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Urology

Choice of urinary drainage after hypospadias repair: suprapubic catheter or urethral stent ?

KEY WORDS: Hypospadias Repair, Suprapubic drainage, urethral Stent

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ABSTRACT

Introduction: Hypospadias is a common congenital disorder requiring surgical correction. The approach to hypospadias repair has been ever changing over past several decades. Apart from surgical techniques, selection of appropriate method of urinary drainage also seems to be important for good results.

AIM: To find out the better method of urinary drainage, in terms of post -operative bladder spasm, stent blockade and overall comfort of the patient.

Material and Method: A prospective study was carried out on 40 subjects. The patients, who have undergone single stage hypospadias repair by the single surgeon, were included. Patients were divided in two groups of 20 each: Group A, with transurethral stent and group B, with suprapubic catheter for bladder drainage. Both the groups received similar post-operative management. The results were analyzed by chi square test to determine the significance.

Results: The incidence of bladder spasm and accidental removal of stent was similar in both the groups (20% and 5 % respectively). 20 % of group A and 25 % of group B had excellent post operative comfort. In group A, one patient had stent slip and another had urinary retention and both required emergency suprapubic catheter insertion. Only one in group B had stent slip and no incidence of urinary retention; not requiring any intervention.

Conclusion: This study was carried out in a smaller sample population and needs further evaluation. Though the overall results were comparable in both the arms; group B patients had an advantage over the other, should there be accidental stent removal.

INTRODUCTION

Hypospadias is a common congenital disorder, occurring in 1 of 300 live male births. Hypospadias surgery is unique among the common congenital anomalies, in having the most number of surgical techniques for the correction of a single condition. For centuries the imagination and ingenuity of surgeons have been challenged to create cosmetically and functionally satisfactory phallus.[1] The approach to hypospadias repair has changed over the past several decades. There has been an inclination towards more and more single-staged rather than the multi-staged repairs. The single-staged repairs seem to be desirable for all the degrees of hypospadias, provided the complication rates and the cosmetic results are satisfactory.[2] Successful urethral reconstruction of hypospadias depends on sound surgical principles and meticulous surgical techniques. The selection of appropriate method of urinary drainage and penile dressing also seem to be important to achieve good results.[3]

As with other aspects of the repair, different modes of postoperative urinary drainage also have been under evaluation, time to time. Traditionally, a bladder drainage catheter has been used for hypospadias repair. The purpose of a bladder catheter has been to provide urinary diversion, permit the repair to become watertight, immobilize the suture lines, drain the neo-urethra, reduce tissue reaction and patient's comfort.[1] The use of perineal urethrostomy, urethral catheter and suprapubic cystostomy after hypospadias repair were quite popular earlier.[6,7,8]

Over the past decade, urethral stents are being increasingly used.[9] The concept of transurethral stents or even the catheterless repair came in to existence because of the increasing practice of the day care surgery in the hypospadias repair.[4] However at times, these stents could result in problems due to either the blockade of stent or the accidental removal.[13] At the other end, suprapubic cystostomies can result in intense bladder spasms, incomplete drainage due to non-dependency and prolonged hospitalization.

Latest trend in the hypospadias surgery is the preference for single-staged repair for all degree of hypospadias and the use of 7F to 10F urethral stent with multiple perforations at the proximal end. When the proximal tip of this catheter is placed proximal to the bladder neck, urine flows continuously.[3] By placing the proximal tip of the stent, distal to the bladder neck, patient is continent to micturition.[1] The stent need to be secured to the glans, by a suture and urine may be drained, either in to a collecting bag or on to the diapers.[11] A modification in the urethral stent was introduced by Mitchell and Kulb[1], called splent. An urethral splent is a silicon pleated stent, with a longitudinal strip corresponding to one-fourth circumference of the tubing, cut. Such split tube is considered to be advantageous over the classical stent.[1] Splents are believed to be more compressible and provide adequate drainage of the urethral secretions as well. However the splents are not as popular as the stents.

Bracka[7] has preferred the use of a fine silicon Foley's catheter through the repair. According to him, this not only provides effective splintage but a more complete urinary drainage and probably fewer bladder spasms than does suprapubic drainage. The perineal urethrostomy, which was favoured by Byars, Browne and Tolhurst[6], still has got role for the most severe variety of hypospadias.

Even as, there has been an increasing tendency to use urethral stents without the proximal urinary diversion, some authors still believe in the proximal diversion of urine after hypospadias repair. Harris and Jeffery[8], in their 100 consecutive hypospadias repairs, compared the three different methods of urinary drainage, in terms of the occurrence of complications. In their study they found that the use of suprapubic cystostomy was associated with least complications as compared to perineal urethrostomy and per-urethral catheter. Their findings were in strong support for the recommendations of Duckett[14], that suprapubic cystostomy is the route of choice. Joseph[11] used suprapubic urinary drainage after the urethroplasty for different types of hypospadias, without urethral stent and reported healing with a good lumen. In this study the urinary diversion was continued for 10 to 12 days.

Minevich et al[10], in their study of 202 consecutive patients of Mathieu repair, found that all patients tolerated the urethral stents well and only 3 required anticholinergic medication to control

bladder spasm. Those who advocate catheterless repair for distal hypospadias, feel that stents could promote pressure related wound breakdown. Hence there is tendency to use soft silicon rubber stents. These stents are left in situ for 7 to 12 days postoperatively.[5,10]

The latest comparative analysis between stent and suprapubic diversion was carried out by Demirbilek and Atayurt.[2] They used two types of urinary drainage after hypospadias repair. One group had suprapubic cystostomy and the other, urethral stent. Suprapubic group also had urethral stent, which was later removed 2 days after operation. In both the groups, proximal end of the stent was placed distal to bladder neck. Suprapubic catheter was removed 6-8 days after operation. When stent alone was used, it was removed 6-8 days after operation. They reported that, the incidence of urethro-cutaneous fistulae and meatal stenosis were significantly less amongst those with suprapubic urinary diversion. They also noted that children were more comfortable during the postoperative period when suprapubic diversion was used instead of urethral stent.

As mentioned earlier, main disadvantages of suprapubic urinary diversion are, that it provides non dependent drainage and that there are increased chances of bladder spasm. Since it is a non-dependent drainage, at times patients do pass urine per urethra. But the fact that, being wider tube drainage and thus lesser chances of blockade, leaves many patients and the surgeons, more comfortable with suprapubic drainage.

We, in our Department of Paediatric Surgery, have been using two types of urinary drainage after hypospadias repair: transurethral stent alone or a suprapubic catheter along with transurethral stent, as per individual preferences. When only the stent is used, proximal tip is kept proximal to the bladder neck and the urine is continuously drained in to a drainage bag. Whereas, when suprapubic catheter is used, a stent is left in the neourethra such that, proximal end of the later does not traverse bladder neck. Suprapubic catheter is attached to continuous drainage bag and the distal end of urethral stent is cut short by 1 cm beyond the neomeatus and left open. The sent in both the cases is removed on 10 to 14 postoperative day. Suprapubic catheter is removed after 2 weeks of surgery, after making sure that the child is able to pass urine per urethra.

As there were no studies available so far, we undertook to study the practice of postoperative urinary drainage, as described above, vis-s-vis complication rates and the patients' comfort in two arms.

AIMS AND OBJECTIVES

The aims and objectives of this study are:

1. To find out, which method of urinary drainage is better tolerated by the patients, in terms of postoperative bladder spasm, stent block and overall patient comfort.
2. To compare the complication rates among the two groups of patients under study.

MATERIAL AND METHODS:

Study design: Prospective data collection and analysis.

Study population: All the patients who have undergone hypospadias repair, since the commencement of the study, in the Department of Paediatric Surgery at our institute. These patients were studied as two groups:

Group A: Those in whom transurethral stent was used as postoperative urinary drainage.

Group B: Those who had suprapubic catheter for bladder drainage and a transneourethral stent (which did not have traversed the bladder neck).

Twenty consecutive patients, in each arm have been taken randomly for the study. All of the subjects were operated as in-patients. All the patients had got perioperative antibiotic cover, oxybutynin (Tropan; 0.2 mg/kg body wt. BD) and luxative (Livoluk), as protocol of the unit. Occurrence of the bladder spasm, catheter / stent block and overall comfort of the patients was recorded in all. Penile dressing was removed around fifth postoperative day. In group A stent was removed between 7-14 days. In the group B, stent was removed around 14 days postoperatively. Once the stent was removed, patients were observed for quality of urinary stream. In group B, suprapubic catheter was initially kept clamped for 24 hours and removed once the patients passed urine satisfactorily. Complications, if any, were recorded. All the subjects were followed up for at least three months postoperatively. Appropriate management was carried out for complications, like urethra-cutaneous fistula and stenosis. The result are analysed by Chi square test to determine the significance.

RESULTS

The mean age of patients in group A and B were 6 and 5.1 years respectively. Distal penile hypospadias was the commonest type included in this study (26 of 40). It was observed that Asopa's and Snodgrass repairs were the common urethroplasties carried out during the study. As per the type of the operation, it was the surgeon's choice and as such no randomization was done in these cases. All the patients / parents were asked to give the subjective assessment of the comfort, when the drainage tubes were in situ. (Figure 1)

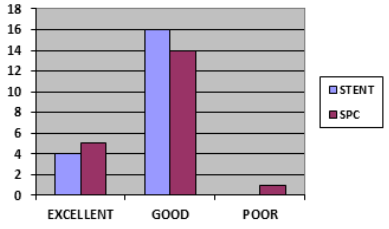

Figure 1. Assessment of Patient Comfort

Early post operative complications (Spasm 10%, Tube block 0% and Accidental removal 5%) were found to be similar in both the groups. After removal of the penile dressing, appearance of the penile skin was noted. In group A, 3 (15%) had macerated penile skin and 2 (10%) had flap necrosis; whereas in group B, one patient had skin maceration and another had flap necrosis.

Late complications were also analysed. Urethro-cutaneous fistula (55% & 45%) and stenosis (10% in each group) were the common problems encountered (Figure 2). There was no significant difference observed in two groups of patients, for the incidence of either fistula or stenosis by Chi square test ($p > 0.5$). As it was observed that Asopa's repair and Snodgrass urethroplasties were the commonly done procedures, complication rates were separately analysed for the above two operations (Table 1&2).

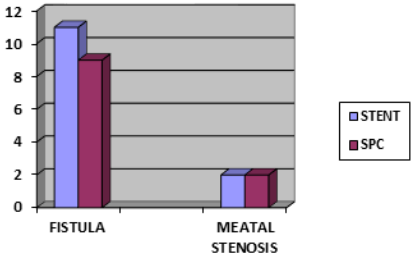

Figure 2. Delayed Complications

Table 1 (Group A: Urethral stent group)

	Total operations	UCF* n (%)	Meatal stenosis n (%)	Total complications n (%)
Snodgrass	7	3 (42.8%)	1 (14.2%)	4 (57%)
Asopa's	4	2 (50%)	-	2 (50%)

Table 2 (Group B: Suprapubic group)

	Total operations	UCF* n (%)	Meatal stenosis n (%)	Total complications n (%)
Snodgrass	11	2 (18%)	1 (9%)	3 (27%)
Asopa's	6	4 (66.6%)	1 (16.6%)	5 (83.30%)

* Urethro-cutaneous fistula

It was found that Snodgrass urethroplasty was associated with 42.8% fistula rate in Group A and it was 18% in Group B. Whereas Asopa's urethroplasty was associated with 50% fistula rate in Group A and 66.6% in Group B. Meatal stenosis was seen in 14.2% patients in Group A and 9% patients in Group undergoing Snodgrass urethroplasty. None of the patients in Group A had meatal stenosis and 16.6% patients had meatal stenosis in group B, who underwent Asopa's urethroplasty. There was no significant difference observed in the frequency of urethra-cutaneous fistula, after Snodgrass urethroplasty, in either of the groups (p>0.01).

One of the patients in Group A (urethral stent) had accidental removal of urethral stent, and required a suprapubic cystostomy. This child later on developed urethral stricture and required frequent dilatations. Another child of the same group had urethral stent removed on postoperative day 5, following which he developed acute urinary retention, requiring a suprapubic cystostomy. From the Group B (Suprapubic catheter), one patient had accidental removal of urethral stent on postoperative day 4. This child had a functional suprapubic catheter, so did not require any further intervention immediately. Though, later he developed urethro-cutaneous fistula.

DISCUSSION

Different methods of hypospadias repair are under regular improvisation. It was later realized that penile dressing and urinary drainage procedures also contribute to the results of urethroplasty. Postoperative urinary drainage has been considered an essential component of the urethroplasty. In an attempt to improve the surgical results and patients' comfort, different urinary drainage methods have been evaluated from time to time.

As regards the postoperative urinary drainage, the available literature addresses the following:

1. Whether urinary diversion is needed after hypospadias repair?
2. If yes, what type of diversion?
3. If urethral drainage, should if enter the bladder or remain external to the bladder neck?

Traditionally, urinary diversion was used after all urethroplasties. The common diversion procedures were, per urethral catheter, suprapubic cystostomy and perineal urethrostomy. The idea was to allow urethral wound healing without urinary soiling. These patients with proximal diversion needed prolonged hospitalization. With the popularization of day care surgery, inclination is towards the use of urethral stents, or even catheterless repair, especially for distal variety of hypospadias.
The present study involves two groups of patients:

A. Urethral stent alone, with proximal tip entering bladder and continuously draining urine into a drainage bag.
B. Suprapubic cystostomy and in additional urethral stent, proximal tip of which remains distal to the bladder neck.

Both the groups of patients tolerated the bladder drainage procedures equally well except one from group B. This patient had intense bladder spasms and was allergic to oxybutynin and analgesics. Bladder spasm was observed in both the groups with equal frequency (10%) in our study. In an earlier report by Demirbilek and Atayurt[2], no bladder spasm was observed in patients with suprapubic cystostomy.

One of the disadvantages of urethral stent is that, it tends to get blockage frequently, due to small caliber. Suprapubic catheter, being of wider lumen, can drain urine easily. In the present study, blockage of stent and suprapubic catheter occurred only transiently and opened-up on flushing alone. With suprapubic catheter, urethra remains dry, except when it gets blocked.

Fistula rates are quite high in our study (55% in group A, and 45% in group B). The contemporary literature report it to be around 5-17% for all types of repair.[2,15] In a review of surgical results of hypospadias, reported by Smith, the fistula rate was between 3.3% to 33%, after pedicle flap urethroplasty.[16] In a study, similar to ours, Demirbilek and Atayurt[2], reported 7.14% and 14.28% fistula rates in suprapubic catheter and urethral stent groups, respectively. The reasons for such high occurrence of fistula, in our patients, could be explained by a few limitations:

- Small sample size
- Different surgical techniques
- Heterogenous population

In Demirbilek and Atayurt's series patients were operated by either Mathieu, Duckett's or Duckett's combined with Thiersch technique. It is known that complications as such cannot be attributed to the methods of urinary drainage alone and sound surgical principles and meticulous techniques; do have a major role to play in this regard.

To determine, whether similar operations in two groups of patients produced different results, we compared Asopa's and Snodgrass techniques. When applied chi square test, results of both the techniques were not found to be significantly different (p >0.01). Whereas, Demirbilek and Atayurt have reported significant difference in the incidence of fistula and meatal stenosis, between patients of suprapubic diversion and urethral stent groups (p < 0.01).

The present study is different from the earlier ones, in several aspects. Mitchell and Kulb[1] in 1985, have reported, use of urethral splent in 44 patients. In all, proximal tip of the splent was placed just proximal to the neourethra. Both, dressing and splent were removed on postoperative day.[7] During initial part of their study, suprapubic cystostomy was also added as a safety measure. In those patients, suprapubic catheter was removed around 36 hours postoperatively. None of their patients required subsequent catheterization or hospitalization. They reported 4.5% fistula rate (2 of 44).

In 1991, de Badiola et al[5], reported 113 patients of age between 3 months and 13 years. In all these patients, only urethral stent, with multiple perforations towards proximal end was used without the urinary diversion. Proximal tip was placed in bladder, in non toilet trained children and it was placed proximal to the bladder neck in toilet trained children. The stent was left in situ for 2-5 days in those who underwent meatal based flap repair. It was retained for 10 days, in those who had preputial island flap repair. Children with meatal flap repair (n=53) had no fistula or stenosis and preputial island repair (n=58) had fistula in 27%, stenosis in 2% and diverticula in 9%.

Demirbilek and Atayurt[2], reported 105 patients of primary hypospadias repair, who had urinary diversion similar to the present study. They had 56 of their patients with suprapubic cystostomy and other 49 with stent. Here, proximal end of the stent was outside bladder neck. Patients of suprapubic group also had an urethral stent, which was removed after 2 days of operation. Suprapubic catheter was removed on 6-8 days postoperatively. In patients, where stent alone was used, it was removed 6-8 days postoperatively. In their study, they reported significantly different fistula and meatal stenosis rates, between the two groups. Mild bladder spasm occurred in 2.5% patients of stent group and they responded to oxybutynin. No bladder spasm was noted in suprapubic cystostomy group. Overall, they reported better results with suprapubic group. On comparison of different surgical procedures vis-a-vis complications, it was noted that Duckett's repair without suprapubic cystostomy, had 2 to 3 times more complications.

Reviewing our results, we did not find significant difference in the

occurrence of complications, in between the two groups, we studied. Results of the two groups were comparable. But, it was observed that, in group A (stent group), accidental removal of the stent had required an alternate drainage procedure, in the form of suprapubic cystostomy. Thus, resulting in increased morbidity, should the stent slips out accidentally. Obviously, such a situation could be avoided if suprapubic cystostomy is added as a bladder drainage procedure, after the hypospadias repair.

SUMMARY AND CONCLUSION

This study was carried out in a smaller sample population. However, we are of opinion that, urinary diversion is an essential component of hypospadias repair. Choosing between suprapubic cystostomy and urethral stent, could be an individual preference. Suprapubic cystostomy, as a primary urinary drainage procedure, at the time of hypospadias repair, has not resulted in increased morbidity. Rather, it was appreciated equally well, by the patients themselves. Using urethral stent alone can result in problems, should there be accidental removal. Such unpleasant situations can be avoided, if suprapubic drainage is added to the urethroplasty, primarily.

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