

Research

Complication Rates of the Tubularized incised plate urethroplasty: A Prospective Study

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Abstract

Objective

To assess the complications encountered with tubularized incised plate urethroplasty and the impact of the tissue used to cover the repair site in the prevention of these complications.

Material and Methods

A prospective study was performed on 115 patients underwent tubularized incised plate urethroplasty for distal hypospadias repair between May 2010 and June 2013. All of these patients were treated by a single surgeon. The age of patients at surgery ranged from 1 to 11 years (median 3.3 years). Postoperatively, the patients were evaluated at regular intervals (8 days, 15, 30, 90, 180 and 360).

Results

The cosmetic results were excellent in 103 patients (89, 6% of cases) with meatus at the apex of the glans and straight phallus. However, the rate of complications observed in these patients was significant: meatal stenosis was seen in 20 patients (17,5% of cases), fistulas in 14 patients (12,2%) and glans dehiscence in 12 patients (10,4%).

Conclusions

The tubularized-incised plate urethroplasty is a simple technique which provides an excellent cosmetic appearance of the glans. However, the rate of complications, especially for meatal stenosis remains high with this procedure.

Key Words: Hypospadias; Distal Hypospadias; Urethroplasty; Tubularized Incised Plate; Snodgrass' Technique; Meatal Stenosis; Fistulas; Glans Dehiscence

Introduction

The term hypospadias is a Greek word composed of two words: Hypo (υπο) which mean under and spathe (σπάθη) which mean sword. It represents the most common urogenital malformation in boys and it is characterized by ectopia of urethral meatus. This meatus is located on the ventral side of the penis or on the scrotal area [1].

In 1994, Snodgrass described tubularized incised plate urethroplasty [2], a variant of Duplay's technique. Since, this technique has become the method of choice for correcting distal hypospadias in the majority of centers and a large number of authors have reported excellent results with this surgical technique. However, if the cosmetic result was excellent with a low rate of fistulas, several authors reported a high rate of meatal stenosis [3,4,5].

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Sub Date: June 12th 2018, **Acc Date:** June 18th 2018, **Pub Date:** June 19th 2018.

Citation: Ibtissème Bouanani, Yazi Aboubekr Essedik, Smail Acimi, Samia Benouaz and Messouda Hanou (2018) Complication Rates of the Tubularized incised plate urethroplasty: A Prospective Study. BAOJ Surgery 4: 034.

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The aim of this study was to assess the complications, especially meatal stenosis countered with this procedure, and the impact of the tissue used to cover the repair site in the prevention of these complications.

Materials and Methods

A prospective study was realized on 115 patients treated for distal hypospadias, between May 2010 and June 2013, by a single surgeon. A single center descriptive study and data was gathered from aspect and location of meatus, aspect of glans, presence or absence of chordee, the age of the patients at the surgery ranged from 1 to 11 years (mean, 3.3 years). All patients underwent tubularized incised plate repair (Snodgrass' procedure).

Postoperatively, the patients were evaluated at regular intervals (8 days, 15, 30, 90, 180, and 360).

A 2,5 magnifying loop was used during surgery, the technique begins always by a traction suture placed through the glans and a rubber band surrounds the penile base, which serves as a tourniquet. A circumferential incision is made 2 mm proximal to the hypospadiac meatus and extends distally by two parallel incisions in the skin and the glans. This incision delimits the urethral plate. The width of the isolated urethral plate is 6–8 mm, as described by Snodgrass [6,7]. An incision of the urethral plate in the midline from the meatus to the tip of the glans was made. This incision extended through the mucosal and submucosal tissue down to the corpora cavernosa [7]. This result in a gain of 4 mm, which gives to the urethral plate a width of 10–12 mm and sometimes 13–16 mm [7]. The urethral plate, is tubularized over an 6 Feeding tube. We used 6/0 polyglactin interrupted sutures. This neourethra was covered by dartos ventral of the penis in 105 patients (92,3%) and by a dorsal preputial flap, transposed on the ventral side of the penis through a buttonhole in 10 patients (8.7%).

One hundred and eleven patients (97.4 % of cases) were undergoing urinary diversion by a 6F feeding tube for 6 days and the urinary catheter was accidentally removed by the patient immediately after operation in 3 cases (2.6% of cases). An antibiotic prophylaxis was maintained for 5 days.

The evaluation of the cosmetic result was subjective, based on the opinion of the operator and the parents. The diagnosis of stenosis of meat in advance in front of the presence of two criteria: a meatus of stenotic aspect and a fine urine jet.

Results

Per operating, the accidental blesure of the natif urethra occurring in 4 our first patients (3.5 %of cases), postoperatively, the complications observed were: the dehiscence of the glans, the fistula and the stenosis

- The dehiscence of the glans occurred in 12 patients (10, 4% of cases) was observed at D30 in 6 patients (5, 2%) but no patient was surgically taken back seen the satisfaction of the parents

- Fistulas were observed in 14 patients (12, 2% of cases). 08 of them (57%) the fistulas was more premature just after the ablation of the urinary catheter to day 15, at 6 patients (42,9%) the fistulas was observed at control of day 90, Patients receiving ventral dartos as an intermediate plan presented fewer fistulas (11.4%) than those receiving buttonhole dorsal preputial dartos (20%).

- The stenosis of the meatus occurred in 20 patients (17.4%). This complication was observed in 10 patients (50% of cases) during control at day 30

The rate of complication (distal release of glanduloplasty, stenosis and fistula) was higher in children whose glans had a normal size ($p = 0$), stenosis and fistula were more important in patients with shallow navicular fossae ($p = 0.0$).

Discussion

The surgery of the hypospadias remains a challenge even by the hands of an experimented surgeon, according to MOURIQUAND (6), the surgery of the hypospadias does not have to be an occasional surgery

For PIET HOEBEKE, a surgeon experienced in hypospadiology must perform about 100 hypospadias per year [8] and the CHRZAN et al [9]. study has shown that the rate of complications was higher for a less experienced surgeon (40%) than for an experienced surgeon (24%). Data confirmed by the work of AKBYLIK [10].

Comparing our results with those of other authors (**Table 1**), we notice that our complication rate is the highest. Knowing that we are still at the beginning of our learning curve.

The Fistulas

In our study sample the fistula rate is 12.2%, thus joining the general data of the literature [20] An intermediate plan (dartos ventral or the buttonhole dorsal dartos) was used in all our patients: the buttonhole dorsal dartos was performed in 10 of our patients, our fistula rate (20%) seems higher if we compared to that of SNODGRASS [21] and DJORDJOVIC [22]. The ventral dartos was performed in 91.3% of our patients because it's seems easier to achieve, our fistula rate (11.4%). % remains lower than that of CIMADOR [19] but it seems very high compared to those of SAVENELLI [15] and EL HUNAYAN [23] who use the same plan, this can probably be explained by the way of dissection that we have adopted, the ventral dartos is less thick and thus the risk of ischemia and perforation are greater, thus increasing the risk of fistula, however we have found that our fistula rate was higher using the buttonhole dorsal dartos (20%) than the ventral dartos (11.5%) but without significant difference ($p = 0.3$)

Table. 1: Complications rate between various authors

AUTHORS	YEAR	RATE OF PATIENTS	Fistula rate		Sténose rate		Dehiscence glans rate	
			N	%	N	%	N	%
SNODGRASS [2]	1994	16		-				
SNODGRASS [6]	1996	148	7		3		2	
ROSS [11]	1997	15	-	-	-		-	
ELBAKRY [3]	1999	21	4		4		-	
SUGARMAN [12]	1999	25	1		-		-	
DAYANC [13]	2000	20	1	5	1	5	-	
BACCALA [14]	2005	93	1	1,1	1	1,1	-	
SAVANELLI [15]	2007	130	20	15,4	5	3,8	6	4,6
EL-KASSABY [16]	2008	764	16	2	8	1	2	0,2
AKBIYIK [10]	2009	437	17	3	14	3,2	-	-
AL GHORAIRY [17]	2009	195	14	7,2	11	5,6	-	-
ACIMI [5]	2010	132	4	3	29	22	-	
BRACKA [18]	2011	70	1		2		-	
CIMADOR [19]	2013	130	19	14,9	13	10	5	3,8
Notre série	2014	115	14	12,2	20	17,4	12	10,4

The Stenosis

Complication inherent to this technique, the majority of authors speak of a low rate of stenosis [21], however for others the rate of stenosis is higher varying between 6 and 22% [5,23-30], this stenosis most often concerns the urethral meatus [31]. The depth of the navicular fossa seems to be a factor favoring the appearance of this stenosis: SMITH and HOLLAND [32] have described a high rate of meatal stenosis (13% in 48 patients) in the presence of an initially narrow plate, MOSHARAFA and Al [33] found that the stenosis rate was higher in patients whose plaque was narrower or shallower. On the other hand NGUYEN [34] as well as Snodgrass [35] did not find any relation between the width of the plate and the postoperative complications.

In the series of S.ACIMI the rate of stenosis was 22% [5] according to the author the appearance of this stenosis is probably related to this incision made at the level of the glandular mucosa however this incision is necessary for the Obtaining an apical meatus

Some authors incriminate other factors [36]:

- A large mobilization of the ailerons of the glans causing edema and ischemia source of stenosis
- Adhesion between the two edges of the incision.

According to Snodgrass, these stenoses are rather due to technical errors, namely an incision too deep and / or extended to the apex. According to the author, the incision should stop at about 3 mm before the end of the urethroplasty, a recent comparative study between two groups of patients, one having a median incision to the top of the glans and the other to the middle of the glans found that the stenosis rate was higher (6.1%) in the first group than the second group (1.5%) [37].

The time of appearance of these stenosis remains controversial: for BORER [38] these stenosis appear early in the course of the first 6 months postoperatively, for ELBAKRY [3] these stenosis appear early after the ablation of the stent, the GROSOS and al [39] study revealed that these stenosis are of later appearance (12 months postoperatively).

The indication for postoperative dilatation remains controversial, at the beginning of his experience, SNODGRASS practiced postoperative dilatation in a systematic way [40], but currently the author merely monitors his patients by a meter, he says that postoperative dilatations systematic, unnecessary and exacting, EL BAKRY [3,41] has reported a high rate of occurrence of stenosis of the ear canal sooner than ablation of the probe, he proposed to make dilatations systematic postoperatively because of dilatation by week during 3 months, these daily expansions avoid any approximation and adhesion of the two edges of the incision for a better healing without stenosing risk, for the author the systematic dilatations must be part of the operating times of the technique of Snodgrass, for LORENZO [40]. These systematic postoperative dilatations

are useless and exacting for the patient and his family; he advocates catheterization in infants who have not acquired cleanliness 6 months after the postoperative and a debimetry at older children to detect subclinical stenosis.

-A review of the literature has found few articles on the duration of these dilations in the treatment of this stenosis, for ACIMI [5] the frequency of dilations is one dilation per week for several months up to two years, ELICIVIK [42] practices a meatoplasty, and according to the author these dilations are stressful and traumatic. -For other authors, in order to avoid this risk of cicatricial stenosis, they modified the Snodgrass technique by adding a graft at the level of the median incision: DECTER and FRANZONI [43] covered this incision with a mucosal graft preputial, HAYES and MALONE [44] used a graft taken at the expense of the oral mucosa. In our study sample, the stenosis rate was 17.4% (photography 1) and it concerns the meatus and it was early onset in 10 of our patients (day 30), thus joining the data of the literature [3,20,38], we did not practice systematic dilatation postoperatively, the patients with a fine urine jet were dilated by a sterile flexible probe 8 and lubricated by a local anesthetic for 2 years



Figure 1 : Meatus Stenosis

The Glans Dehiscence

A rare complication for the distal hypospadias, its rate varies between 0.5 and 4% [10,39,42,45,46]. A review of the literature shows few studies on the factors favoring the appearance of this complication. According to ELBAKRY [3], this complication is due to the interposition of the dorsal flap on the urethroplasty. According to the author, this intermediate plane is thick causing tension during the closure of the glans which is responsible for this dehiscence.

Our dehiscence rate is very high 10.4% compared to literature data, we did not find a correlation between the rate of this complication and the anatomical conditions (size of the glans, the appearance of the navicular fossa) these patients did not have a postoperative infection and we found that this rate was high at the beginning of our learning curve, the experience of the surgeon in this area, seems to us a determining element in the appearance of this complication.



Figure 2 : Glans Dehiscence

Cosmetic Result

A review of the literature since the description of this technique, found an excellent postoperative cosmetic appearance; the aspect of the penis is excellent with a vertical slit-like appearance meatus [20]. In our sample the evaluation of the cosmetic result was subjective, based on the opinion of the operator and the parents, it was excellent in 83.6% of our patients; the meatus was apical and vertical with a conical glans (photography. 3), thus joining the data of the literature [20].



Figure 3: Cosmetic Result

Conclusion

Our work has shown that the technique of SNODGRASS in the treatment of distal hypospadias has the merit of being a simple technique; we can claim that overall the results are satisfactory particularly from the aesthetic point of view, but on the functional level the stenosis remains the most common complication.

References

1. Acimi S (2017) What is the pathogenesis of proximal hypospadias?. Turk J Urol DOI: 10.5152/tud.2018.85530
2. Snodgrass WT (1994) Tubularized incised plate for urethroplasty: indications, technique and complications. J Urol 151: 464-465.
3. Elbakri A (1999) Tubularized incised plate urethroplasty: is regular dilatation necessary for success?. BJU Int 84(6): 683-638.
4. O'Connor KM, Kiely EA (2006) Lessons learned using Snodgrass hypospadias repair. Ir J Med Sci 175(1): 37-39.
5. Acimi S (2010) Comparative study of two techniques used in distal hypospadias repair: tubularized incised plate (Snodgrass) and tubularized urethral plate (Duplay). Scand J of Urol and Nephrol 45: 68-71.
6. Snodgrass W, Koyle M, Manzoni G, Hurwitz R, Caldamone A, et al. (1996) Tubularized incised plate hypospadias repair: results of a multicenter experience. J Urol 156(2): 839-841.
7. Snodgrass W (1999) Tubularized incised plate hypospadias repair: indication, technique, and complications. Urology 54(1): 6-11.
8. Snodgrass W, Hoebeke P, Mouriquand P (2011) hypospadias dilemmas: a round table. J Ped Urol 7(2): 147-157.
9. Chrzan R, Dik P, Klijina J (2007) Quality assessment of hypospadias repair with emphasis on techniques used and experience of pediatric urologic surgeons. UROLOGY 70(1): 148-152.
10. Akbiyik F, Tiryaki T, Senel E (2008) Clinical experience in hypospadias; results of tubularized plate in 496 patients. Ped Urol 73(6): 1255-1258.
11. Ross JH, Kay R (1997) Use of de-epithelialized local skin flap in hypospadias repairs accomplished by tubularisation of the incised urethral plate. UROLOGY 50(1): 110-113.
12. Sugeran ID, Trevett J, Malone PS (1999) Tubularization of the incised urethral plate (Snodgrass procedure for primary hypospadias surgery. BJU 83(1): 88-90.
13. Dayanc M, Tan MO, Gokalp A, Yildirim I (2000) The incised urethral plate urethroplasty for distal and midpenile hypospadias. Eur Urol 37: 102-104.
14. Baccala AA, Ross J, Kay R (2005) Modified tubularized incised plate (Snodgrass) procedure for hypospadias repair. UROLOGY 66(6): 1305-1306.
15. Savanelli A, Settini C (2007) A prospective randomized comparative study on the use of ventral subcutaneous flap to prevent fistulas in

- the snodgrass repair for distal hypospadias. *world J Urol* 25(6): 641-645.
16. Elkassaby A, Al-Kandari A, Elzayat T (2007) Modified tubularized incised plate for hypospadias repair: a long term results of 764 patients. *J Urol* 71(4): 611-615.
 17. Al-Ghorairy BA, Elashry OM, Al-Housain AE (2009) Analysis of five year experience with tubularized plate urethroplasty for anterior and mid penile hypospadias. *Eur J Ped* 19(2): 90-95.
 18. Aslam R, Campbell K, Bracka A (2013) Medium to long term results following single stage snodgrass hypospadias repair. *Journal of Plastic Reconstructive and Aesthetic surgery* 66(11): 1591-1595.
 19. Cimador M, Pensabene M, Sergio M (2013) Coverage of urethroplasty in pediatric hypospadias: randomized comparison between different flaps. *Int Urol* 20(10): 1000-1005.
 20. Braga H, Lorenzo A, Pippi Salle J (2008) Tubularized incised plate for distal hypospadias; a littérature review. *Indian Journal of Urol* 24(2): 219-225.
 21. Sozubir S, Snodgrass W (2003) A new algorithm for primary hypospadias repair based on tip urethroplasty. *Ped Surg* 38(8): 1157-1161.
 22. Djordjevic M, Perovic. SV, Slavkovic Z (2005) Longitudinal dorsal dartos flap for prevention of fistula after a snodgrass hypospadias procedure. *Eur Urol* 50(1): 53-57.
 23. El Hunayan AA, K Ehinde EO, Elsalam MA (2003) Tubularized incised plate urethroplasty: modification and outcome. *Int Urol Nephrol* 35(1): 47-52.
 24. Moradi M, Maradi A, Ghaderpanah F (2005) comparaison of snodgrass and Mathieu surgical techniques in anterior distal shaft hypospadias repair. *J Urol* 2(1): 28-31.
 25. Soygur T, Arikan N, Zumrutbas AE (2005) Snodgrass hypospadias repair with ventral based dartos flap in combination with mucosal collars. *Eur Urol* 47(6): 879-884.
 26. Mustapha M (2005) The concept of tubularized incised plate hypospadias repair for different types of hypospadias. *Int Urol Nephrol* 37(1): 89-91.
 27. Bar-Yocef Y, Binyamini J, Mullerad Met (2005) megameatus intact prepuce hypospadias variant: application of tubularized incised plate urethroplasty. *Urology* 66(4): 861-864.
 28. Barrack AM, Hamdun AH (2001) Tubularized incised plate urethroplasty for distal hypospadias. *East Afr Med J* 78: 327-329.
 29. Stehr M, Lehner M, Schuster T (2005) Tubularized incised plate urethroplasty I primary hypospadias repair. *Eur J Ped Surg* 15: 420-424.
 30. Leclair MD, Camby C, Battisti (2004) Set Unstented tubularized incised plate urethroplasty combined with foreskin reconstruction for distal hypospadias. *Eur Urol* 46: 526-530.
 31. Gurdal M, Tekin A (2004) Intermediate-term functional and cosmetic results of the snod grass procedure in distal and midpenile hypospadias. *Pediatriurgint* 20(3): 197-199.
 32. Hollnd. AJ, Smith GH (2000) Effect of the depth and width of the urethral plate on tubularized incised plate urethroplasty. *urol* 164(2): 489-491.
 33. AA Mosharafa D, Abgo-Panzo E (2009) Aubry Cure d'hypospadias .la forme de la plaque uretrale a-t-elle une influence sur le résultat de l'intervention de Duplay-Snodgrass?. *Progurol* 19: 507-511.
 34. Nguyen MT, Snodgrass WT, Zaontz MR (2004) Effect of urethral plate characteristics on tubularized incised plate urethroplasty. *UROLOGY* 171(3): 1260-1262.
 35. Snodgrass WT, Bush N, Cost N (2010) Tubularized incised plate urethroplasty for distal hypospadias. *J Pedurol* 6: 408-413.
 36. Singh RB, N Pavithran M (2004) Lessons learnt from Snodgrass TIP urethroplasty: a study of 75 cases. *Ped Surg Int* 20(3): 204-206.
 37. Alsharbaini R, Almaramhy H (2014) Snodgrass urethroplasty for hypospadias repair: a retrospective comparison of two variations of the technique. *journal of taibah university sciences* 9(1): 69-73.
 38. Borer JG, Bauer Sb Petres CA (2001) Tubularized incised plate urethroplasty: expended use in primary and repeat surgery for hypospadias. *J Urol* 165: 581-5.
 39. Grosos C, Bensaid R, Gorduz DB (2014) Is it safe to solely use ventral penile tissues in hypospadias repair? Long-term outcomes of 578 duplay urethroplastie performed in a single institution over a period of 14 years. *J Ped Surg* 10(6): 1232-1237.
 40. Lorenzo AJ, Snodgrass WT (2002) Regular dilatation is unnecessary after tubularized incised plate hypospadias repair. *BJU Int* 90: 473.-474.
 41. Elbakry A (2002) Further experience with the Tubularized incised plate for hypospadias repair. *BJU Int* 89: 291-294.
 42. Eliçivik M, Tireli G, Sander S (2004) Tubularized incised plate urethroplasty: 5 years 'experience. *Eur Urol* 46(5): 655-659.
 43. Decter RM, Franzoni DF (1999) Distal hypospadias repair by the modified Thiersch _Duplay technique with or without hinging the uretrale plate: a near ideal way to correct hypospadias. *J Urol* 162(3): 1156-1153.
 44. Hayes MCC, Malone PS (1999) The use of dorsal buccal graft with urethral plate incisions (Snodgrass) for hypospadias salvage. *BJU* 83: 508-3.

45. Bertozzi M, Yildiz A, Kamal B (2011) Multicentric experience on double dartos flap protection in tubularized incised plate urethroplasty for distal and midpenile hypospadias. *Pedsurg In* 27: 1331-1336.
46. Snodgrass WS, COST N (2011) Analysis of risks factors for glans dehiscence after tubularized incised plate. *J Urol* 185(5): 1845-1849.