

Snodgrass' Urethroplasty in Hypospadias Surgery in Clinical Hospital Mostar – Preliminary Report

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ABSTRACT

Amongst the various methods of reconstructing the hypospadiac urethra such as the MAGPI, Mathieu's and Preputial island flap urethroplasty method and the Snodgrass method, the latter is being used more frequently nowadays in patients with the urethral meatus located in the proximity of the penis. In the Pediatric ward at Mostar Clinical Hospital, we have recently adopted the Snodgrass method when reconstructing the hypospadiac urethra. We herewith present our research regarding the successful results in adopting the aforementioned method. Success was evaluated according to the frequency of post-operative complications, as well as the patients' satisfaction with the functional and the cosmetic result of the urethra reconstruction. The conclusions relating to our research result in an addition basis from which to evaluate whether the Snodgrass method should receive privileged preference in future operative treatment of the hypospadias over others methods, as can be seen from our research.

Key words: children, urethra, hypospadias, treatment, Snodgrass' method.

Introduction

Hypospadias is an anomaly that can be manifested through several variations, divided into types¹. Although not endangering life itself nor causing major disturbances in the functions of genitourinary system organs, nor originating recidive urinary infections, it is usually surgically removed, except when it appears in minor forms as granular dystopia of the urethra meatus.

Due to its varying level of defect, different forms and quality of the penis and prepuce, different glans constitutions and different meatus locations, numerous surgical methods have been developed trying to correct this innate defect. Allegedly, there are more than 200 types^{2,3}. There is no universal surgical technique that would suit the correction of all the different types and variations of hypospadiac expression.

The aim of hypospadias surgical treatment is with or without curvature of the penis: 1. trying to bring the urethra opening at the top of the glans, 2. achieving a regular and straight penis, 3. creating favourable conditions for a successful psychosexual life^{1,4,5}. Besides, other instances than these have been more and more emphasized in hypospadias treatment: 1. achievement of the same

penis appearance as before the circumcision, 2. a low percentage of post-operative complications and 3. one-stage operation⁶⁻⁸.

In reconstructing the hypospadiac urethra various operative methods use various tissues. All of them can be divided in three groups based on the type of tissue: 1. local penile tissue, 2. genital non-penile tissue (urinary bladder mucosa); 3. distant tissues of the same organism (buccal mucosa). Currently, 4 methods of hypospadiac urethra reconstruction are being used:

1. Meatal advancement and glanuloplasty (MAGPI)
2. Vascularized preputial island flap urethroplasty
3. Onlay-inlay island flap urethroplasty
4. Tubularized incised plate urethroplasty (Snodgrass' method)

The aim of all these methods of hypospadiac reconstruction is to achieve the same appearance of the penis as it used to be before the circumcision in one-stage operations, and with a low percentage of post-operative complications.

The Snodgrass urethroplasty method is suitable both as a primary operation as well as a repeated operation after an unsuccessful urethra reconstruction by using some other method. It is also suitable for boys who have already been circumcised. Furthermore, by the longitudinal incision of the urethra plate, as this method requires, a normal size neo-urethra can be formed even where the urethra plate is narrow. This method can be used in patients with proximal penile hypospadias, and some believe that, apart some exceptions, it will soon be used as a universal method.

Snodgrass¹¹ developed this method of hypospadiac urethra reconstruction in which all the three of the following aims of the surgical hypospadias treatment can be achieved: the appearance of the penis to be the same as before the circumcision, a low percentage of post-operative complications and a one-stage operation. There are more and more reports about the excellent results achieved by this method^{9,10,13–15}, which is proven in the experiment¹⁶. The Snodgrass method has also been referred to as the »method of choice«¹⁷ and even as the »revolutionary« method of surgical hypospadias treatment¹⁸. It is currently used in examples of proximal hypospadias¹⁹ and some believe that it can be used practically in all types of hypospadias^{9,10}.

Materials and Methods

Some time ago we used to utilize various methods of hypospadias treatment according to the type of hypospadias, the anatomic and the morphologic penis, as well as the prepuce construction. In the last few years we started using the original Snodgrass method in surgical treatment of distal and midpenile hypospadias¹¹. We have, so far, excluded patients with highly evident penile curvature to such an extent that needed surgical correction.

In the last three years we have operated on 19 boys with distal and midpenile hypospadias. Only boys who had not been circumcised were included in the program so that, in case of unsuccessful recovery, we could still use some other method such as the onlay-inlay method, as well as their modifications. All of them underwent the hypospadiac urethra reconstruction with the Snodgrass method for the first time, i.e. that was the primary operation.

TABLE 1
DISTRIBUTION OF PATIENTS ACCORDING TO THE AGE AND THE TYPE HYOSPADIAS

Age at operation (years)	Type of hypospadias		Number of patients
	glanular, coronal subcoronal	distal penile midpenile	
0–1	–	–	–
2–3	4	7	11
4–5	4	–	4
6–7	1	–	1
> 7	1	2	3
Total	10	9	19

Table 1 shows the age of the boy at the time of the operation and the second column refers to the types of hypospadias. It can be seen that the boy's age was higher than the deemed optimal age for urethra reconstruction. Currently, there is a trend to perform the operation on the hypospadiac urethra as early as possible, even within the boy's first 12 months. According to general opinion, early age cannot be a hindrance to the surgical treatment of hypospadias, and especially not for the Snodgrass method. The urethra reconstruction is indicted even in the first year of age. As shown in Table 1, our youngest patient was 2 years old and the oldest 9 at the time of the operation.

Results

We assessed the results of the urethra reconstructions in our patients according to three parameters: 1. the frequency of post-operative complications; 2. the quality of the urinary stream and 3. the satisfaction or dissatisfaction of patients (parents) with the final postoperative penial appearance. Table 2 shows the frequency of organic postoperative complications, i.e. fistula and stenosis. This table shows that a fistula of the urethra was present in only 1 of the patients (5,3%), while none presented either a urethral or meatal stenosis. One patient presented a punctiform fistula on the suture border of the earlier meatus and neourethra, which self-healed after three weeks, so that the real incidence of this complication in our material was 5.3%.

TABLE 2
INCIDENCE OF POSTOPERATIVE COMPLICATIONS AND THEIR RELATION WITH HYOSPADIAS TYPE

Age at operation (years)	Type of hypospadias		Postoperative complications	
	glanular, coronal subcoronal	distal penile midpenile	fistula	stenosis
0–1	–	–	–	–
2–3	4	7	–	–
4–5	4	–	–	–
6–7	1	–	–	–
> 7	1	2	1	–
Total	10	9	1	–

TABLE 3
QUALITY OF URINARY STREAM, MEATUS APPEARANCE AND SATISFACTION OR DISSATISFACTION OF EXAMINEES (PARENTS)

Age at operation (years)	Type of hypospadias		Meatal appearance		Urinary stream		Satisfaction with penile appearance	
	glanular, coronal subcoronal	distal penile midpenile	vertical	oval	normal stright	lightly a side	yes	no
0–1	–	–	–	–	–	–	–	–
2–3	4	7	11	–	11	–	11	–
4–5	4	–	4	–	4	–	4	–
6–7	1	2	1	–	3	–	1	–
> 7	1	–	2	1	1	1	3	–
Total	10	9	19		19		19	

Our postoperative results based on the assessment whether the patients were satisfied with the postoperative penile appearance and with the quality of urinary stream are shown in Table 3. All the participants (parents), without exception, were satisfied both with the penile appearance and the urinary stream. We need to mention that some of the parents, during the survey, of their own accord said that the penis now looked as if it were »just after a circumcision«. Nota bene, the project was conducted in an environment with a mixed population of Christian and Muslim traditions, so both of them were familiar with the term of »circumcision«.

The meatus of all the participants was postoperatively placed on the apex of the glans and was vertical, with the exception of one patient whose meatus had an oval form and was somewhat larger due to dehiscence of the final suture on one side of the glans.

Discussion

Hypospadias is one of the most frequent malformations of the genital system with a 1:300 incidence ratio in newborn boys¹⁹. There seems to be even a bigger incidence, which speaks in favour of an increasing incidence trend²⁰. The hypospadias does not present a major concern for the pediatric surgeon only because of its incidence, but also because of its numerous variations, from the mildest forms to the most complex ones, where it is difficult even to distinguish the sex of the patient on the basis of its external appearance at first sight. It also presents a problem for surgeons who are unable to utilize a universal method of the operative treatment, which would be acceptable for all types of this anomaly^{6,13,21} although the Snodgrass method is slowly becoming more dominant and accepted method.

In surgical treatments of the hypospadias we used several methods and different tissues for urethra reconstruction. The choice of the method dictated the position of the external urethral meatus, the penile appearance and the quality of the prepuce, as well as some other specific qualities of each specific case. The glans configuration and the quality of urethra plate also played a significant role in choosing the method.

We saw that some boys with distal hypospadias had a narrower urethra plate in the area of the coronal sulcus than in its proximal parts. Beside that, it was in the sulcus area that we found much more abundant dysgenetic fibrous tissue, also reported by Snodgrass²², which was then excised and subsequently the meatus would automatically withdraw towards proximal. We noticed that it was exactly in these cases that the incidence of post-operative complications increased. Therefore, in such cases we tried using the Janžeković method²³ earlier, which represented a simple reconstructive operation of the urethra in cases of coronal and subcoronal hypospadias. However, the percentage of fistulas was higher than usual when using other methods. Moreover, the operation is performed in two, and sometimes even in three stages, so despite being a simple operation, we discarded it. Mathieu's method did not give us the desired results in relation to the neomeatus form, and we performed the operation in two stages, leaving the prepuce in case of failure for a possible reintervention, and the use of the onlay-inlay method as when using the Janžeković method. With the Grob method of midpenile and penoscrotal hypospadias we achieved good functional, but not satisfactory cosmetic results. Furthermore, we operated in three stages.

We also used the Ombrédanne method of hypospadiac urethroplasty, which we performed in two stages, mostly in patients with distal and midpenile hypospadias. The functional results were satisfactory, but not so the cosmetic ones, while the complications percentage was analogous to the percentage of other current methods²⁴. The best cosmetic results were achieved with the MAGPI method, rather than the aforementioned ones, but the MAGPI method can be used only on boys with distal hypospadias.

According to Snodgrass²² all current methods of hypospadiac urethra reconstruction can be classified into three groups: 1. as tubularization of the urethra plate, 2. skin flaps and 3. grafts. Although various techniques and variations of the latter two methods are still in use today, according to some reports the Snodgrass method is more frequently used^{9,10,14}. It is successfully used even in sec-

ondary operations after previous unsuccessful hypospadiac urethra reconstruction from some of other methods²¹.

Recently we have tried using the Snodgrass method¹¹ of hypospadiac urethra reconstruction in our clinic on patients with distal and on those with midpenile hypospadias. We used it on 10 boys with distal and on 9 with midpenile hypospadias; all of them had a primary operation. The penile appearance is analogous to the penis of circumcised boys so that the cosmetic results were excellent, which is confirmed by the interviewed patients' parents who expressed satisfaction with the post-operative penile appearance, as well as with the flow rate of the urinary stream. Postoperative fistula occurred only in one patient (5,3%), whereas the other patients presented no such complications. One of the patients had a fistula that self-healed. All the subjects had the meatus placed vertically except one who had an oval meatus and similarly, the urinary stream in all of them was straight and with abundant flow. As we can see from Table 3, all the 19 patients were satisfied with the penile appearance.

We performed the urethra reconstruction on some of the boys with proximal hypospadias, including the proximal penile type, using the buccal mucosa graft. Due to the high percentage of postoperative fistula, despite the excellent cosmetic results, we orientated ourselves to-

wards the Snodgrass method with patients suffering from penoscrotal and proximal penile hypospadias. Thanks to the very good cosmetic and functional results, the low percentage of postoperative complications and it being a one-stage operation, we accepted the Snodgrass method of urethra reconstruction as the »method of choice« from all the aforementioned types. Furthermore, this method is technically simple, it protects the urethral plate, there is only one suture line, the neomeatus is placed vertically, the urinary stream is straight and abundant, while the postoperative penile appearance is as if just after a circumcision, and therefore we recommend it. In agreement with the author Snodgrass²², we believe that on the basis of our experience this method is the most suitable even in examples of a wide flattened glans, as well as in cases of different meatal configuration and structure of the urethral plate: in these cases we previously utilized the Janžeković method²³.

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**SNODGRASS-OVA METODA REKONSTRUKCIJE HIPOSPADNE URETRE U
KLINIČKOJ BOLNICI MOSTAR: PRELIMINARNO IZVJEŠĆE**

S A Ž E T A K

Među brojnim metodama za rekonstrukciju hipospadne uretre, uz MAGPI, Mathieu-ovu i »Preputial island flap urethroplasty« metodu, danas se sve više rabi Snodgrassova metoda koja se može primijeniti i u bolesnika s uretralnim otvorom položenim sasvim u proksimalnom dijelu penisa. Na Odjelu za dječju kirurgiju Kliničke bolnice u Mostaru počeli smo zadnje vrijeme u liječenju bolesnika s distalnom i penilnom hipospadijom primjenjivati Snodgrassovu metodu rekonstrukcije uretre. Iznosimo rezultate naših ispitivanja uspješnosti primjene ove metode. Uspješnost procjenjujemo prema učestalosti postoperacijskih komplikacija, a i prema tome da li su operirani zadovoljni kozmetskim i funkcionalnim ishodom rekonstrukcije uretre. Zaključci naših ispitivanja bit će prilog procjeni da li s razlogom Snodgrass-ova metoda danas prednjači u operacijskom liječenju hipospadije, kako to iz naših ispitivanja proizlazi.