Tubularized proximally-incised plate in distal/midshaft hypospadias repair

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Abstract

The aim of this study was to verify the validity, feasibility, and the functional results, by uroflowmetry, of Tubularized proximally-incised plate technique in selected case of distal/midshaft hypospadias. Out of 120 patients scheduled to undergo TIP (or Snodgrass) procedure, 23 were selected between January 2013 and January 2016 (19.1%). This case series comprised 16 patients with distal and 7 with midshaft hypospadias. Mean age at surgery was 2.9 years. The inclusion criteria were a deep and wide glandular groove and a proximal narrow urethral plate. The procedure was carried out as described by Snodgrass but the incision of the urethral plate, including the mucosal and submucosal tissue, was made only proximally, between the original meatus and the glandular groove in no case extending to the entire length of the plate. Postoperatively a foley catheter was left in place from 4 to 7 days. Uroflowmetry was performed when the patients age ranged from 2.5 to 5.7 years (mean age 3.11 years and mean follow-up 1.8 years, body surface <1.1 m^2). Patients were included if they were old enough to void volitionally and fistula-free. The results of flow pattern were expressed as percentiles and compared with those reported by Toguri. At the time of uroflowmetry their ages ranged from 2.5 to 5.7 years (mean age 3.11 years and mean follow-up 1.8 years, body surface <1.1 m^2). No patient presented fistulas nor perioperative complications. At uroflowmetry, eighteen patients presented values above the 25th percentile and 5 showed a borderline flow. All patients in this group remained stable without urinary symptoms. In selected cases, the tubularized proximally-incised plate yields satisfactory cosmetic and functional results for the treatment of midshaft proximal hypospadias. A long-term follow-up study is needed for further evaluation. Patient selection is crucial for the success of this technique.

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Introduction

Tubularized-incised plate urethroplasty (TIP) is currently one of the most common techniques for the treatment of hypospadias: it is in fact simple, versatile and produces satisfactory cosmetic results.[1,2] The urethral plate is a well vascularised tissue with good muscular backing, a rich nerve supply and able to form periurethral glands, which explains the success of the procedure.[3]

Adequate functional results have also been reported when this technique is employed to repair midpenile and penoscrotal hypospadias.[4,5] However the urethral plate is not of uniform consistency in all hypospadias, but may present morphological irregularities that should be taken into account when deciding the most suitable surgical technique. In fact some patients present a narrow urethral plate proximally to the native meatus and a deep glandular groove: in these cases the midline incision of the urethral plate could be limited to the affected tract in order to avoid an unnecessary extensive incision. Smith[6] was the first to propose the tubularized-incised plate technique only on the proximal segment of the native meatus, with satisfactory cosmetic and functional results, a low incidence of fistulas and the absence of meatal stenosis.

We reviewed the records of our patients with distal/midshaft hypospadias who had undergone tubularized proximally-incised plate to objectively determine the functional results of this technique by uroflowmetric data.

Materials and Methods

Out of 120 patients scheduled to undergo TIP (or Snodgrass) procedure, 23 were selected between January 2013 and January 2016 (19.1%). This case-series comprised 16 patients with distal and 7 with midshaft hypospadias. Mean age at surgery was 2.9 yrs (range 16 months- 3.5 yrs) while at the time of uroflowmetry their ages ranged from 2.5 to 5.7 years (mean age 3.11 years and mean follow-up 1.8 years from the last surgical procedure, body surface <1.1 m^2).

All patients had distal or midshaft hypospadias and the inclusion criteria were the presence of a deep glandular groove and a proximally narrowed urethral plate. Patients were treated as follows: after degloving of the penis, artificial erection was performed to assess chordee. The presence of chordee was corrected by single or multiple dorsal plications.[7,8] Two parallel incisions were made to define the urethral plate, and the glans wings were created. The urethral plate was incised along the midline, including the mucosal and submucosal tissue. A deep incision of the urethral plate, including the mucosal and submucosal tissue, was made only proximally, between the original meatus and the glandular groove (Figures 1 and 2). The plate was tubularized with a 7/0 subcuticular interrupted polyglyconate (Maxon®) suture. A second

suture line covered the first one; the dorsal subcutaneous tissue was dissected from the preputial and shaft skin and rotated ventrally to cover the neourethra. Finally the glands wings were closed along the midline in a single layer. A foley catheter was left in place from 4 to 7 days. Inclusion criteria for uroflowmetry consisted of the patient's capacity to void volitionally and the absence of fistulas. Flow pattern, maximum flow rate (Qmax) and mean flow rate (Qave) were considered; the results were expressed as percentiles and compared with Toguri's published data.[9] Qmax and Qave above the 25th percentile were considered normal; Qmax and Qave between the 25th and 5th percentile were taken to indicate a borderline flow; Qmax and Qave below the 5th percentile an obstructed flow (Figures 1-5).

Results

In all patients postoperative course was uneventful; all achieved a good aesthetic appearance and good function. No patients presented fistulas nor perioperative complications. At uroflowmetry eighteen patients had values above the 25th percentile, 5 showed a borderline flow that was never below the 15th percentile. All patients in the latter group remained stable without urinary symptoms (Figures 3 and 4).

Discussion

Snodgrass technique has become one of the most common techniques to correct hypospadias, for its simplicity as well as optimal functional and cosmetic results;[9] nevertheless, a certain low incidence of urethral meatal stenosis and need for second surgery have been reported in the literature.[10,11] The functional results in children, evaluated by uroflowmetry, seem to confirm this hypothesis.[3,11,12]

The ultimate aim of plate incision is the widening of a narrow plate, to enable an adequate median suture in order to widen the neourethra. According to some Authors the depth of the urethral groove may play an important role, influencing neourethral caliber after tubularized incised plate urethroplasty.[13] But when occurs the condition of a deep urethral plate, the procedure can be carried out avoiding the etching of the flat distal urethral, which ultimately is considered responsible of urethral strictures which are sometimes reported.[14] Moreover avoiding extensive and unnecessary incision reduces the surgical trauma, possible bleeding, and favors a faster healing process. This by no means suggests a systematical use of this technique, but could represent a further evolution of Snodgrass's technique and a confirmation of its versatility, limiting the principle, in selected cases, only to the affected section. In our experience it was possible to apply this kind of technique only in 23 of 120 patients scheduled to undergo TIP, equal to 19.1%, meaning that this technical variant is applicable only in well-selected cases. The uroflowmetric data we obtained seem to confirm the soundness of our hypothesis. The Toguri nomograms that correlate flow to body surface and age have so far proven to be a reliable evaluation tool especially in younger patients, who are

generally unable to retain and, thus, void large volumes. In some patients of this series, the uroflowmetry showed a slightly flattened curves: this can be explained by the lower elasticity of the neourethra in the absence of a stricture or meatal stenosis which can be avoided with the adoption of this technique.[15]

The Snodgrass procedure was originally developed for distal hypospadias but its current evolution has made it applicable also to more proximal hypospadias as well as for the repair of complications.[16-19] Incising the entire urethral plate not only increases the potential risk of bleeding and meatal stenosis, but is often not required for a tension free urethroplasty provided that the patient presents an adequate glandular groove. At present, in the literature, there is only one report on this procedure[6] but the Author used this technique without any inclusion criteria.

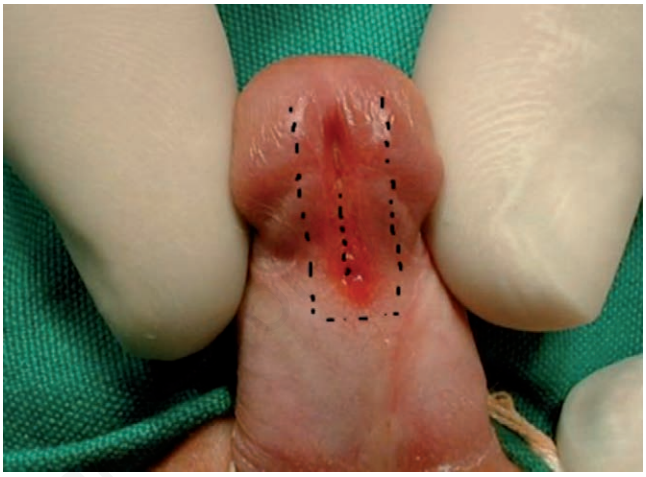

Figure 1. Scheme of tabularized proximally-incised plate.

Figure 2. Proximal incision of the urethral plate.

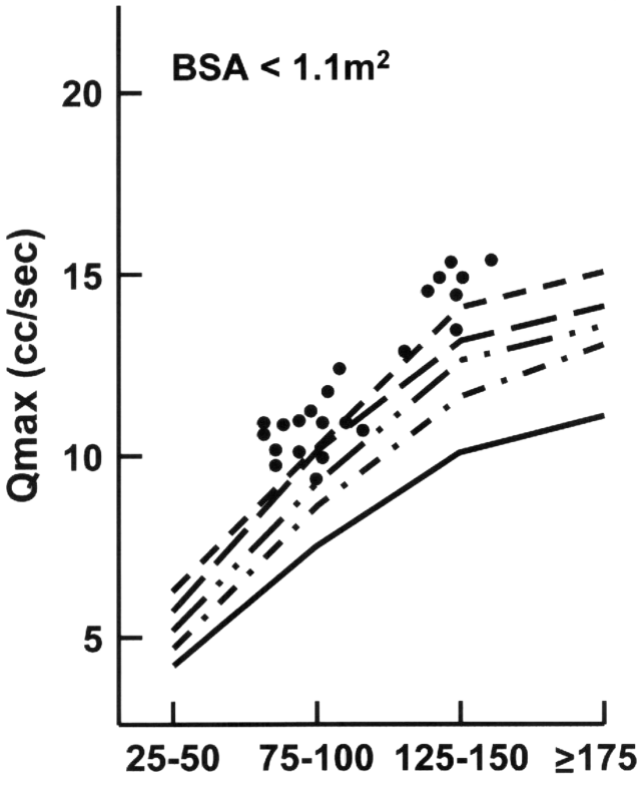

Figure 3. Patients maximum flow rate (Qmax) values according to Toguri's nomograms.

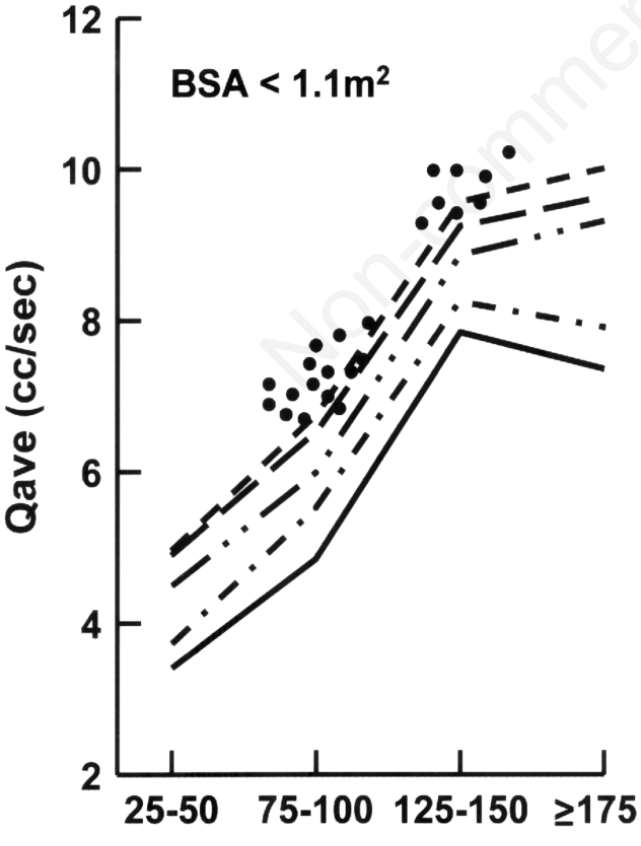

Figure 4. Patients mean flow rate (Qave) values according to Toguri's nomograms.

Figure 5. Postoperative result.

Conclusions

Tubularized proximallly-incised plate is a feasible and safe technique and leads to satisfactory functional and aesthetic results in the treatment of distal/midshaft hypospadias, as confirmed by uroflowmetry. The procedure is characterized by technical simplicity and reduced surgical trauma, provided that the inclusion criteria are adequately met. The overall cosmetic results of the glans and urethral meatus have proven to be excellent, for the natural appearance of the meatus (Figure 5). However, given the relatively small number of patients and the short follow-up of our study, our data need to be confirmed on a much larger population and a longer follow-up.

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