Surgery for distal hypospadias: what about the catheter?

Maria-Grazia Scarpa,[1] Giordano Perin,[1] Massimo Di Grazia,[2] Daniela Codrich,[1] Federica Pederiva,[1] Edoardo Guida,[1] Maria Antonietta Lembo,[1] Antonio Giannotta,[1] Jürgen Schleef[1]

[1]Pediatric Surgery, Institute for Maternal and Child Health - IRCCS Burlo Garofolo, Trieste; [2]Institute for Maternal and Child Health - IRCCS Burlo Garofolo, Trieste, Italy

Abstract

No agreed recommendations exist for timing of urethral stent removal, after distal hypospadias surgery. We compared our preliminary case series with outcomes from literature: 18/44 patients were treated with catheter and 26/44 without it. The surgical outcome was comparable in the two groups. After hypospadias surgery, the main advantage of the immediate postoperative catheter removal was the shorter hospital stay without negatively affecting the care and home management.

Introduction

Hypospadias is the most common penile malformation, affecting up to 1 in 300 live male births. Its aetiology is largely unknown, often multifactorial.[1] Since its introduction in 1994 by Snodgrass,[2] Tubularized Incised Plate Urethroplasty (TIPU) has become one of the most popular procedures for hypospadias repair.[3] Generally a urinary diversion (urethral stent or bladder catheter) is maintained in situ for 2-7 days or more, depending on the severity of the defect. Healing of the urethral plate after incision is the result of urothelial growth from the edges along the whole depth of the incision. Urine flow during voiding might be responsible for keeping the incised plate open during urothelial regeneration. A urethral stent seems not to be necessary for normal healing in a rabbit model.[4] Few researchers tried to evaluate the efficacy and safety of a catheter-free urethroplasty in children. Because of the low level of evidence, the latest guidelines of the European Association of Urology (EAU) and European Society of Paediatric Urology (ESPU) give no recommendations concerning the timing of catheter removal, after distal hypospadias surgery.[5] Immediate removal of the catheter in distal hypospadias can reduce the discomfort post operatively and in the community following discharge. This argument is in line with the modern concept of *fast track surgery*.[6]

Correspondence: Maria-Grazia Scarpa, Pediatric Surgery, Institute for Maternal and Child Health IRCCS Burlo Garofolo, via dell'Istria, 65/1, 34137 Trieste (Italy).
Tel: +39 040 3785314 - Fax: +39 040 3785537.
E-mail: mariagrazia.scarpa@burlo.trieste.it

Key words: TIPU; Catheter; Fistula; Urinary retention; Stent.

Received for publication: 6 November 2016.
Revision received: 9 August 2017.
Accepted for publication: 22 August 2017.

La Pediatria Medica e Chirurgica 2017; 39:145
doi:10.4081/pmc.2017.145

Materials and Methods

We retrospectively analysed data related to TIPU performed at our Department between May 2011 and June 2013. In balanic forms we usually maintain a Foley® bladder catheter for 2-3 days depending on postoperative edema. When the native meatus is under the coronal sulcus we usually remove the catheter after 6 days, when it is proximal, after 7-10 days. We usually remove the dressing (Urgotul®, sterile gauzes and a soft compression bandage) 3 days after the operation. In cases where edema/hematoma persists instead of removing it we only change it. In this study we only included cases of primitive (non recurrent) distal hypospadias with a minimal follow-up of 9 months. Balanic hypospadias were excluded.

Patients affected by syndromes, psychiatric diseases and major malformations were excluded. The operating surgeons assigned the patient to one of two groups (non randomised): group A received catheter for 6 days; group B had it removed immediately after surgery. We used a silicon bladder catheter: Foley® 8-10 Fr depending on the age of the patient and on the depth of the urethral plate. Children were assigned to group A or B on an alternate month basis: if a patient was operated in May 2011 would have been assigned to group A, if operated on June 2011 to group B and so on. Three general paediatric surgeons were involved: each of them had been operating the same number/year of distal hypospadias. All patients were dis-

charged without catheter and were scheduled for an outpatient assessment weekly in the first month, monthly for the next three months, then at 6-12-24 months if necessary. We collected information related to age at surgery, type of hypospadias and association with chordee, presence or absence of a catheter, acute urinary retention episodes, persistent fistula occurrence (fistula persisting for more than 4 weeks during follow up), hospitalization and follow-up. Urinary retention was defined as a full bladder on physical and ultrasound examination associated with pain. The presence of a urethral fistula was based on subjective assessment of the surgeon and confirmed by an assessment under sedation in the operating theatre. Our final outcome was to compare the incidence of episodes of acute urinary retention after catheter removal, fistula rate and the length of hospital stay in the two groups. Statistical analysis was conducted with the Statistica version 10-StatSoft program. Numerical data were expressed as the group median and range (minimum and maximum) ± SD (Standard Deviation) and CI (Confidence Interval) 95%. Statistical significance was set at $P<0.05$.

We finally compared our results with the outcomes reported in the literature for unstented hypospadias repair.

Results

Fifty-nine TIPU were performed during the analysed period. 44/59 patients satisfied the requirements for inclusion: 18 cases received a catheter for six days (group A), 26 cases had it removed immediately after surgery (group B). A summary of demographic, operative and postoperative variables analysed can be found in Table 1.

Concerning hospital stay, there was a statistically significant difference between the two groups (P=0.000). The median length of hospitalization was 7 days (range 6-9, SD 0.85, CI6.74-7.59) for group A, 3 days (range 3-7, SD 0.94, CI 3.19-3.95) for group B.

No blockage or breakdown of the catheter occurred in group A. No urinary tract infections were recorded. After the removal of the catheter, 3 episodes of urinary retention developed: 1/18 in the stented group, 2/26 in the unstented group. These episodes were recorded in patients older than 24 months and were treated with the insertion of a urinary catheter under sedation: no long-term complications (*e.g.* fistula, stenosis) needing surgery occurred as a consequence. During the follow-up period, 4 cases of persistent fistula (2 in group A and 2 in group B) occurred. Our indication is to treat fistulas not before six months after first surgery. One patient was operated again seven months after first surgery; the others had a late diagnosis and were treated after ten, twelve and fourteen months. If we consider the unstented patients, except from one who presented meatal stenosis followed by a fistula, we only had one case of subclinical meatal stenosis.

We finally found and reviewed six manuscripts in PubMed about unstented TIPU for distal hypospadias: all of them were in English and published between 1997 and 2013.

See Table 2 for comparison between the fistula rate and

Table 1. Demographic, operative and postoperative variables: comparison between the two groups.

Variable	Group A (N=18)		Group B (N=26)	
	Median	Range (SD, CI)	Median	Range (SD, CI)
Age (months)	25.5	15-143 (SD 33.62, CI 23.22-56.66)	25.5	10-69 (SD 14.89, CI 23.52-35.55)
Surgical time (minutes)	77.5	58-115	80.5	55-120
Follow up (months)	23	9-34 (SD 8.34, CI 6.26-12.51)	22	9-31 (SD 6.50, CI 5.09-8.97)
Hospital stay (days)	7	6-9 (SD 0.85, CI 6.74-7.59)	3	3-7 (SD 0.94, CI 3.19-3.95)

SD, standard deviation; CI, confidence interval.

Table 2. Comparison between literature and our own case series. Fistulas and acute urinary retention rate in unstented cases after tubularized incised plate urethroplasty repair for distal hypospadias.

Manuscripts and personal experience (authors)	Unstented cases		
	Cases, n	Fistula, n (%)	Urinary retention, n (%)
Steckler and Zaontz[8]	33	0 (0)	0 (0)
Samuel *et al.*[10]	170	6 (3.5)	0 (0)
El-Sherbiny *et al.*[9]	29	5 (17.2)	7 (24.1)
Leclair *et al.*[11]	162	9 (5.5)	4 (2.4)
Turial *et al.*[12]	41	2 (4.8)	0 (0)
Xu *et al.*[13]	151	8 (5.3)	6 (3.9)
Scarpa *et al.* (personal experience)	26	2 (7.7)	2 (7.7)

the urinary retention rate after catheter removal, in each case series.

Discussion

TIPU is currently the most widely used technique for the treatment of distal hypospadias because it provides excellent functional and cosmetic results. Fistula is one of the most common complications reported in the literature. In an international review published in 2008,[7] Pippi Salle and colleagues analysed the complications rate in primary distal hypospadias repair defining a mean fistula rate of 5.9% (range 0-16%). They suggested that surgeon experience and high volume of cases contribute to reduce the number of complications in any series, pointing out that small studies usually report a higher number of complications. Generally a urinary stent is maintained in situ for 2-7 days postoperatively.

In 1997 Steckler and Zaontz reported their excellent experience with stent-free repairs in 33 patients.[8] On the other hand, in 2003 El-Sherbiny and colleagues[9] obtained discouraging results in 64 toilet-trained children with a median age of 6 years. In this prospective study an increase of urinary retention and reoperations was observed (even if not statistically significant). The Authors used soft plastic urethral catheter in the stented group. Samuel in 2002,[10] Leclair in 2004,[11] Turial in 2011,[12] Xu in 2013[13] reported good results with unstented repair: the first and the last Authors used bladder silicon catheter in the stented group like our group A cases; the two other Authors only reported unstented cases.

Our fistula rate was 9% (11.1% in group A, 7.7% in group B) which is higher – but still in the range – of what is reported in the literature and similar in the two groups (2/18 in group A, 2/26 in group B). All the surgeons involved were general paediatric surgeons and had a similar level of expertise. After catheter removal, 3 cases of urinary retention (1/18 in group A, 2/26 in group B) affected toilet trained children older than 24 months (results similar to the one reported by El-Sherbiny).[9] As per hospital policy, in the attempt to reduce home care impact, we discharge a patient only once the catheter has been removed: children in group B were discharged earlier than those of the group A (median hospital stay of 3 days *versus* 7 days). In our case series, the median age of our enrolled patients was 25.5 months, which is older then the recommended age for hypospadias repair.[5] This was mostly due to a delay in patient referral for outpatients' assessment after diagnosis. It is widely reported in the literature that an older age at time of surgery increase complication rate. Concerning our experience, patients older than 24 months have a low compliance, to the double diaper method (positioning the catheter between two diapers to increase mobilization and reduce discomfort). We think that the early removal of the catheter can expedite discharge from hospital without giving the families the responsibility of the catheter management, especially when patients are not toilet-trained.

Conclusions

Considering the case series reported in the literature and our preliminary experience, we think that the immediate removal of the catheter can reduce patient discomfort and improve the familiar compliance without increasing acute urinary retention episodes and persistent fistula rate, after TIPU for primary distal hypospadias.

Our study has some limitations: the number of enrolled patients is low and the study is retrospective. As this was a pilot study, only a small number of cases were enrolled. For this reason, a decision was made not to randomize a patient to one group or to the other, but to assign them to group A or B on an alternate month basis.

Early discharge, best compliance of the patient and the family and absence of postoperative devices, are all key factors for a *fast track surgery* which is a modern concept of *surgery*, valid both in adulthood that in childhood.

Further studies should be conducted on this topic to clarify the role of postoperative stenting in distal hypospadias repair.

References

1. Wilcox DT, Mouriquand DP, Thomas DFM, et al. Essentials of pediatric urology. 2nd ed. London: Informa Healthcare; 2008. pp. 213-31.
2. Snodgrass W. Tubularized incised plate urethroplasty for distal hypospadias. J Urol 1994;151:464-5.
3. Cook A, Khoury AE, Neville C, et al. A Multicenter evaluation of technical preferences for primary hypospadias repair. J Urol 2005;174:2354-7.
4. Hafez AT, Herz D, Bägli D, et al. Healing of unstented tubularized incised plate urethroplasty: an experimental study in a rabbit model. BJU Int 2003;91:84-8.
5. ESPU/EAU Guidelines on Paediatric Urology. Update March 2015 (Hypospadias, chapter 3 E: pp 15-19). Available form: http://uroweb.org/wp-content/uploads/23-Paediatric-Urology_LR_full.pdf
6. Skukfeh N, Reismann M, Ludwikowski B, et al. Implemantation of fast-track pediatric surgery in a German non-academic institution without previous fast-track experience. Eur J Pediatr Surg 2014;24:419-25.
7. Braga LH, Lorenzo AJ, Pippi Salle J. Tubularized incised plate urethroplasty for distal hypospadias: a literature review. Indian J Urol 2008;24:219-25.
8. Steckler RE, Zaontz MR. Stent-free Thiersch-Duplay hypospadias repair with the Snodgrass modification. J Urol 1997;158:1178-80.
9. El-Sherbiny MT. Tubularized incised plate repair of distal hypospadias in toilet-trained children: should a stent be left? BJU Int 2003;92:1003-5.
10. Samuel M, Capps S, Worthy A. Distal hypospadias: which repair? BJU Int 2002;90:88-91.
11. Leclair MD, Camby C, Battisti S, et al. Unstented tubu-

larized incised plate urethroplasty combined with foreskin reconstruction for distal hypospadias. Eur Urol 2004;46:526-30.
12. Turial S, Enders J, Engel V, Schier F. Stent-free tubularized incised plate (TIP) repair of distal and mid-shaft hypospadias irrespective of age. Eur J Pediatr Surg 2011;21:168-70.
13. Xu N, Xue XY, Wei Y, et al. Outcome analysis of tubularized incised plate repair in hypospadias: is a catheter necessary? Urol Int 2013;90:354-7.