

DOUBLE-TUBE OPERATION IN HYPOSPADIAS REPAIR*

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Hypospadias is the result of incomplete embryological development due to 1) abnormal androgen production by the fetal testis, 2) limited sensitivity to androgen in the target tissues of the developing genitalia, or 3) premature cessation of androgenic stimulation secondary to early resolution of the Leydig's cells of the testis¹. The urethral meatus is proximal to its normal location. We can classify hypospadias depending on the location of the meatus as,

1. Anterior hypospadias
 - a) Balanic
 - b) Balanopenile
 - c) Anterior penile
2. Middle hypospadias
3. Posterior hypospadias
 - a) Posterior penile
 - b) Penoscrotal
 - c) Scrotal
 - d) Perineal

The type of surgery selected for the management of hypospadias usually depends on the location of the external urethral meatus and the preference of the surgeon. Cases with anterior hypospadias are generally treated in a one-stage operation. The middle and posterior hypospadias are managed by one- or two-stage operations.

In one-stage operations for posterior hypospadias, pedunculated or free-flap tubes are used. The usual complication encountered in pedunculated long grafts is tissue necrosis due to poor blood supply. Similarly, free-graft techniques are not free of complications and secondary curvatures and strictures may develop because of longitudinal retraction of the non-pedunculated free graft. Theoretically it may be stated that, the shorter the pedunculated graft, the better the blood supply.

In the light of these observations, we decided to use two short grafts instead of one long one, with the aim of decreasing the incidence of complications.

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Material and Methods

Double-tube operations were performed on 7 patients with penoscrotal hypospadias between 1982 and 1984 in the Department of Urology at Hacettepe University.

Technique. Perineal urethrostomy was performed as a urinary diversion in all cases. Chordee excision was performed by using a longitudinal incision on the ventral surface of the penis extending to the glans, and forming a V shape. After completion of the chordee excision, a circumcision incision was made at the coronal level.

Then an incision was made on the ventral surface of the prepuce for the formation of a tube flap. The formation of the tube flap was carried out with minimal undermining of the skin in order to preserve the vascularity of the flap. The lateral flaps of the glans penis were slightly undermined at the level of the fascia penis. A longitudinal incision was made on the dorsal skin of the prepuce at the level of the proximal end of the tube flap, to transfer the preputium containing the tube flap ventrally through the buttonhole. The distal end of the tube was sutured to the tip of the penis to match the triangular flap of the dorsal floor. The lateral flaps that were developed from the glans penis were sutured together over the tube flap to make the new meatus.

A U-shaped incision was then made in the mid-scrotal area, long enough to make the neo-urethra between the original urethra and the proximal end of the distal tube. The scrotal flap was undermined by blunt dissection as much as possible in order to preserve the blood supply of the graft. A tube was made and anastomosed to the original urethral meatus proximally, and to the proximal end of the tube prepared according to the Toksu procedure, distally. The skin incisions were closed with the preputium and scrotal skin.

A fenestrated catheter was inserted in place through the anastomoses to provide splinting as well as drainage of secretions.

Results

Satisfactory results were observed in only 3 of these cases (43%). Fistulae occurred in the others, mostly due to infection. In one patient recurrent erections caused complete rupture of the tubes.

Discussion

Urethral fistulae are the most common complication of hypospadias repair. Incidence varies from 21.1% to 91% in the reported series^{3,4}. Different factors may be involved in the formation of a fistula:

- i. Distal obstruction: If the pressure is increased in the proximal urethra due to narrowing of the newly reconstructed distal urethra, it may lead to leakage of urine through the suture lines.

- ii. Poor suture technique: If a suture passes through the urethral epithelium or epidermis it may result in leakage of urine under the skin flap and cause a fistula.
- iii. Urethral dilatation or overhang of the junctional area may cause turbulent flow, which increases the incidence of fistulae.
- iv. Overlapping suture lines.
- v. Immediate post-operative erection may exert increased tension and result in breakage of the suture lines.
- vi. Decreased blood supply.
- vii. Postoperative edema⁵.

The relatively high rate of fistula formation in our group may have been due to any of the above mentioned factors or to there being two anastomatic sites instead of one. But one must keep in mind that the meatus were located in the penoscrotal area in all of the cases and 43% of the patients were cured by a one-stage operation.

Summary

In the surgical management of hypospadias various methods have been used which can be classified as "one-stage urethroplasties" and "two-stage urethroplasties". In the Hacettepe University Department of Urology, patients with distal hypospadias have been managed with one-stage operations such as "Horton-Devine" and "Toksu" methods. In the case of proximal openings, "Denis-Brown", "Horton-Devine" and double tube operations have been performed. Our experience of these different methods is given here. The double tube operation is given special emphasis.

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