

Comparison of Snodgrass and Bracka Methods In Terms Of Urethral fistula and Meatal Stenosis in Hypospadias Repair

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ABSTRACT

Hypospadias is one of the most frequent congenital anomalies in birth. Many factors may have part in etiology. Its treatment is possible only through surgical intervention, and there are more than 300 methods in literature identified for hypospadias repair. The purpose of this study is to compare Snodgrass and Bracka methods, the methods most frequently used for hypospadias repair, in terms of urethral fistula and meatal stenosis.

In this study, the data of 40 patients operated between 2014 and 2019 years have been used. 20 of the patients have been operated with Snodgrass, and the others have been operated with Bracka method.

The average ages of the patients operated with Snodgrass method and Bracka method were 4 years 3 months and 2 years 9 months respectively. Average length for follow-up for the patients operated with Snodgrass method was 18 months 9 days, and it was 35 months 1 day for the patients operated with Bracka method. Urethral fistula was observed to develop in %30 of the patients operated with Snodgrass method and %25 of those operated with Bracka method totally. In both methods, rates of meatal stenosis were more frequent compared to fistula (Snodgrass: %35, Bracka %40).

Fistula development is found numerically more in the patients operated with Snodgrass method while meatal stenosis development is observed numerically more in those operated with Bracka method.

Key Words: Hypospadias, Snodgrass, Bracka, Fistula and Meatal Stenosis

Introduction

Hypospadias is one of the most frequent congenital anomalies which follows cardiac and circulatory system anomalies and occurs as a result of midline fusion defect (1). Rate of incidence of this anomaly which has different variations is 20.9 in 10000 live births (2). Its etiology is multifactorial; main factors are advanced age, some chemical agents and drugs, cigarette, heredity (history of father's urologic disease), low birth weight, prematurity, small gestational age (SGA) and multiple pregnancy (3,4). As well as seemed to be isolated, hypospadias may be accompanied by antenatal hydronephrosis, urinary stones, neurological anomalies, other system anomalies and especially undescended testicle and inguinal hernia (5).

Generally, as location, glanular hypospadias is the most frequently encountered localization. Distal, mid-penile, penoscrotal, scrotal and perineal locations are more rarely seen than glanular location (6). In hypospadias treatment, the goal should be not only

functionality but also providing aesthetic appearance. The most important predictive factor about which method will be used is localization. According to localization, meatal advancement and glanuloplasty (MAGPI method) is frequently preferred in distal (glanular) hypospadias while Snodgrass, Mathieu and Duckett methods are frequently used in mid-penile hypospadias and Duckett method is mostly used in proximal hypospadias (7).

In the method identified by Snodgrass, neourethra is formed with a cut on urethral plate (8,9). In complicated cases or when the defect is large, use of onlay flap may be required (8). When Snodgrass was first identified, it was mostly used in proximal hypospadias, but then, it was also applied in distal hypospadias. Fistula and stenosis development is frequently seen in Snodgrass method, as seen in other methods. Therefore, to reduce these risks, modified Snodgrass methods including different usages of dartos flap (double layer, longitudinal dorsal dartos flap) have been introduced recently (10,11).

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On the other hand, Bracka method is two-staged; in the first stage, graft is taken from inner preputium and neourethra is formed as form of tie-over dressing (12). In the second stage, upper side of the neourethra is covered with transposition flap, and aesthetic and functional result is obtained by covering skin appropriately (12). Yet, fistula and stenosis may develop in this method as in other methods.

In our study, the aim is to compare Snodgrass and Bracka methods that we often use in hypospadias surgery in terms of fistula and meatal stenosis.

Material and Method

The consent was taken from Local Ethics Committee with 2019/16-09 serial number and 08.11.2019 date. 40 patients who were operated with diagnosis of hypospadias between March, 2014 and November, 2019 and were followed were included in the study. Snodgrass method was preferred in 20 of the patients while Bracka method was preferred in the others. The numbers of urethral fistula and meatal stenosis occurred during follow-up were recorded.

The patients aged 1 to 18 years were included in the study. Distal hypospadias cases and the patients operated in different centre and directed with the aim of revision were not involved in the study. In both methods, the repair line was supported with flap. The amount of stenosis was determined with clinical evaluation. After operation, both patient groups were included in dilatation program. Waiting time for the second surgery in the patients developing urethral fistula was determined as 6 months.

For statistical analysis, SPSS 21.0 packet program (IBM Corp, Armonk, NY, USA) was used. Descriptive statistics were presented as average \pm standard deviation and nominal variances were demonstrated as the number of percentage and case. A comparison between categorical variables was made using chi-square test. Mann-Whitney U test was utilized for searching the difference between the groups. Statistically significant p value was accepted under 0.05.

Results

Among the patients in the study, the average age of those who were operated with Snodgrass was 4 years 3 months while the average age of those operated with Bracka method was 2 years 9 month. Average duration of surgery in Snodgrass method was 2 hours whereas the average duration of surgery in the first stage of Bracka method was 2.5 hours, and the duration in the second stage was 1.5 hours. Of 40

patients who were evaluated, 12 patients in the group of the patients operated with Snodgrass and 8 patients in the group of the patients operated with Bracka had isolated hypospadias. Of 8 patients operated with Snodgrass, undescended testicle was accompanying anomaly in 4 patients, and, in the other 4 patients, inguinal hernia was accompanying. On the other hand, of 14 patients operated with Bracka method, undescended testicle was accompanying anomaly in 6 patients; in other 6 patients, inguinal hernia was accompanying; lastly, in 2 patients, hydrocele was accompanying anomaly (Table 1).

The numbers of the patients developing both fistula and stenosis as complication were 6 in Snodgrass method and 5 in Bracka method. Development of isolated fistula was not seen in both groups. However, the numbers of the patients developing isolated stenosis were 3 patients in the group operated with Bracka method and 1 patient in the group operated with Snodgrass (Table 1). A statistically significant difference in terms of urethral fistula and meatal stenosis was not observed between the groups ($p=0.723$, $p=0.744$).

The second stage was applied to the patients operated with Bracka method after approximately 7 months 20 days. The patients developing fistula and stenosis during follow-up were taken to revision surgery. As for location, 70% of the patients operated with Snodgrass were penoscrotal-located and %30 were mid-penile-located while 40%, 35% and 25% of the patients operated with Bracka method were penoscrotal-located, mid-penile-located and perineal-located, respectively.

In the operated 40 patients, any additional complication (hematoma, suture dehiscence etc.) was not seen apart from urethral fistula and meatal stenosis.

Discussion

Hypospadias is a clinical entity which concerns pediatric surgery, plastic surgery and urology departments and negatively affects social life of individual when not treated. Having the rate of incidence of 1 in 200-300 births, hypospadias is the second frequent anomaly after cryptorchidism among external genital organ anomalies (13).

Hypospadias occurs as a result of hesitation in development of genital tubercle maintaining its development from sixth month to sixteenth month (14). There are a lot of surgery methods which have been identified so far in hypospadias in which the surgery varies according to location. The purpose of existing surgery methods is to ensure aesthetic and

Table 1. Demographic data of the patients operated with Snodgrass and Bracka methods

Parameters	Snodgrass	Bracka	p
Age (years), Mean \pm SD	4.3 \pm 3.43 (1-11)	2.9 \pm 1.97 (1-7)	0.383
Length of Follow-up (month)	18.9 (6-36)	35.1 (12-60)	0.050
Urethral Fistula	6 patients (30%)	5 patients (25%)	0.723
Meatal Stenosis	7 patients (35%)	8 patients (40%)	0.744
Accompanying Anomaly	8 patients (40%)	12 patients (60%)	0.527

SD: Standard Deviation

functional integrity. Among complications of hypospadias surgery in which getting an exact result is not possible in single-stage, the most frequent is urethral fistula, and it is followed by urethral stenosis, persistent hypospadias, diverticulum and chordee (15).

Shah et. al. found rates of fistula as 9.38% in Snodgrass and 18.75 in Bracka in their study in which they compared Snodgrass technique and Aivar Bracka technique in distal hypospadias in terms of fistula (16). In other study, Yang et. al. found rates of fistula in the patients, whom they operated with Snodgrass technique, and most of whom had proximal- located hypospadias, as 28% (17).

We determined rate of fistula for Snodgrass as 30%. We think that highness of the rate may be related to status of literacy of families and troubles during follow-up (lack of dressing, controls being delayed, hygiene-care's being bad).

In other series in which rates of fistula are high, rates of fistula can be reduced by modifying Snodgrass method (10,11). Longitudinal dorsal dartos flap and dorsal double layer dartos flap can reduce formation of fistula for this purpose. To reduce rates of fistula, Snodgrass himself made modification in his method, and in his article which he published in 2003, he aimed to minimize rates of fistula by covering repair line with dorsal dartos pedicled flap, which he obtained from dorsal preputium, as second layer. However, in the same study, 14% rates of complication, including mostly fistula, are mentioned (18).

Bracka found rates of fistula as 5.7% in his article in which he published his series of 600 cases in 1995 (12). In Bracka method in which two-staged repair is described, in the first stage, "Wolfe" graft taken from inner preputium is adapted to the cleft occurred in glans, and it is used in the formation of neourethra in the second stage applied after 6 months. Moreover, the repair line is supported with "waterproofing" flap, and thus, rates of fistula are minimized (12).

In another study, Joshi et. al. detected that fistula developed in eight patients (18%) of 43 patients whom they operated with Bracka method (19). We found rate of fistula as %25 in 20 patients operated with Bracka in our study. We did not encounter with loss of graft and carried out second-stage operation after 7 months 20 days before contracture developed. Based on our experiences, rates of fistula are seen lower if hypospadias is distal-located, however, in mid-penile-located and proximal-located, rates of fistula can be seen higher because length of defect and the amount of gotten graft increase. In our serial, there were 40% penoscrotal-located, %35 mid-penile-located, 25% perineal-located hypospadias and there was not distal hypospadias case. Therefore, we consider our rates of fistula to be higher than normal.

After hypospadias repair, development of meatal stenosis is the second frequent complication following fistula. In the study that Litvak et. al. published about meatal stenosis whose detection and staging are more difficult compared to development of fistula, 6F calibration for the new born, 6F-8F for those up to 4 years old, 8F-10F for 4-11 years old, 10F and over calibrations for over 11 were interpreted not to be meatal stenosis (20). In our study, for evaluation of meatus stenosis of the patients, urinary calibration during micturition and the calibration of meatus with the help of catheter and appearance of meatus were used as parameter.

Snodgrass found rate of meatal stenosis as %3.5 (1 stenosis in 27 cases) in proximal hypospadias cases that he operated with his own method and as %2 (3 stenoses in 148 cases) in distal hypospadias cases (8,21).

Bracka determined rates of meatal stenosis as 7% (41cases) in his series of 600 cases and stated that stenoses developed mostly in late period. We, in our serial, found rates of stenoses as 35% in the patients operated with Snodgrass and as 40% in the patients operated with Bracka. However, most of them were mild stenoses and dehiscid after dilatation with catheter.

Apart from urethral fistula and meatal stenosis, we did not encounter with the complications that can be seen in early or late period such as loss of graft, hematoma, graft contracture, necrosis. As the reasons why rates of urethral fistula and meatal stenosis were determined high in our study:

1. Hypospadias locations were usually proximal and less often mid-penile. There was not distal-located hypospadias case. With the philosophy **“the more scars, the more fistula and stenosis”**, rates of fistula and stenosis were determined higher because defect area was large and the amount of the used graft was much.
2. Educational status of families was low and troubles were experienced in follow-ups.
3. Hygiene and care of wounded place of the patients were bad.
4. The patients that were operated consisted of challenging cases whose location was proximal rather than isolated distal hypospadias, and to which additional anomalies accompanied.

Consequently, we consider Bracka method to be more advantageous compared to Snodgrass in terms of urethral fistula since it provides more powerful repair (bottom layer- graft, top layer- flap). Yet, in terms of meatal stenosis, we support that Bracka method is disadvantageous because it is two-staged and the amount of scar is higher (based on use of graft) compared to Snodgrass. Therefore, it is inevitable for rates of fistula and stenosis to be low in surgeries which will be carried out without increasing amount of scar in hypospadias surgery.

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