

19th Congress of AAPS

Urethral Advancement and Glanuloplasty with V Flap of the Glans in the Repair of Anterior Hypospadias

Sadegh Sadeghipour Roodsari, Mansour Mulaeian¹ and Mehran Hiradfar, Department of Pediatric Surgery, Mashhad University of Medical Sciences, Mashhad and ¹Tehran University of Medical Sciences, Amir Kabir and Bahrami Children Hospitals, Tehran, Iran.

BACKGROUND: Hypospadias is a common urethral anomaly in boys. More than 65% of hypospadias cases are anterior (glanular, coronal and distal penile shaft). More than 200 original techniques have been applied to correct hypospadias. Each of these techniques has some complications, the most common of which are fistula and meatal stenosis.

METHODS: A total of 74 boys with anterior hypospadias underwent the procedure of urethral advancement and glanuloplasty (UAGP) with V flap of the glans in our medical centres between March 1994 and March 2000. The procedure included degloving, correction of chordee, urethral mobilization and glans plasty.

RESULTS: Cosmetic results were excellent in most patients. There was no fistula, and meatal stenosis was also not observed after applying V flap of the glans. In a 1–6-year follow-up (mean \pm SD, 3.15 \pm 1.79 years), the results, functionally and cosmetically, were satisfactory in all cases, with no long-term complication or chordee.

CONCLUSION: Our findings suggest that UAGP is an excellent technique for repairing anterior hypospadias with satisfactory results and low complication rate. [*Asian J Surg* 2006;29(3):180–4]

Key Words: anterior hypospadias, chordee, urethral advancement

Introduction

Hypospadias is a rather common urethral anomaly in boys. As a result of this anomaly, the urethral meatus opens onto the ventral surface of the penis proximal to the end of the glans. Barcat (1973) has divided cases of hypospadias into three groups: anterior, middle and posterior. Based on this classification, 65–70% of cases of hypospadias are of the anterior type. Anterior hypospadias itself is divided into three kinds: glanular, coronal and distal shaft.¹ It is generally believed that one out of every 300 boys suffers from hypospadias. If minor cases are taken into account, the incidence increases to one out of every 125 boys.^{1–3}

The cause of hypospadias is not exactly known. A combination of environmental, genetic and endocrine factors are involved. Several researchers have shown a defect in epidermal growth factor in the ventral area of the penis in patients suffering from hypospadias compared to normal people.⁴

There are more than 200 methods of original surgery for the treatment of hypospadias, each termed differently. Some methods do not produce acceptable results, and too many complications may result, so that the possibility of fistula occurrence is 5–15% and there is also the chance of recurrence.³

Almost 100 years ago, Beck, with the aim of preventing flap side effects, introduced a method for advancing the

Address correspondence and reprint requests to Dr Sadegh Sadeghipour Roodsari, Department of Pediatric Surgery, Dr. Sheikh Pediatric Hospital, Mashhad University of Medical Sciences, Taheri Avenue, Mashhad, Iran.
E-mail: sheikh-hos@mums.ac.ir • Date of acceptance: 28 February 2005

distal urethra without urethral mobilization for restoring glanular hypospadias. Glassberg and Waterhouse,³ Belman⁵ and Koff⁶ employed a method for extensive mobilization of the urethral canal and corpus spongiosum. Finally, Nasrallah and Minott reported the successful method of urethral mobilization.⁷ The method, employing anatomical tissue, works well with all patients suffering from anterior hypospadias, and compared with other methods, the reports of urethral advancement and glanuloplasty (UAGP) show fewer complications; it can be performed in one stage, and most reports confirm that no fistula has been observed.⁸⁻¹⁰ The results of UAGP from cosmetic and functional points of view have been excellent as well.^{6,9,11,12} The method may also be used with circumcised patients.^{13,14}

Patients and methods

The population under study were male patients younger than 14 years suffering from anterior hypospadias who underwent UAGP with V flap of the glans between March 1994 and March 2000 at Amir Kabir and Bahrami hospitals, affiliated to Tehran University of Medical Sciences.

Before the operation, all patients received prophylactic antibiotic including cefazolin (50 mg/kg) and gentamycin (2 mg/kg) in the operation theatre. Antibiotic continued after the operation for 3 days at 8-hour intervals. The operation was performed as follows: all patients were treated with tube suprapubic cystostomy using polyethylene catheter (Nelaton) no. 12 Fr. A holding suture was placed just dorsal to the glans groove. Bougiennage was performed to assess the position of the urethral meatus. A circumcising incision was made 8 mm proximal to the corona. The penis was then degloved sufficiently as far as the penoscrotal junction and relieved any cutaneous chordee from dartos or associated torsion.

Dysplastic dartos in the ventral area was eliminated, and the penis was corrected with respect to chordee. Any kind of chordee was corrected with mobilization at the ventral area or dorsal plication. The tourniquet was placed at the base of the penis, and then the meatus was released very carefully from corpora with straight scissors to the extent required. The urethra was released depending on the type of hypospadias and the urethral defect (Figure 1). In the case of distal shaft, the urethra was released as far as the penoscrotal area, in which case the length of the urethra increased up to 1.5 cm.

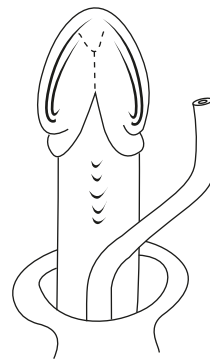


Figure 1. Degloving, release of chordee and complete mobilization of the urethra. Dotted line on the glans shows Y incision.

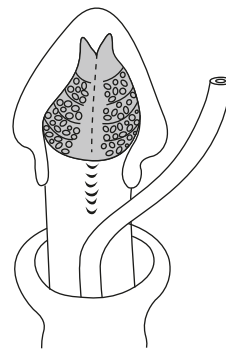


Figure 2. V flap of the glans and glans wings developed on either side.

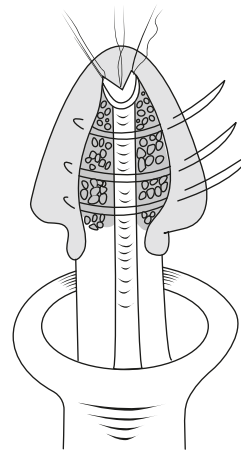


Figure 3. Glanuloplasty and meato-plasty.

A Y-shaped incision—from the groove to the surface of the corpus cavernosa—was made on the glans so that two triangular flaps (wings) on the two sides and one V flap from above the glans were created (Figure 2). The tourniquet was released and bleeding was controlled with cautery. About 2–3 mm vertical incision was made on the dorsal side of the mobilized urethra and brought to the end of the glans and was sutured to the V flap with 6/0 vicryl suture. Interrupted sutures were applied to the two tips of the V flap with the same stitches. Then, by using interrupted mattress sutures (5/0 vicryl), the wings of the glans were brought closer to each other (glanuloplasty) (Figure 3), and the urethra was also sutured to the corpus cavernosa

at the base of the penis and shaft. Ventrolateral meatal sutures were placed to complete the meatal anastomosis (meatoplasty). With the elimination of the extra prepuse skin, the skin was sutured at the subcorna area.

Dressing was done with gentamycin impregnated gauze, and slight pressure in the anatomic condition. The opening of new urethral meatus was controlled with the catheter and at the end of the operation, catheter no. 8 was placed as a stent inside the penile urethra and was fixed by holding sutures. The stent was removed on day 3 and the cystostomy catheter on day 14. All patients were examined 1 week, 1 month and 1 year after they left hospital and at the time of gathering data for any complication, or when there was a problem with the urethral canal, the meatus, chordee and the physical appearance of the penis.

Results

Our patients, consisting of 74 boys, underwent UAGP with V flap of the glans between March 1994 and March 2000. Of these, 31 (41.9%) had coronal hypospadias,

25 (33.8%) had distal shaft hypospadias and 18 (24.3%) had glanular hypospadias (Table 1). Nine of the patients had already undergone surgery one or several times in other hospitals. Forty-seven patients had mild skin chordee. In eight cases, the chordee was not removed after degloving and we had to do dorsiplication. The follow-up period ranged from 1 to 6 years, with an average of 3.25 (SD ± 1.79) years. When each patient was referred, based on his history, we examined the physical appearance of his glans, the coverage of his penis, chordee and meatal stenosis. The youngest two patients were 3 years old, and the oldest was 14 years old (one patient). The mean age was 6.51 ± 2.21 years. The mean period of hospitalization was 3.42 ± 1.51 days.

Twenty-eight (37.8%) patients were subjected to three doses of testosterone injection (2 mg/kg), at 3-week intervals because the size of their penises was small. They underwent an operation 1 month after the last injection. Early complications observed in our patients were as follows:

1. Seven cases (9.7%) of transient skin ischaemia, which disappeared without treatment.

Table 1. Distribution of various types of anterior hypospadias treated using the UAGP method with V flap of the glans

Year	Location of meatus			Total, n (%)
	Glanular, n (%)	Coronal, n (%)	Distal shaft, n (%)	
1994	2 (25.0)	2 (25.0)	4 (50.0)	8 (100)
1995	5 (31.3)	7 (43.8)	4 (25.0)	16 (100)
1996	3 (33.3)	4 (44.4)	2 (22.2)	9 (100)
1997	0 (0)	5 (83.3)	1 (16.7)	6 (100)
1998	3 (18.8)	8 (50.0)	5 (31.3)	16 (100)
1999-2000	5 (26.3)	5 (26.3)	9 (47.4)	19 (100)
Total	18 (24.3)	31 (41.9)	25 (33.8)	74 (100)

UAGP = urethral advancement and glanuloplasty.

Table 2. Complications following operation

Early complications	Location of meatus			Total, n (%)
	Glanular, n (%)	Coronal, n (%)	Distal shaft, n (%)	
Transient skin ischaemia	1 (5.6)	3 (9.7)	3 (12)	7 (9.5)
Bleeding	0 (0)	0 (0)	2 (8)	2 (2.7)
Occluded cystostomy tube	0 (0)	0 (0)	1 (4)	1 (1.4)
No complications	15 (83.3)	26 (83.9)	19 (76)	64 (86.5)
Total	18 (100)	31 (100)	25 (100)	74 (100)

2. Two cases (2.7%) of bleeding and haematoma, one case was treated with conservative management but the other patient required exploration of the wound and control of bleeding.
3. One case (1.4%) of cystostomy catheter obstruction. In this case, the catheter was changed. Sixty-four patients (86.5%) had no early complications (Table 2).

There were no cases of meatal stenosis and meatal retraction or fistula.

Discussion

UAGP is one of several methods we commonly used to repair anterior hypospadias (glanular, coronal, distal shaft) with or without chordee. This method is also referred to as sleeve advancement^{1,12} and urethral mobilization.^{5,6} In order for the method to work successfully, the surgeon must have sufficient experience and should be careful about the details of the surgical operation.

Urethral blood supply is from the posterolateral bulbar vessels (antegrade) and vascularization from the glans (retrograde). However, in hypospadias there is no efficient distal retrograde element of urethral vascularization due to atresia of the distal spongiosus. Therefore, there is sufficient antegrade blood flow, which is an important factor in the results of reconstructing surgeries.

Although we used diversion of urinary tract and the stent of the meatus, operations were reported which did not use diversion of urinary tract and the stent of the meatus, but had excellent results.^{3,15} Before using Y-V flap of glans, we had some cases of meatal stenosis, as Spencer and Perlmatter,¹² Atan et al,⁹ and Hamdy et al¹¹ reported. Using this kind of flap avoids a circular anastomosis, reduces the risk of late contraction and meatal stenosis.

We had no meatal stenosis. In the one-stage repair of hypospadias the expected rate of fistula is 10–15%.^{2,16} In their study of tabularized incised plate (TIP) method used on 106 patients, Borer et al reported fistula and meatal stricture in 7% of cases.¹⁷ One of the advantages of the UAGP method is removing hypospadias without making a new urethra. Since all anastomoses are prone to meatal stricture, in this method anastomosis does not take place and there is no suture line. Therefore, there is no chance of fistula. In our study, we observed no case of fistula. In this method, the glans keeps its natural cone shape, which is not the case with meatal advancement

glanuloplasty. In all our patients, we repaired the glans on the urethra and the results produced a much better appearance than in the tunnelling method. We observed no case of infection, disruption or relapse. The method may also be used with circumcised patients.^{13,14} Patients' erection and skin sensitivity do not suffer after surgery.¹⁸

In anterior hypospadias, fibrous chordee is not common. We did not routinely do artificial erection for every patient. We did it only in suspected situation. We released distal spongiosum-glans attachment in all patients, so that any torsion was corrected.

We used other techniques in the case of more proximal hypospadias, but Warwick et al described the details of bulbar elongation anastomotic meatoplasty through a perineal incision that provides 2–2.5 cm of tension-free lengthening in children and additional urethral length to overcome for more proximal than anterior hypospadias.¹⁵

The results of our study and those of other researchers^{6–10} show that if the surgeon has sufficient experience, he can use the UAGP method with all anterior hypospadias patients, which constitutes about 70% of all hypospadias cases, with good to excellent cosmetic and functional results and the fewest complications.

References

1. Murphy JP. Hypospadias. In: Ashcraft KW, Murphy JP, Sharp RJ, et al, eds. *Pediatric Surg*, 3rd edition. Philadelphia: W.B. Saunders, 2000:763–79.
2. Duckett JW, Baskin LS. Hypospadias. In: Oneil JA, Rowe ML, Grosfeld JL, et al, eds. *Pediatric Surgery*, Vol 2, 5th edition. Missouri: Mosby, 1998:1769–79.
3. Duckett JW. Hypospadias. In: Walsh PC, Retika AB, Vaughan ED, et al, eds. *Campbell's Urology*, 7th edition. Pennsylvania: W.B. Saunders, 1998:2093–116.
4. Mouriquand PDE, Mure PY. Hypospadias. In: Gearhart JP Rinkcr, Mouriquand PDE, eds. *Pediatric Urology*, Philadelphia: W.B. Saunders, 2001:713–27.
5. Belman AB. Hypospadias and chordee. In: Belman AB, King LR, Kramer SA (eds), *Clinical Pediatric Urology*, 4th edition. London: Martin Dunitz, 2002:1061–88.
6. Koff SA. Mobilization of the urethra in the surgical treatment of hypospadias. *J Urol* 1981;125:394–7.
7. Nasrallah PF, Minott HB. Distal hypospadias repair. *J Urol* 1984; 131:928–30.
8. Ampe J, Nijman JM, Van Oyen P. Urethral advancement for distal hypospadias repair; indications, techniques and results. *Acta Urol Belg* 1990;58:159–61.
9. Atan A, Yildiz M, Aydoganli L, et al. Urethral sleeve advancement in repairment of distal hypospadias. *Arch Ital Urol Androl* 1996; 68:103–5.

10. Mills C, McGovern J, Mininberg D, et al. An analysis of different techniques for distal hypospadias repair, the price of perfection. *J Urol* 1981;125:701-20.
11. Hamdy H, Awadhi MA, Rasromani KH. Urethral mobilization and meatal advancement, a surgical principle in hypospadias repair. *Pediatr Surg Int* 1999;15:240-2.
12. Spencer JR, Perlmatter AD. Sleeve advancement distal hypospadias repair. *J Urol* 1990;144:523-5.
13. Baram NK. Urethral advancement for distal hypospadias repair in circumcised patients. *Plast Reconstr Surg* 1982;70:496-504.
14. Jawad AJ. Urethral advancement and glanuloplasty vs. MAGPI for distal hypospadias repair. *Urol Nephrol* 1997;29:681-6.
15. Warwick RT, Parkhouse H, Chapple CR. Bulbar elongation anastomotic meatoplasty (BEAM) for subterminal and hypospadiac urethroplasty. *J Urol* 1997;158:1160-7.
16. Ghali AM, El Malik EM, Almalki T. One-stage hypospadias repair experience with 544 cases. *Eur Urol* 1990;36:436-42.
17. Borer JG, Bauer SB, Peters CA, et al. Tubularized incised plate urethroplasty. *J Urol* 2001;165:581-5.
18. Perovic SV, Djordjevic ML. A new approach in hypospadias repair. *World J Urol* 1998;16:195-9.