stage repair of hypospadias. These one stage repairs stood as good procedures overcoming the problems of multistage procedures.[4] Previously it was thought that the bending of penis is because of skin tethering and abnormal Corpora cavernosa development,

But Smith was explained that simply degloving the penis skin straighten the penis.[5]

Later Duckett insisted on preservation of the urethral plate.[6] This urethral plate was incorporated in different urethroplasty procedures i.e. Mathieu flip flap, Onlay preputial flap etc. A criticism of these repairs was that they resulted in horizontally oriented and rounded meatus, which was cosmetically less desirable.

Rich et al., described hinging the plate by incising its distal aspect to improve the meatal cosmesis.[7] Snodgrass extended this midline incision deeply through the entire urethral plate and realized that it can be tubularized without using additional flap.[8] The result of above modified techniques was experienced and reported by several centers leading to the idea that longer urethral plates with mid and proximal meatus can be incised and tubularized.

This concept has gained popularity and multicenter experiences are good. The main objective of the present study is assessment of the tubularized incised plate (TIP) urethroplasty. The present study was done in experimental research design.

METHODS

The experimental study was done in Pediatric Surgery Department, Gandhi Medical College and Associated Kamla Nehru Hospital, Bhopal (M.P.) from October 2011 to April 2014. In initial 2 years. We had started Tubularized incised plate urethroplasty as developed by Warren Snodgrass in all boys having coronal sub-coronal, distal, mid, and proximal hypospadias where urethral plate is intact.

Sample

Total 37 cases were included in the present study.

Procedure

These procedures were done as describe below:

Anesthesia

All boys are operated under general anesthesia with endotracheal intubation.

Tubularized incised plate urethroplasty

It was done in next 37 patients who had coronal, distal penile, mid-shaft and proximal penile hypospadias.

Dressings

All cases of urethroplasty were dressed by non-adhesive dressings (Sofratule/Bactigrass) and covered by gauze. Pressure is applied by tight dressing. Later on, penis was compressed over abdomen.

Urinary diversion

Every urethroplasty was done on 6/7 Fr catheters. In urethroplasties done by TIP method, initially catheter was kept for 7 days but gradually we decreased the time of diversion and then for the distal penile variety stent were kept only for 48 hrs and for proximal variety stent were kept for 72 hrs.

Antibiotics

Every child was given 4th generation Cephalosporin according to weight of child for at least 7 days.

RESULTS

We had started Tubularized incised plate urethroplasty as developed by Snodgrass. It was done in all 37 boys having coronal, sub-coronal, distal, mid, and proximal hypospadias where urethral plate was intact. All 37 patients who underwent above procedures were followed up. Outcome of surgery was assessed on the basis of position of neo-meatus, its shape (Cosmesis), penile curvature / distortion, glans / wound dehiscence, presence or absence of fistulas, their number, their positions and response to distal urethral / meatal dilatation.

Table 1 is showing in the out of 37 patients was smallest of 18 months of age and the oldest patients was of 20 years who came for primary repair. Maximum patients were toddlers i.e. below 5 years of age. Only 3 patients were above 14 years of age out of which, only one had come for primary repair. Other three were previous failed hypospadias and had come for reoperation.

Table 1: Age wise distribution of studied cases.

Age (years)	Snodgrass	Total
0-4	17(45.9%)	33(44.6%)
5 -9	13 (35.1%)	28 (37 .8%)
10-14	4 (10.8%)	9 (12.2%)
14 and, above	3 (8.1%)	4 (5.4%)
Total	37	74

Mean ± SD: 6.22 Years ± 4.26

Table 2 observed that the 21 patients with distal penile variety and 8 of coronal variety Snodgrass TIP procedure done. Numbers of 6 patients were mid-shaft and 2 cases were of proximal penile variety also under gone Snodgrass TIP urethroplasty.

Table 3 showing on the out of 37 patients 17 patients developed fistulas at different sites, 10 patients had coronal fistula, 2 distal penile and one mid-shaft fistula. 2 patients who had fistula closure with urethroplasty for distal urethra by TIP developed reopening of fistula.

Table 2: Presentation of patients.

Site of meatus	Snodgrass
Coronal	8
Distal penile	21
Mid shaft	6
Prox. Penile	2
Total	37

7 patients had thinning of stream out of which 3 patients developed immediate post-operative. It was managed by meatal dilatation. 4 patients complained thinning of stream after l0 days to one month. All patients were advised meatal dilatation. Stream improved later on in 6 patients. In 7 patients fistulas also closed spontaneously. All patients who had any complication underwent different conservative managements.

Table 3: Snodgrass tubularized incised plate (TIP) urethroplasty.

Complication	Post op	Improved
Fistula	15	7
Thinning of stream	7	6
Wound dehiscence	2	2
Total	24	15

DISCUSSION

Many of them were improved by these procedures, rest of them were advised surgical corrections. Previously usual recommendation for correction of hypospadias was that it should be repaired before child goes to school. It was found that, as there is some growth of penis occur up to 2 years of age.[6]

AAP (American Academy of Paediatrics) recommended that best time of surgery is 6-12 months.[9] Although John W Duckett mentioned that successful repair can be done after 3 months of age.[4] Although many authors mentioned that the minimum age of repair was 6 months for TIP urethroplasty and 18 months for Mathieu's repair.[8-10] Their upper age limit was 11 to 13 years. Sugarman and Smith report their experience of urethroplasty in very young children i.e. 6 months to 33 months of boys.[11]

In this institute youngest child who presented was 18-month-old. Different age of presentation of different type of hypospadias was 18 months to 20 years with mean age of 6.22 years. Primary presentation may extend up to 18-20 years because of different socio-economic reasons. Recently in 2013, a prospectively study of TIP repairs by Snodgrass et al indicated that the age at surgery does not increase odds of urethroplasty complications. Surgery can be performed any time after 3 months (in full-term, healthy boys) without raising the rate of complications.[12]

Only one boy presented with right side cryptorchidism. Literature reveals that approximately 8 -9% patients have cryptorchidism in all type of hypospadias. As in this study only coronal, distal shaft and all mid and proximal variety in which urethral plate can be preserved are include, this data is not exactly comparable.[13]

It was found that sibling of two boys had history of hypospadias. There is documented evidence that 14% of male siblings have hyposapdias.[14]

Urethroplasty Complications:

In 37 patients TIP urethroplasty was started. After initial learning curve now TIP urethroplasty is regularly being done. 15 patients out of 37 (i.e. 40.5%) developed urethra-cutaneous fistula. 10 patients had coronal, distal penile and one developed mid-shaft fistula. 2 patients who had underwent fistula closure with TIP surgery for distal part, one patient developed recurrence of fistula at the same site with meatal stenosis. Fistula reopened in other. It might be because of use of Foley's catheter in an adolescent boy. Shanberg et al., also pointed out fistula with Foley's catheter use. Seven boys whom had fistula, improved by distal urethral dilatation. 6 boys out of 7 also show improvement, which had problem of thinning of stream. Therefore, overall success rate was 75.6%.[15]

This success rate with TIP urethroplasty is not good as compared to a multi-center experience in USA and as reported by Saleem, et al. Their results were very good i.e. 93%.[16] In a Thai experience fistula rate was 14%. Barrak et al., and Anwar-Ul-Haq found fistula rates as high as 20% and 24.4 %.[17-19] Elicevek gave 77% initial good results and overall 95%, after correction of complications.[17] Their single fistula rate was 8% and multiple fistula with meatal stenosis was 3%. These total results are comparable with our study as he concluded that "TIP can be used as primary surgery and after a learning curve cosmetic and functional results are good".

Glanular dehiscence was nil in Snodgrass urethroplasty, but 2 patients developed penile wound dehiscence. One was with fistula and another was simple skin dehiscence. Snodgrass mentioned one case in his series.[20] Two cases /148 in multicenter experience showed dehiscence of glans. Oswald also mentioned 1 case of glans dehiscence.[21,22]

Although In the present study of 37 patients none of them developed this problem in TIP repair. Only in one study of TIP urethroplasty for proximal hypospadias one patient had glans dehiscence otherwise this complication was not commonly encounter in literature.[20]

Snodgrass repair in posterior hypospadias:

Snodgrass TIP urethroplasty is easily performed in patients, in whom urethral plate can be preserved after chordee correction. Snodgrass found overall complication rate was 33% in his initial work.[23] In the present study only 2 patients of posterior hypospadias found suitable in

which TIP urethroplasty can be done. Both developed post-operative meatal stenosis. It was managed by meatal dilatation. One developed mid shaft fistula, which closed spontaneously after wards. As such in both patient ultimate result was very good (i.e. 100%) but such few numbers could not be compared with other studies.

Although in a Taiwan study overall success rate was 88% other studies mentioned overall complication rates of 27% and 11% in proximal or penoscrotal hypospadias without major degree of chordee. Snodgrass showed 21% fistula rate in proximal hypospadias repair.[24-27]

TIP Urethroplasty for Reoperation:

After the introduction of TIP urethroplasty for distal hypospadias its use was extended in different varieties, as well as in patients who has previously failed urethroplasties by other methods. In this study 4 patients are operated by TIP urethroplasty as reoperation. One who had coronal meatus with mid-penile fistula developed coronal fistula post-operatively. Second have mid shaft meatus with distal scarred skin.

Postoperatively boy had bifurcated stream and coronal fistula. Patient's conditions were improved later on. In remaining 2 cases one developed meatal stenosis. Overall results are not very good as fistula occurred in 50% of cases and meatal stenosis in one out of 4 i.e.25%. Only one patient operated by Mathieu's, and two by on lay flap techniques, out of which one developed fistula. In all procedure results are not comparable, as number of patients is very small.

Retik and Borer operated on 4 boys who had failed urethroplasties, by TIP method and comes out with good results.[28] Later when they compared primary repair with reoperation in patients, their total complication rate came 24%, in re-operative group as compare to primary repair which was only 5%.[29]

Shanberg gives good results in his study of re-operative hypospadias.[21] Yang conclude in his study that. "TIP is the viable option for the treatment of previously failed hypospadias repair".[30] It is also found that total complication rate between primary and re-operative TIP is not significantly different.[31]

CONCLUSION

It is also found and concluded that the total number of the complication rate between primary and re-operative in TIP method is very low; it means TIP method is very useful and effective.

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