Ten-year review of hypospadias surgery from a single centre

Obaidullah*, Mohammed Aslam

Plastic Surgery Clinic, Aman Hospital, Dabgari Gardens, Peshawar 25000, Pakistan

Received 13 June 2004; accepted 11 January 2005

KEYWORDS
Hypospadias

Summary  Hypospadias is more common than cleft lip and palate. However, in comparison to the latter, few units have dedicated any team to its correction. Hence, urologists, paediatric surgeons, plastic surgeons, general surgeons and paediatric urologists keep trying various methods of correcting this deformity. That more than 350 procedures have been described for the correction of one anomaly speaks volumes of dissatisfaction with the results. We describe our humble experience with this anomaly over a period of 10 years during which time we were able to treat 1415 cases. However, this paper only describes results of 1206 patients. We use universally only one technique for hypospadias repair and perform this in two stages. This technique has been described by many but lately popularised by Aivar Bracka from UK [Bracka A. A versatile two-stage hypospadias repair. Br J Plast Surg 1995;48:345-52]. Our overall fistula rate has been 3.8% though most of the fistulae occurred in the earlier period. Other complications included repeated UTI (3%) and hair growth in the urethra (0.2%).

Incidence of hypospadias is one in 350 live male births. Racial differences are not known. The diagnosis is quite apparent and can be made at birth. Over the last century, more than 300 procedures have been described. This is a proof that no technique has so far produced desirable results. The struggle for a better procedure goes on and every now and then a new procedure is described.

For some unknown reasons, it has also not been established as to which specialty should take care of this congenital anomaly. Though pioneers like Duckett have collectively started calling the art of management of hypospadias as hypospadiology it has yet to be accepted by the medical community at large. Although its incidence is more than that of cleft lip/palate, a unified teamwork has not been evolved over the years. Hence, urologists, paediatric surgeons, general surgeons, plastic surgeons and paediatric urologists are all treating these patients. This has resulted in dilution of experience of hypospadias surgery among all these specialists. Surprisingly ignorance of physicians coupled with
natural shyness has kept most of the patients from seeking help openly. Hypospadiasepispadiasforum4 is an internet group of patients and their parents. Going through each story shows the failure rate of various procedures, patients’ agony and mistrust they have in their physicians.

In this region, the authors have persistently shown keen interest in this kind of surgery. As a result, all colleagues from other specialties so kindly started referring their patients to this centre and collection of a series of this number became possible. The learning curve of the team improved and residents also found an opportunity to see more of the same procedure more often. With time, our complication rate dropped, our operating time shortened and we could train more residents.

Staged procedures are quite common in plastic surgery. However, subjecting young children to general anaesthesia more than once has been unpopular among many surgeons. Therefore, most surgeons have tried single stage procedures. This brings in another issue of complications, which did rise very high. So far the commonest complication has been residual fistula formation. Until recently, a fistula rate of up to 10% has been acceptable.5 Urethral stricture, scarring, chordee and painful erection are other trades off from various surgical procedures. Most one-stage procedures usually end up with four to five revisions.

There has been a basic flaw in setting the objective right. Most procedures aim at bringing a urethral tube to the end of penis. Little emphasis has been laid on central location of the external urinary meatus through the glans, its typical slit like shape and scar-less smooth, movable skin on the under surface of the penis. Aesthetic appearance was the least acknowledged factor. Westernised cultures the world over demands male members to urinate in public urinals with little privacy. Thus failure to pass a straight stream embarrasses the patient with hypospadias. Though intercourse has not been hindered with distal varieties, severe chordee and more proximal hypospadias make sexual relations almost impossible. Too much openness of sexual activities has put patients even with the distal varieties, at the risk of rejection, ridicule or at least curiosity.4

This centre has restricted its technique of hypospadias repair to a two-stage procedure. Staged procedures have been described by Humby, Cloutier, Nicolle, Byar, Turner-Warwick and Rabinovitch but the credit of popularising and standardisation of the whole procedure no doubt, goes to Aivar Bracka of UK.1 In this country, this technique is quite common among the plastic surgeons and a few paediatric surgeons, and is widely known as Aivar Bracka (or AB for short) repair. This technique has come to our help in all types of hypospadias including hypospadias cripples. In fact, this has been the only technique the authors can safely perform to repair this congenital defect. Though Bracka1 published his series in 1995, the senior author had worked with him and, hence, this series is based on the patient including those operated before 1995.

Patients and methods

A protocol has been formulated for hypospadias management, since, January 1994 and followed throughout. Hence, a complete record of all the patients including preoperative, interim and postoperative photographs has been maintained. From 1994 to 2002, photographic details were recorded in the form of 35 mm film, printed on 4 × 6″ photographic paper. However, since January 2002, all record has been maintained in the form of digital photographs. A database has been developed by the senior author and a software engineer for plastic surgery patients; this database contains all the relevant data essential for any hypospadias series.

Procedure

The procedure has been almost exactly the same as described by Bracka1 with minor changes evolved over a period of time. The first stage is performed on children preferably at the age of 3-4 years. However, very young children who came with meatal stenosis causing back pressure and having
Figure 2  Various steps of first stage of hypospadias repair. (2.1) Dorsal view of phallus of an 8-year-old boy. (2.2) Ventral view showing penoscrotal meatus. (2.3) Horton test showing degree of chordee. (2.4) Ventral aspect after complete release of chordee and glans split. (2.5) Repeat Horton test. (2.6) Preputial full thickness skin graft stabilised over the raw area with 6/0 chromic catgut. (2.7) Tie-over dressing, showing clear area between the meatus and dressing for unobstructed micturation after removal of catheter. (2.8) Graft take after removal of tie over dressing on the 5th postoperative day.
normal phallus size, have been offered stage I at an early age after counselling with their parents. The procedure was carried out under general anaesthesia, tourniquet and an additional penile block with Bupivacaine 0.5%. We have cut our cost of an extra latex catheter as a tourniquet by using the rolled end of an assistant’s glove instead (Fig. 1). A Horton test enabled us to estimate the magnitude of chordee. We extended the ventral meatotomy described by Bracka regardless of the size of the meatus. We felt that thin margin of the meatus later hindered tubing proximally at the ectopic meatus. We felt that thin margin of the meatus later hindered tubing proximally at the ectopic meatal site. Fig. 2 (2.1)-(2.7) shows the various steps of first stage of the procedure. However, we did not extent our midline incision in the urethral plate right to the tip of the opened meatus and left half to 1 cm of urethral plate between the raw area and the meatus. This gave us ample space to tie a bolster of tulle grass without obstructing the urinary flow after removing the catheter on the postoperative day. Fig. 2.7 explains this point particularly. In first stage only latex catheter was used for less than 24 h merely for saving the cost of a silastic catheter. We could not use 7/0 catgut for lack of availability and hence had to content with 6/0 chromic catgut. Taking advice from Bracka, we tried to use minimum sutures to stabilise the graft on the raw area and mainly took help from the tie over dressing in the form of about 1” wide strips (Fig. 3.9). This dressing conveniently adheres to the normal skin and onto itself without sticking to the wound. It remained attached and gave an elastic support to the penis thus restricting postoperative oedema. Even after removal of the catheter on the fifth postoperative day, we left the dressing in place to be removed after 2 weeks. In very few patients the dressing fell off before 2 weeks.

The second stage was essentially similar to that described by Bracka. However, we had the following minor changes:

i. We used 6/0 vicryl instead of 7/0 for reconstruction of neo-urethra over a silastic catheter, for shear lack of availability.

ii. On personal communication with Bracka, we learned to check any leakage on table from the suture line by inserting an intravenous cannula into the neo-meatus and inject saline while the tourniquet was on (Fig. 3.4).

iii. We could harvest a long flap of Buck’s fascia for ‘waterproofing of the suture line’ from the lateral aspect through minimal degloving rather than from dorsal area after full degloving (Fig. 3.5 and 3.6).

iv. Because of our loco-religious setting, every patient was routinely given a neat and tidy circumcision at the end of stage II repair.

v. Most patients were sent home the next day with the indwelling catheter and never came across any problem.

vi. We used Mepitel® dressing (Möllycke Health Care AB, Box 13080, SE 402 52, Göteborg, Sweden) in the form of about 1’ wide strips (Fig. 3.9). This dressing conveniently adheres to the normal skin and onto itself without sticking to the wound. It remained attached and gave an elastic support to the penis thus restricting postoperative oedema. Even after removal of the catheter on the fifth postoperative day, we left the dressing in place to be removed after 2 weeks. In very few patients the dressing fell off before 2 weeks.

Fig. 3 depicts various steps of the second stage. The purpose of showing an adult case in this illustration is to show the fine details in magnification. It also shows how a hypospadias cripple can also benefit this two stage universal technique.

Again the patients were reviewed at 2 weeks, 3 and 6 months. If there was a fistula, we tried to repair it at this stage after a lapse of not less than 6 months; otherwise the paediatric patients were advised a review at 18 years of age. Figs. 4 and 5 collectively show results before first procedure, before second procedure and few months postoperatively in an 8-year-old previously un-operated and a 6-year-old hypospadias cripple.

Data collection

As all the data is available in our computer database, it was very easy to retrieve all patients
operated upon for the diagnosis 'hypospadias' between January 1, 1994 and December 31, 2003 and they were included in the study. Only patients operated by the two authors were included in the series. Patients with less than 3 months of follow up after uneventful second stage, patients who were treated with any other technique or those who were not seen at least 3 months after second stage or closure of the fistula were excluded from the study. Patients who did not report for follow up were also not included in this series.

The data retrieved was fed into SPSS-10 program and, frequencies and analysis was mostly done by this statistical program.

Figure 3 Various steps of second stage of hypospadias repair in a hypospadias cripple, 23 year of age. (3.1) Ventral aspect of phallus showing multiple fistulae. (3.2) Six months after release of chordee and removal of scar, covered by bilateral post auricular full thickness skin graft. (3.3) Neat inverting suture line of neo-urethra over a 14 size silicone catheter with 6/0 vicryl. (3.4) In a different patient checking for any leak from suture line on table. An intravenous cannula is inserted into the meatus while the tourniquet is on. (3.5) Water proofing flap of Buck’s fascia raised from the left side of phallus. (3.6) Flap sutured over the suture line. (3.7) Skin closure with 6/0 chromic catgut. (3.8) Meatus shown to prove adequate diameter loosely around the catheter. (3.9) Mepitel dressing neatly wound around phallus. (3.10) Four months after completing second surgery, dorsal view. (3.11) End-on view of meatus. (3.12) Ventral view showing soft and supple scar. (3.13) Straight urinary stream without spraying.
Results

Our database presented us a total of 1415 cases operated by the one of the two authors during this period of 10 years. However, only 1206 patients fulfilled the criteria. One hundred and thirty three patients are awaiting second stage repair while 55 patients had not reached their follow up point of 6 months. Forty-eight patients were completely lost to follow up while 65 patients had one of the stages performed by other than the two authors. Two patients underwent single stage surgery (Snodgrass type) and, hence, did not qualify for this study.

Age was taken at the time of first stage. There was a wide range of age averaging 8.9 year with a range of 6 months to 33 years. Median age calculated was 6 year (Fig. 6). Hypospadias site varied from the most distal to penoscrotal and Fig. 7 depicts the scatter. Distal penile topped the rank with 702 patients (58.2%) followed by midpenile 342 (28.4%), coronal and penoscrotal both 54 each (4.5%), perineal 45, (37%) and only nine glandular.

Figure 4  Pictures of an 8-year-old patient’s phallus at various stages of repair. (4.1) Dorsal view of phallus with incomplete prepuce. (4.2) Ventral view showing midpenile meatus and chorddee. (4.3) Ventral view 8 months after first stage surgery. (4.4) Dorsal view of circumcised phallus 4 months after second stage surgery. (4.5) End-on view of glans showing slit like meatus. (4.6) Ventral aspect of phallus, showing soft and supple scar. (4.7) Straight urinary stream without spraying.
Accordingly chordee ranged from absent to serve as shown by Fig. 8. One hundred and forty-four (11.9%) did not show any chordee on Horton test while 72 phalluses showed mild chordee (6%), 837 (69.4%) moderate and 153 (12.7%) severe chordee.

Four varieties of grafts were used: preputial, post-auricular, buccal mucosal and medial arm (the last for excessive length). Their ratio is shown in Fig. 9. It clearly shows that preputial full thickness skin graft was available and used in the majority i.e. 920 cases (76.3%) followed by post auricular skin graft in 268 cases (23.5%) and medial arm skin was used in three cases (0.2%). Unfortunately none of the buccal mucosal graft patients qualified for the study criteria and hence did not appear in the results. One point needs consideration; the ratio of preputial graft increased over the years as unoperated cases increased with heightened awareness among the public and medical community of

Figure 5  Pictures of a 6-year-old hypospadias cripple after four failed attempts at repair elsewhere. (5.1) Ventral view of the phallus showing scars of previous surgeries and chordee. (5.2) Hemostat in the fistula. (5.3) Ventral aspect of phallus with all the scars and chordee removed, showing soft and supple graft. (5.4) Semi-dorsal view of phallus 5 months after successful reconstruction of urethra. (5.5) Ventral aspect of the same phallus with minimal scarring and excellent healing. (5.6) End-on view of the external meatus, resembling normal slit like shape. (5.7) Patient micturating with a straight stream.
our interest in this entity. Of the total of 1206 patients, 999 (approximately 83%) patients had no surgery for hypospadias or meatal stenosis before coming under our care. Eighteen patients (1.5%) had undergone meatotomy before undergoing proper staged procedure for correction of hypospadias though the total number of patients with meatal stenosis was 108 (9%). On the other hand only 189 patients had experienced attempts at correction elsewhere ranging between one and 27 procedures each, averaging 3.7 attempts per patient among these 189 patients. Circumcision is routine as a loco-religious custom and of all the patients 361 (29.9%) had been circumcised before presenting to us. However, 75 patients even among the circumcised ones had enough prepuce left for grafting the first stage.

The commonest complication after first stage surgery was partial graft loss, which occurred in 36 cases (approx. 3%) but did not jeopardise subsequent stage II repair. Half of these cases bled postoperatively but only three of them needed to be taken to theatre again for haemostasis. Only three patients showed some signs of graft hypertrophy and all the three had grafts taken from their post auricular areas and the hypertrophy was confined to the junction of two pieces of post auricular graft.

Figure 6  Age distribution of patients under study.

Figure 7  Extent of hypospadias: PS, penoscrotal 4.5%; P, perineal 3.7%; C, 4.5%; M, midpenile 28.4%; G, glandular 0.7%; D, distal 58.2%.

Figure 8  Extent of chordee: D, mild 6.0%; M, moderate 69.4%; N, no chordee 11.9%; S, severe 12.7%.

Figure 9  Type of graft used in the first stage of repair: M, medial arm, full thickness skin graft 0.2%; P, preputial full thickness skin graft 76.3%; PA, post auricular full thickness skin graft 23.5%.
As we mentioned earlier, patients rarely abided by the arbitrary interval of 6 months between the two stages of repair. Hence, this interval ranged from 17.6 to 181 weeks with a mean of 42.6 weeks.

The most common complication after completing the procedure was residual fistula. Seventy-one (5.9%) patients experienced leakage through a fistula. However, only 46 of them (3.8%) required proper closure under general anaesthesia and the rest were so tiny that they closed over a period of time. Other revision surgeries included trimming of the pouting part of the graft at the tip of the phallus, and tidying up of circumcision five and 77, respectively. Nine patients were left with mal-rotation of the glans. However, we could not retrieve information about mal-rotation before surgery and hence, cannot tell how many mal-rotation were corrected. The next commonest complication in our series was repeated lower urinary tract infection, which occurred in 37 patients (3%), which ultimately got cured with prolonged use of antibiotic. One of these patients had hair growth in the urethra; this was reconstructed with medial arm graft. He has so far declined surgery.

Discussion

Keeping the sheer number of hypospadias in mind, it is intriguing why a unified approach has not been adopted for its care. Personal interest of some physicians has created excellent results when they follow a set protocol but on the whole no clear guidelines on the management are available. This has created mistrust between patients and their physicians which, on the one hand deprived the caring physicians of the true feelings of patients and their parents and on the other hand keeping long term follow up incomplete.

In the presence of a plethora of techniques, we need to clearly mark a realistic goal; it does not matter how it is achieved. As of any procedure, the aim would be to make as nearly normal urethra as possible in such patients, in the least traumatic manner, at an appropriate age and with least number of complications. A one-stage repair would be ideal. Literature, however, gives evidence to the contrary in this particular defect when single stage procedure turns up into numerous procedures. In our opinion, planned stages of operation cause less anxiety to parents and patients alike than unexpected intervention due to complications.

There are hundreds of procedures described for hypospadias repair. Some of them have given excellent results in the hands of gifted few. Almost none of these procedures can be universally applied to all types of hypospadias; some are suitable for distal types and some for various degrees of proximity. Even presence or absence of chordee can determine the suitability of various procedures. The commonest complication, fistula has almost been accepted by surgeons of average dedication at around 10-20%. Other complications are no less frequent with majority of techniques like mental stenosis, mental retraction when urethra is forcibly drawn to the tip of the glans, urethral stricture and hair growth. Aesthetic aspect of reconstruction has never been a major factor in determining the success of a repair though various surveys clearly mentioned the dismay patients have shown over this aspect. If a particular procedure fails, it usually does not leave any room for a re-do of the same procedure. In all these aspects, a two-staged procedure with set protocols has consistently shown better results as described by Bracka. After all, it is the end result, which counts no matter how many stages of the procedure are incorporated. As aesthetic results have so far been totally ignored, most papers describe procedures without near normal appearance and support their claims with very few photographs. Photography is key difference between plastic surgery and other specialties. We, not only, used it routinely both for record keeping and presentations but also in educating such patients or their parents.

Retention of penile dressings has been a problem whereas siliconised dressing in our experience has fulfilled all the criteria of an ideal penile dressing. None of the patients needed any sedation for removal and very few dressings fell off earlier than 2 weeks.

There are other complications apart from fistula like scarring, residual curvature and still an abnormally placed meatus, and patients are deeply concerned with them. We have found our protocol quite satisfactory in addressing all of these problems.

Bracka’s two-stage repair has the following advantages:

1. It produces a normal looking central, slit like urinary meatus.
2. It addresses full extent of chordee.
3. It is suitable to all types of hypospadias and hence one has to master a single universal technique.
4. The slit like neo-meatus restricts spraying at micturation.
5. It produces an almost scar less ventral surface and a movable pliable skin over the urethra.
6. This procedure can be repeated as often as there is failure of the same procedure.
7. Learning curve of the surgeon rises sharply to a plateau.

As one would agree that there is no procedure, which can mimic nature, there are some drawbacks of this procedure, too. Only pursuance of excellence would improve this or any other technique. We consider the following as drawbacks:

1. It is a staged procedure and hence requires a second anaesthetic exposure mostly for children.
2. No matter how spacious urethra we make, the muscular corpus spongiosum cannot be replaced. This, in our view, hinders full ejaculation in some cases of proximal hypospadias. Patients are advised to milk the thick fluid manually if the ejaculate is in stasis.

Acknowledgements

The authors are grateful to numerous hypospadias patients who opened up their feelings on the Internet. The senior author subscribes to the Yahoo group of concerned hypospadias patients and their parents.

References

12. Searles JM, Mackinnon AE. Point of technique; the savav hypospadias dressing. BJU Int 2001;87:531-3.