One Stage Repair of Hypospadias Using Double Island Preputial Skin Tube

R. Asopa and H.S. Asopa, Agra

ABSTRACT

Single-stage repair of hypospadias using double island preputial flap has been described. This flap is based on the superficial dorsal vessels of the penis. The inner layer of the prepuce forms the neourethra and the outer layer covers the ventral aspect of the penis. Of the 18 patients, operated using this technique, 14 were cured in one operation, with excellent cosmetic results.

INTRODUCTION

Two-stage repair of hypospadias was in vogue till the early 1960's[1], when one-stage operations, using free preputial grafts[2] and lateral penile skin[3], were reported. Subsequently vertical preputial and penile skin was utilized for the repair, and it was shown that the pedicled neourethra healed better than free grafts[4,5]

Asopa et al[6] described a technique in which a neourethra was constructed from a transverse island of inner layer of prepuce which was left attached to the outer preputial layer. After anticlockwise rotation of the flap, the right end of the neourethra was anatomosed to the spatulated ectopic meatus and the other end was sutured to the glans penis which had previously been laid open. The outer prepuce provided the skin cover. Duckett[7] modified the above technique by developing separate blood supply for inner face preputial tube (based on superficial dorsal vessels) and the outer face preputial and penile skin (based on subcuticular blood vessels). The tube was rotated around the shaft of the penis to construct the neourethra and the penile and preputial skin covered the raw area in the Byars' fashion[8].

The blood supply of the skin cover is precarious often leading to necrosis of the preputial part of skin cover, however the neourethral tube is not affected[7]. It was realised by us that the two layers of prepuce have a common blood supply through the fanned out branches of the superficial dorsal artery of the penis and separation of the two layers of the prepuce jeopardises the blood supply of both layers, particularly that of the outer layer. Moreover the length of the skin cover is more than the width of the base and the vascular supply depends only on subcuticular vessels. A technique has been developed in which the two layers of the prepuce, based on the superficial dorsal vessels of penis, were separated from the penile skin. The inner layer of the prepuce formed the neourethra and the outer layer covered the tube on the ventral aspect, a symmetrical cover being provided by the penile skin. The technique has worked well in our hands in the present series.

PATIENTS AND METHOD

18 patients were operated during the last three years, the youngest child being 2 years of age and the oldest 17

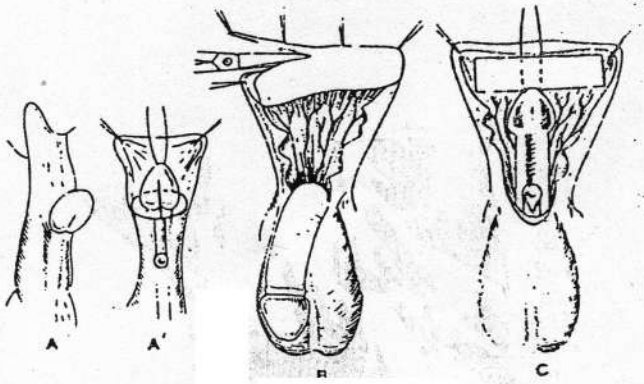
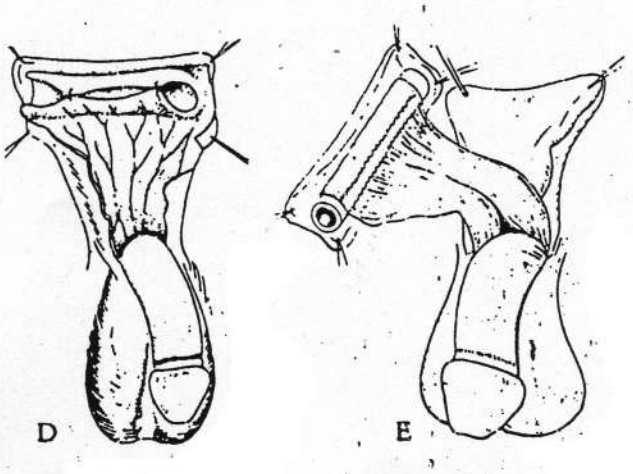
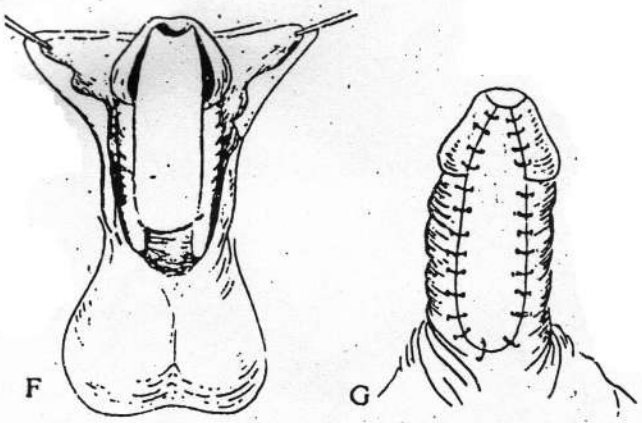


Figure 1: (A) & (A') Showing incision lines.
(B) Trimming of the distal margin of prepuce.
(C) Rectangular island flap from inner layer of prepuce.

ears. Perineal urethrostomy for urinary diversion was erformed in all the cases.



igure 2: (D) Formation of tube from inner layer of prepuce.
(E) Inner layer skin tube and outer layer prepuce, dissected from penile skin.



igure 3: (F) Two ends of skin tube stitched to the ectopic urethral opening and laid open glans
(G) Skin sutures completed (Note the new urethral opening at the tip of the penis).

echnique (Fig 1–3)

An anchoring stitch of 3/0 silk is passed through he tip of the glans and held in a haemostat. Adrenaline 1:200000) was used in later cases, as suggested by Duckett[7], around the coronal sulcus and ventral aspect f penis, distal to the ectopic urethral opening. The erineal urethrostomy is performed while waiting for drenaline to act. A circumcoronal incision is made nd extended vertically in the ventral midline upto nd encircling the ectopic urethral opening. The prepuce with attached penile skin, is raised over the shaft of the penis, using fine plastic scissors, so that the whole shaft of penis is denuded. The mobilised skin flap derives its blood supply from the superficial dorsal vessels of penis.

Chordee is corrected by excision of all fibrous tissue on the ventral aspect of the corpora cavernosa from the tip of the penis to the hypospadiac opening, which is freed circumferentially. The glans is laid open. A soft rubber catheter is used as a tourniquet at the base of penis and normal saline injected into one corporal body to produce an artificial erection. Any fibrous tissue impeding the straightening of the penis is excised. The tourniquet is left in place during the next 15–20 minutes, till the tube is constructed and anastomosed to the urethra to prevent bleeding.

Stay sutures are passed along the distal margin of the preputial hood, arranging the inner layer of the prepuce in a rectangular form. The free margins of the preputial hood are excised with scissors along with the stay sutures, so that the inner layer of prepuce now lies as an island on the outer layer of prepuce. A tube is formed transversly from the inner layer of prepuce, using 5/0 chromic catgut around a silastic tube. A running suture is used, taking care to invaginate the skin margins.

The skin of the penis and the neourethra are pulled down, and a transverse incision is made in the skin at the junction of the outer layer of the prepuce and penile skin with a knife, taking care not to injure the vascular pedicle beneath it. With the help of a knife edge and fine plastic scissors, the penile skin is raised over the subcutaneous tissue and the superficial dorsal vessels of the penis, by sharp dissection. Thus a double island of preputial skin, supplied by the superficial dorsal vessels, is separated from the penile skin which is supplied by a network of subcuticular vessels. The double island is rotated around the shaft of the penis. The right end of the neourethral tube, which has been constructed from the inner face of the island, is anastomosed to the spatulated urethral opening, and the left end is anastomosed to the glans which has been laid open at its tip. The outer face island covers the whole urethral tube on the ventral aspect of the penis. The penile skin is sutured to the corona and around the outer face island, thus completing the skin cover. 5/0 chromic catgut is used on an eyeless needle, taking care to evert the skin margins. A pressure dressing with gauze soaked in betadine ointment is applied, and the penis is strapped to the lower abdominal wall. Urethral stent is removed on the 7th day after the operation, during the first dressing, and the perineal urethrostomy is removed on the 12th day. Postoperative antibiotic and ibuprofen are administered for 7 days following the operation.

RESULTS

Of the 18 consecutive cases included in the series, 14 healed primarily with very good cosmetic results (Fig 4), 2 cases have been operated successfully for closure of fistula and one case is waiting for closure of fistula at the site of urethral anastomosis. One case had stenosis of the meatus and was treated by meatotomy. Dilatation was required in a further 4 cases, who had mild stenosis of the meatus on 12th day and once thereafter. In all cases, the meatus was inspected and probed on the 12th day to detect any evidence of narrowing.

The cosmetic appearance of the penis after this operation is excellent. The skin is soft and pliable within a few months after the operation. The new meatus is at the tip of the glans and the urinary stream is good.

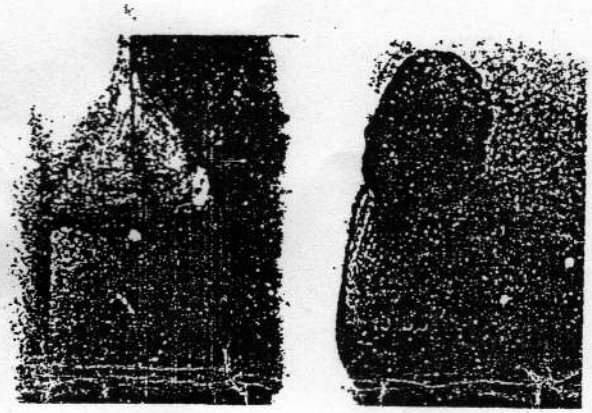


Figure 4: Result 3 months after operation.

DISCUSSION

In the present technique the two layers of prepuce are ıot separated, in contrast to the Duckett operation, ınd only the penile skin is raised over the vascular ıedicle so that the penile skin has to be separated only or a short distance. Thus the base of the penile skin, ·hich depends on the subcuticular vessels for blood ıpply, is broad with a relatively short length minitising the chance of avascular necrosis. We believe ıat the two layers of prepuce have a common blood ıpply through the superficial dorsal vessels of the penis, ıd as these two layers are not separated there is no ;k of avascular necrosis of the tube or its covering. ;, the whole neourethra, along with its anastomosis th the ectopic urethral opening, is covered by skin d the suture lines do not overlap, the chances of fistula formation are minimised. The skin closure is symmetrical and cosmetic results are excellent.

Urinary diversion by perineal urethrostomy was used in all cases and there were no problems associated with it. Suprapubic cystostomy is preferred by some workers[9].

As recommended by some workers[9], adrenaline was instilled only around the corona and around the ectopic urethra and we found no untoward effects attributable to this. Use of chromic catgut for the construction of urethra and for the anastomosis of the skin tube and urethra as well as skin cover is quite satisfactory. Anaesthesia is not required a second time for removal of skin stitches. Dexon sutures, which stay on too long and help epithelialisation of the suture tract, were not found to be satisfactory by us. We prefer laying open the glans to bring the neourethral meatus to the tip of the penis instead of making the glans tunnel as done by Duckett[7,9]. This gives a good cosmetic result, encrustation at the meatus or stenosis, which is more likely with the glans tunnel, is less of a problem with this method.

The results of this operation, as far as cure in only one operation is concerned, are highly satisfying. Out of the 18 cases operated on by this technique, 14 healed in a single operation and one required only a meatotomy. Only three cases warranted a second major surgical intervention for closure of fistula, accounting for only 16.6%. This can be compared favourably with other single stage procedures of Duckett and Devine & Horton.[3] Even those cases who required a second operation were no worse off than those operated on using two stage procedures.

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Dr H.S. Asopa, M.S., F.R.C.S. (Eng.), F.R.C.S. (Edin), 1/145, Delhi Gate, Agra-282 002, INDIA.