

# Repair of Penoscrotal and Complicated Hypospadias by a Two-Stage Technique

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## Abstract

The management of a sub-group of patients with penoscrotal hypospadias with severe chordee and those complicated cases due to failed previous attempts at repair is challenging and controversial. In this retrospective review, the management of 14 patients who had penoscrotal hypospadias or crippled hypospadias treated with a two-stage technique are discussed. The mean follow-up was 37.1 months (range 4-72). Mean age 8.1 years (range 15 months – 21 years). Nine patients (64.3%) had primary repair, while five patients (35.7%) had salvage repair. One patient had poor graft take. Five patients (35.7%) had urethro-cutaneous fistulae. Meatal stenosis in two patients (14.2%). Persistent chordee in one patient (7.1%). Urethral diverticulum, meatal retraction and urinary tract infection in one case each. Final cosmetic results as judged by near normal, slit-like meatus, and straight penile shaft, were achieved in all of the patients, except the one with meatal retraction. At the time of follow-up, all of the patients or their parents were satisfied with the cosmetic appearance. In conclusion, the two-stage repair may be a good alternative in the management of the most severe forms, and complicated cases of hypospadias.

(JMJ 2005; Vol. 39 (1): 14- 18)

Received

October 5, 2004

Revised

March 21, 2005

Accepted

May 5, 2005

## Keywords

hypospadias, penoscrotal, two-stage repair, fistula.

## Introduction

Approximately, 20% of hypospadias cases occur from the penoscrotal junction to the perineum. <sup>1</sup> The ideal repair should achieve normal looking straight penile shaft with a terminal meatus that allows for forward directed stream and normal coitus, and minimal post-operative complications. In a sub-group of patients, including penoscrotal hypospadias with severe chordee, those with failed previous repair, or previously circumcised, left with deficient scarred and unhealthy local tissue (cripple hypospadias), the repair is difficult and challenging. <sup>2</sup> Despite the introduction of many refined techniques, there is still no consensus on the ideal method of repair. Single-stage repair is attractive, and different techniques utilizing grafts and flaps <sup>1, 3,4-7</sup> have been reported. However, they did not yield on long-term follow up acceptable final functional and cosmetic results, and has been associated with high complication and revision rates. <sup>2, 6, 8</sup> In a long-term review of hypospadias to adulthood, Bracka reported that 86% of patients felt that the number of operations was not very important provided that the treatment was completed by school age, and that the quality of repair was regarded more relevant psychologically than the time taken to achieve it. <sup>9</sup> Bracka introduced a two-stage repair with prepuccial graft interposition and subsequent tabularization of the urethral plate, as a suitable and a good price to pay for successful outcome of hypospadias repair. <sup>10, 11</sup> Many surgeons nowadays adopt the Bracka technique for the management of the severe forms of hypospadias.

In this retrospective review, we present 14 patients with penoscrotal hypospadias and crippled hypospadias treated at Jordan University Hospital with the two-stage technique popularized by Bracka.

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**JORDAN MEDICAL JOURNAL, VOL.39.NO. (1) MAY 2005**

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## Patients and Methods

Between 1996 and 2004, 71 cases of hypospadias were managed by the two authors at Jordan University Hospital. A sub-group of 14 patients with penoscrotal hypospadias, or failed previous single-stage repair, underwent two-stage repair with the technique described by Bracka.<sup>10</sup> Medical records of these patients were reviewed, and data was collected on a number of variables including; age at operation, degree of hypospadias, presence of chordee, history of previous attempts at repair, circumcision status, period of follow up, outcome and post-operative complications as urethral fistula, meatal stenosis, and diverticulae.

## Technique

All the procedures were performed under endotracheal general anesthesia. The chordee was assessed intra-operatively in all patients using intracavernous saline injection to achieve erection (saline erection test). An axial line was drawn from the proposed new meatus, at the tip of glans, down to and encircling the ectopic meatus, this was crossed by lateral incision lines at the subcoronal level. Through these lines, the glans was ventrally split, and all of the fibrous chordee tissue was excised. Penile straightening was achieved in all patients. After securing good hemostasis, a full-thickness skin graft was harvested from the pre-auricular area, or the preputial skin. After defating of the graft, it was sutured to the ventral defect and fixed in place by a tie-over dressing over a suitable size urethral catheter. The graft was inspected after six days. The timing of the second stage repair was judged by the maturation of the graft (6-15 months). At the second stage, tubularization of the neo-urethra was performed using magnifying loupes. Two longitudinal lines were marked on the sides of the graft from the tip of the glans down to and encircling the native urethral opening, the width of the flap was planned to achieve adequate, tension-free neo-urethra, the lines were incised, dissection was minimal, but adequate to ensure tubularization of the neo-urethra without tension, closure was performed, around a urethral catheter with continuous 6:0 Vicryl sutures.

A vascularised flap of preputial areolar tissue was raised, when feasible, and moved to cover the neo-urethral suture line, the skin layer was closed with interrupted 6:0 Vicryl sutures. Urinary catheter was removed after 7 days.

## Results

Table (1) summarizes patients and operative data. The mean follow-up time was 37.1 months (range 4-72). The mean age at operation was 8.1 years (range 15 months – 21 years). Twelve patients (85.7%) had penoscrotal hypospadias, and two patients had mid-shaft hypospadias, chordee was present in all patients. Nine patients (64.3%) had primary repair, while five patients (35.7%) had salvage repair following failure of previous single-stage repair (three patients had two procedures each, two patients had one procedure each). Three patients were previously circumcised. Pre-auricular full-thickness skin graft was used in 12 patients (85.7%) and perpcucial graft in two. The mean operative time for the first stage was 101.8 minutes (range from 75 -135). The mean operative time for the second stage was 110.4 minutes (range from 90 -165). Skin graft take was successful in 13 patients (92.6%). One patient had poor graft take, and required repeat of skin grafting. The complications of the second stage are shown in Table (2). Five patients (35.7%) had urethro-cutaneous fistulae that required rehospitalization for repair. Meatal stenosis was encountered in two patients (14.2%), they responded to urethral dilatation. One patient (7.1%) had persistent chordee that was corrected by Nebsit plication. Urethral diverticulum, meatal retraction, and urinary tract infection, were seen in one case each. There was no significant bleeding or hematoma. None of the patients complained of weak stream to suspect urethral stricture. Final cosmetic results as judged by near normal, slit-like meatus and straight penile shaft was achieved in all of the patients, except the one with meatal retraction. All patients or their parents were satisfied with the results.

**Table 1: Summary of patients and operative data (n=14).**

Age at operation. Mean (range)	8.1 Years (1.25-21)
Site of hypospadias	
Penoscrotal. n(%)	12 (85.7%)
Mid-shaft. N(%)	2 (14.3%)
Previous repair. N(%)	5 (35.7%)
Circumcision. n(%)	3 (21.4%)
Graft donor site	
Pre-auricular. n (%)	12 (85.7%)
Prepuccial skin. n (%)	2 (14.3%)
Operative time:	
First stage. Mean (range)	101.8 minutes (75-135)
Second stage. Mean (range)	110.4 minutes (90-165)
Interval between the two stages. Mean(range)	9 months (6-15)
Follow-up period. Mean(range)	37.1 months (4-72)

**Table 2: Complications of second stage repair.**

Complication	No/ percentage	Revision surgery
Fistula	5 (35.7%)	Fistula repair
Stricture	0 (0 %)	
Diverticulum	1 (7.1 %)	
Meatal retraction	1 (7.1%)	
Meatal stenosis	2(14.3%)	Dilatation
Hematoma/bleeding	0 (0 %)	
Urinary tract infection	1 (7.1%)	
Persistent chordee	1 (7.1%)	Nesbit plication

## Discussion

The major principles of hypospadias repair are, complete resection of the chordee to achieve straight penile shaft, terminal location of like meatus, and reducing post-operative complications such as fistulae and strictures. The history of hypospadias and the hundreds of methods reported in the literature for its management, reflect the challenging and controversial nature of the repair. Single-stage repair is attractive, and may be appropriate for most cases, especially the distal forms. However, in patients with the most proximal hypospadias associated with severe chordee, those with failed previous attempts at repair, and

those previously circumcised, left with deficient scarred, unhealthy local tissue (cripple hypospadias), the repair is even more difficult and controversial, with no consensus yet about the ideal repair.<sup>12</sup>

In the 1950s, the standard repair was that of a two-stage repair using multiple techniques, later on, single stage repair, emerged as a convenient method of repair for patients and surgeons, attracted by its potential advantages of reducing the costs and risks of two hospitalizations, and the prolonged psychological trauma to patients. These techniques included among others, the transverse preputial island flap popularized by Duckett.<sup>3</sup> Koyanagi technique,<sup>4,5</sup> onlay island flap urethroplasty<sup>1,6</sup> and recently, the technique of tabularized incised plate urethroplasty introduced by Snodgrass.<sup>7</sup> However, many surgeons realized that these single-stage techniques did not yield, on long-term follow up, the intended final results, and has been associated with non negligible complication rate,<sup>6,12</sup> unsatisfactory revision rate, and sub-optimal functional and cosmetic results.<sup>2,8</sup> The wider published experience with these approaches would suggest that the ideal single-stage procedure has yet to be devised.<sup>2,12</sup> Realizing the inherent limitations of these single-stage repairs, and depending on the results of his long-term review of hypospadias repair, which demonstrated the value of the aesthetic results on long-term socio-sexual adjustment, and the fact that the quality of repair was regarded by most patients, more relevant than the time taken to achieve it,<sup>9</sup> Bracka introduced his two stage technique as a versatile, reliable and aesthetic method for the management of all forms of hypospadias.<sup>10,11</sup> In 1995, he reported on 600 cases of different degrees of hypospadias at different ages, operated upon over 10-year period. 5.7 % of the patients required readmission for fistula repair, 59% of the fistulas occurred in the first three years, patients with salvage surgery had a higher fistula rate (10.5%) than those undergoing primary surgery, stricture rate was 7 %, revision rate of first stage repair was 3.7%, and 5.5% had further minor surgical adjustment. He concluded that a two-stage repair is an acceptable price to pay for such a versatile, reliable repair that achieves good functional and cosmetic results.<sup>10,11</sup>

Many other surgeons went back and applied the same technique, some with modifications, for the management of all forms of hypospadias.<sup>8, 13, 14, 16</sup> Others used the technique for primary repair of proximal hypospadias, and as a salvage procedure for those patients with failed previous repairs.<sup>2, 12, 17</sup>

First stage complication rate reported by these authors ranged from 2.5% to 10%, and the overall complication rate of the second stage ranged from 15.7% to 23.5%.<sup>12</sup> Factors that may affect the complication rate include the experience of the surgeon and the learning curve,<sup>14</sup> the complexity of the hypospadias and salvage repair,<sup>8, 16</sup> and the reinforcement of repair by a water proof vascularised preputial areolar tissue flap.<sup>15</sup>

Gershbaum compared the results of a single-stage with two-stage repair in patients with perineoscrotal hypospadias with severe chordee, results with long-term follow-up suggested that the overall functional and cosmetic results were superior in the two-stage repair compared to the single stage repair with less complication rate.<sup>18</sup>

The value of the native urethral plate is well appreciated by many hypospadias surgeons, who would maintain it whenever possible. In our patients, however, chordee was severe, and the urethral plate was either hypoplastic (in the primary cases) or scarred (in the salvage group), so the urethral plate was sacrificed along with the underlying fibrous tissues to achieve good penile straightening. Encouraged by the optimal functional and aesthetic results reported by Bracka and others, we elected to repair this sub-group of patients by a two-stage technique. At the first stage we used preputial skin grafts in only two cases.

The rest of patients were either previously circumcised, or had insufficient foreskin, we preferred to use pre-auricular full-thickness skin grafts, as these grafts are relatively thin, pliable, non hairy, and leaves inconspicuous donor scar. The first stage was complicated in one patient (7.1%), who had loss of the graft and required regrafting, this compares favorably with results reported by others. At the second stage, fistula rate of 35.7% is apparently higher than that reported in the literature. This high complication rate may be explained partially by the growing learning curve of the procedure, as four out of the five fistulae occurred in the first half of the study period, in the Bracka series, two thirds of fistulae occurred in his first three years,<sup>10, 11</sup> the value of the learning curve was later demonstrated by Tittly et al, who showed that repairs performed by trainees had higher incidence of complications compared with those done by consultants.<sup>14</sup> The second factor that might increase the fistula rate in our cases is the fact that three out of the five patients who developed fistulae were previously circumcised, so they did not have preputial areolar tissue flap over the urethral suture line as recommended by Bracka.<sup>10, 11</sup> The value of this water proof layer was proved positively by Telfer who reduced the fistula rate from 63% to 4.5% by transposing a vascularised flap of preputial areolar tissue over the urethral suture line.<sup>15</sup> Bracka suggested a six-month interval between the first and second stages, in our series the mean time was 9 months (range 6- 15 months). This time was judged by the maturation of the skin graft, and we felt that in many patients this six-month period was not sufficient to have a soft graft that would allow tension free tubularization. At the time of follow-up all of the patients or their parents were satisfied with the cosmetic appearance, and this echoes the findings of other authors using the same technique.<sup>10- 12, 17, 18</sup>

## Conclusion

Although it is a technique that requires building up experience, a two-stage repair may be a good alternative in the management of the most severe forms, and complicated cases of hypospadias. The long-term satisfactory results deserve the extra effort, and we recommend it at least for the severe and complicated forms of hypospadias. Staging urethroplasty should not be considered a step backwards, rather we should learn from experience and realize that there are some patients with hypospadias which is too complex to reconstruct in a single stage. More prospective studies are needed to standardize the repair and to determine selection criteria for the two-stage repair, as a simpler form of hypospadias may benefit from the rather simpler one-stage technique.

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## ترميم الاحليل التحتي القضيب صفني والمضاعف (المختلط) بتقنيه ذات مرحلتين

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### ملخص:

إن التدبير الجراحي لفئة المرضى الذين يعانون من احليل تحتى قضيبى صفني أو تلك الحالات المضاعفه بسبب فشل محاولة رتق سابقه، يشكل تحدياً ، اضافة لكونه موضع اختلاف بسبب عدم وجود طريقه مثلى لإصلاحها.

تناقش هذه الدراسة الراجعة الخبرة لأربعة عشر مريضاً يعانون من احليل تحتى قضيبى صفني أو احليل تحتى ( معطل)، عولجوا جراحياً بتقنيه ذات مرحلتين ، بلغ متوسط مدة المتابعة 37,1 شهراً (المدى 4 - 72 شهراً) ، وكان متوسط عمر المرضى وقت إجراء العملية 8,1 سنه ( المدى 15 شهر - 21 سنه) ، أجريت عملية إصلاح أوليه لتسعة مرضى ( 64,3%) بينما خضع خمسة مرضى (37,2%) لعملية إصلاح إنقاذي بعد فشل عملية أحادية المرحلة سابقاً. استجاب أحد المرضى بشكل غير مرضٍ للطعم الجلدي وأصيب خمسة مرضى (37,2%) بناسور احليلي جلدي .

عانى مريض واحد (7,1%) من بقاء اعوجاج القضيب في حين حدث لدى مريض واحد رتج احليلي وحدث لدى آخر انكماش فتحة البول وحدث لدى ثالث إنتان بولي. النتائج التجميلية النهائية كما حكم عليها من خلال قربها للطبيعي أي شبه شق للفتحة وجسم قضيب مستقيم تحققت لدى جميع المرضى باستثناء المريض الذي أصيب بانكماش أفتحه وقد كان جميع المرضى أو ذويهم راضين بالمظهر الجمالي في نهاية فترة المتابعة. استنتاجاً فإن الترميم على مرحلتين قد يكون بديلاً جيداً لتدبير الإشكال الأكثر شدة والمضاعفة من الاحليل التحتي.

### كلمات مفاتيح:

الاحليل التحتي، القضيبى الصفني، ترميم على مرحلتين ، ناسور