Distal Hypospadias Repair: Experience with Corpus Spongiosum Advancement

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Abstract. Objective: Corpus spongiosum advancement technique has been used for repair of glanular, coronal and distal penile hypospadias without chordee. A brief description of the procedure and operative outcome has been described with discussion of relevant literature. Methods: Out of 112 patients aged 12 to 126 months, operated between July 2009 and December 2013, 54 had coronal, 38 had glanular and 20 had distal penile hypospadias. None of the patients had chordee. All patients underwent advancement of corpus spongiosum. Results: The mean operating time was 32 minutes and mean blood loss was 15 ml. In 8 patients, the spongiosum was opened inadvertently during dissection. It was repaired with 5-0 vicryl and stitched to the cavernosal bed. Three of them were kept on catheter drainage for 5 days. Mean hospital stay was 0.5days (0-6 days). Eighty eight patients were discharged on the day of surgery and 21 patients needed admission for a day, as they came from far off places. There were no operative complications. Functional and cosmetic outcome has been found to be satisfactory in all the patients. Three patients with distal penile hypospadias developed meatal stenosis, 2 of them did well with meatal dilatation, but 1 patient needed meatoplasty. The mean follow up period was 24.5 months (4 months to 53 months). Conclusion: Corpus spongiosum advancement is an ideal technique for glanular and coronal hypospadias and associated with excellent functional and cosmetic outcome. However, cases of distal penile hypospadias should be carefully selected to achieve good results.

Keywords: Advancement, Distal hypospadias, Hypospadias, Spongiosum, Urethroplasty

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Introduction

Since the first description of hypospadias by Celsius and Galen, surgical reconstruction of hypospadias has evolved over the centuries. The goal of reconstructive surgery is to achieve a normal looking phallus and the child able to void with a forceful, forward pointed stream. Children with distal hypospadias do not have significant functional defect. So, the outcome of any corrective surgery needs to be as close to perfect as possible. Corpus spongiosum advancement is a new technique ideal for distal hypospadias repair. This procedure has several advantages over many other procedures currently employed for repair of distal hypospadias.

Materials and Methods

Out of 112 patients aged 12 to 126 months, operated between July 2009 and December 2013, 54 had coronal, 38 had glanular and 20 had distal penile hypospadias. None of the patients had chordee. All patients underwent advancement of corpus spongiosum.

Procedure

Under general anaesthesia, stay sutures were put at the glans, either side of the prepuceal hood and the meatus (Fig. 1a). A tourniquet was applied at the base of the penis. Artificial erection test was done to rule out chordee. The skin around the external meatus was incised. The incision extended to the prepuce on either side and stopped just short of the stay sutures (Fig. 1b). A no. 7 or 8 Fr infant feeding tube was passed into the bladder. The corpus spongiosum was raised from the bed of the corpora cavernosa by a sharp pointed scissors, care taken to keep the dissection within the tunica albuginea layers covering both corpus spongiosum and the cavernosa (Fig. 1c). When the dissection reached the level of...
cavernosal bifurcation, the spongiosum could be moved freely independent of the cavernosa. The distal 10-12 mm of skin dissected off the spongiosum keeping the dartos layer along with its vessels attached to the spongiosum (Fig. 2a). In conical glans, a tunnel was made with a sharp pointed scissors. Glans wings were created in flat type of glans and the mobilised spongiosum was advanced up to the location of neomeatus at the glans tip. Three anchoring stitches were put between the advanced spongiosum and the glans tissue with 5-0 vicryl to prevent later retraction of the spongiosum (Fig. 2b). Redundant skin at the edge of spongiosum was trimmed and stitched to the glans with 5-0 vicryl. Preputioplasty was done after undermining the dorsal skin hood and transferring it ventrally or a circumcision could be done. The catheter was removed at the end of the procedure. A compression dressing was applied, which was removed by the parents after 24 hours. The patient was discharged the same day with oral antibiotic for 5 days and ibugesic suspension for 2 days. Patients were called for routine urethral calibration after 15 days of surgery and at 3 months and then 6 monthly for follow up.

**Results**

The mean operating time was 32 minutes (range 25-50 minutes) and mean blood loss was 15 ml (10-30 ml). In 8 patients, the spongiosum was opened inadvertently during dissection. It was repaired with 5-0 vicryl and stitched to the cavernosal bed. Glans tunnelling was done in 55 patients and glans wings were created in 67 patients. Mean hospital stay was 0.5days (0-6 days). Eighty eight patients were discharged on the day of surgery and 21 patients were kept admitted for 1 day following surgery, as they came from far off places. The first 3 patients who had spongiosal injury were catherizered for 5 days, but the other 5 patients did well without a catheter. There were no operative complications. Functional and cosmetic outcome have been found to be satisfactory in all the patients. Three patients who had distal penile hypospadias developed meatal stenosis, 2 of them did well with meatal dilatation, but 1 patient needed meatooplasty. The mean follow up period was 24.5 months (4 months to 53 months).

**Discussion**

Children with distal hypospadias usually do not have a functional defect and are able to stand and void with a straight stream. Therefore, the outcome of a surgical repair needs to be as close to perfect as possible. The common procedures currently employed for such repair are done as day care procedures and without use of a urethral catheter. Choice of procedure for an individual case depends on location and size of the meatus, presence of chordee, condition of the ventral parameatal skin and the urethral plate, depth of the glandular groove etc. So, no single procedure is ideal for all types of distal hypospadias. For instance, MAGPI procedure has been widely practiced for distal hypospadias repair; but this procedure is not ideal for children with thin or rigid ventral parameatal skin or a meatus too proximal or too wide.\[3,4\] Glans approximation procedure (GAP) of Zaontz is more suitable for glanular and coronal hypospadias with a wide, deep granular groove and non compliant urethral meatus.\[5\] Modified technique of Snodgrass's incised urethral plate urethroplasty was suggested for a narrow urethral plate.\[6-8\] Primary tubularization, also known as Thiersch Duplay procedure, can be applied to patients with a deep glandular groove and wide urethral plate for both distal and proximal penile shaft hypospadias.\[9,10\] Alternatively, if the urethral
groove was not wide enough for tubularization in situ, other procedures such as the Mathieu or a vascularized pedicle flap were performed.\[11\] Post-operative complications of these procedures vary from 1.2% to as high as 15.2% in various reports.\[12\] Moreover, a normal looking glans or preservation of the prepuce can't be achieved in all cases. The surgeon also has to learn several techniques depending on the anatomy of the hypospadiac penis. Corpus spongiosum advancement has been applied for repair of distal hypospadias without chordee with excellent clinical outcome.\[13\] Unlike other existing techniques for distal hypospadias repair, this procedure can be used irrespective of various factors such as, size of the meatus, depth and width of urethral plate, condition of parameatal skin etc. The only contraindication for this procedure is a long segment of hypoplastic spongiosum (Fig. 3a). A normal looking glans can be achieved and if the parents desire, the prepuce can be preserved with this technique (Fig. 3b). As there is no suture line, fistula formation is not a problem. Meatal stenosis, as observed in a few cases in this series can be avoided if cases are selected properly. We did not observe any case of meatal stenosis in coronal or glanular hypospadias. This problem occurred only in cases when the meatus was located more than 0.5cm proximal to the corona or in presence of minimal chordee.

Fig. 3.  Fig.3a. Long segment of hypoplastic spongiosum, Fig.3b. At the completion of glans and prepuctoplasty, Fig.3c. Vertical slit like meatus at 6 months follow up.

Corpus spongiosum has an independent blood supply from internal pudendal vessels. It has major proximal inflow through the bulbourethral artery which enters the bulb and supplies the entire spongiosum. The distal part of spongiosum receives small branches from the glans. Hence, the spongiosum can be elevated safely from its bed without significantly jeopardising the vascularity. The limited distal flow can be maintained by carefully preserving the darts layer along with the spongiosum. Successful mobilisation of the anterior urethra for treatment of urethral stricture has been demonstrated by various authors.\[13,14\] Few modifications of urethral mobilisation for distal hypospadias repair have also been reported in the literature with complication rate ranging from 2.2 to 16.2% in various series.\[15-17\] Koff's urethral mobilisation technique involves degloving of the penile skin up to the penoscrotal junction, separation of the urethra and spongiosum from the penile shaft up to the level of the bulbar urethra and the mobilized urethra and spongiosum were anastomosed to the glans tissue to construct the neomeatus.\[18\] The author employed his technique in 10 patients with distal hypospadias, one of them developed meatal stenosis. In contrast to Koff’s technique, our procedure involves limited dissection in the plane between the corpora cavernosa and the spongiosum. Separation of the spongiosum from the cavernosal bed with preservation of the darts layer allows placement of the meatus at the tip of the glans with no risk of distal ischaemia and secondary chordee. A normal looking vertical slit-like opening can be achieved in this technique (Fig. 3c). However, distal penile hypospadias cases with short phallic length or the meatus located more than 5 mm from the corona and presence of distal spongiosal hypoplasia are not suitable for this procedure.

Conclusion

Corpus spongiosum advancement is an ideal technique for glanular and coronal hypospadias and associated with excellent functional and cosmetic outcome. However, cases of distal penile hypospadias should be carefully selected to achieve good results.

References


