Modified Cecil-Culp Technique – An Option for Urethro-Cutaneous Fistula Following Hypospadias Repair

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Abstract

Tissue deficiency accompanying failed hypospadias surgery makes further reconstruction difficult. Modified Cecil-Culp technique utilizes penile mobility to place the repair in a scrotal location for a short duration which helps to accomplish tension-free apposition using dartos and skin of the scrotum. A series of four cases is described where this technique proved beneficial despite adding a short subsequent procedure after a few months.

Keywords

- Cecil Culp technique
- Fistula
- Hypospadias
- Scrotum

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Introduction

The anatomy of the penis and the availability of tissues for reconstruction both dictate the type of surgery to be done for a hypospadias patient. Although several techniques have been described to achieve a functional and cosmetic phallus, none of the techniques can yet claim to be an answer to such a wide range of anatomic variations as a hypospadias patient presents with.[1, 2] This necessitates case-wise proper selection of techniques for reconstruction failing which post-operative complications would be inevitable. Tissue deficiency often leads to closure under tension which adds to ischemia resulting in dehiscence and fistula formation. The amount of remnant tissue locally available lessens after each surgery for complications. How to deal with cases where enough skin is not present to cover the repaired site? The technique described by Cecil et. al[3], and later modified by Culp et. al.[4,] uses the penile mobility and scrotal skin in an ingenious way. Although a technically easier and brief additional procedure is later needed to free the phallus from the scrotum, the high success rate of this technique outweighs the disadvantages of a second operation.

We describe four different cases wherein the modified Cecil-Culp [CC] technique led to tension-free closure at the level of the skin with apposition of its dartos as a secondary layer over fistula-repair site or urethroplasty site.

Case presentation

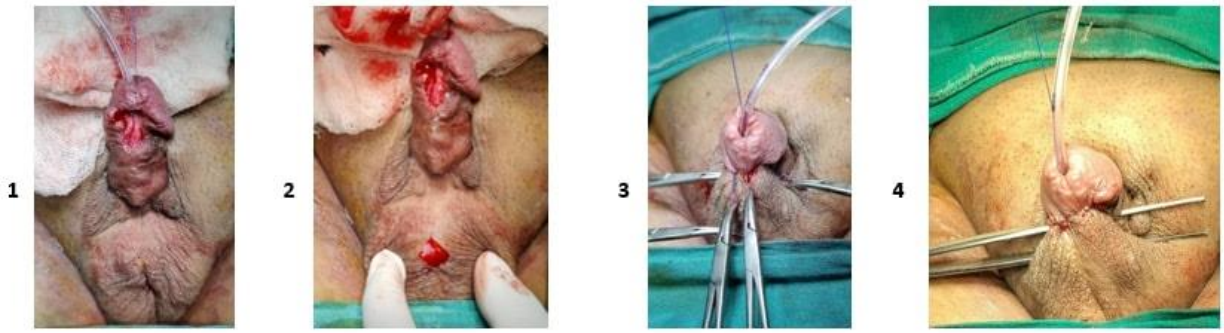
Three of the four cases were cases of urethro-cutaneous fistula following surgeries for hypospadias with deficient skin for covering the repair after fistula closure. Fourth case was a case of mid-penile hypospadias who had had religious circumcision at a hospital in his hometown. In this patient, Cecil-Culp technique was used at the time of primary surgery.

Case 1

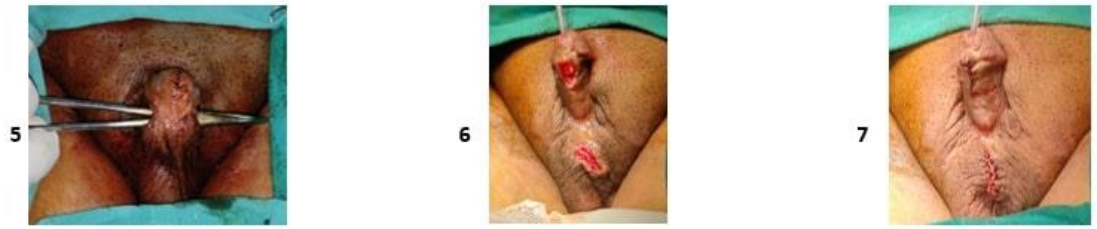
He was a 15-year-old obese male who presented as follow-up case of penoscrotal hypospadias with incomplete penoscrotal transposition. He had undergone staged surgeries for penoscrotal transposition and hypospadias. Following surgery, there was a large fistula involving the coronal region. Meatal caliber was adequate and it was well nested in the substance of the glans. Urinary stream through the meatus was good with leakage from the fistula site. It

was evident that there was paucity of skin locally to be able to cover the subsequent fistula closure. Parents were therefore counselled about the benefits of the staged CC procedure using the scrotal skin and subcutaneous tissue to reinforce the repair. In the first stage, after the closure of the urethro-cutaneous fistula over a 10 FR Infant feeding tube, an incision was given on the scrotum and a few sutures were taken to oppose the scrotal dartos layer over the closure **(Figure 1).** Scrotal skin was then approximated to the phallic skin.

In the postoperative period, urethral catheter was removed on the 7th postoperative day and patient passed urine in stream from the meatus. After six months, a simple procedure was needed to separate the phallus from the scrotum with only a thin rim of scrotal skin. The skin on both phallus and scrotum were then approximated separately **(Figure 1)**. Patient could void from meatus in stream with a phallus which was cosmetically acceptable.



Cecil Culp stage 1 (sequential images): (1) fistula closure with deficient skin; (2) with incision on scrotum; (3) after scrotal apposition to phallus to cover the repair; (4) final picture at the end of first stage



Cecil Culp stage 2(sequential images): (5) healed fistula site covered with scrotal skin; (6) separated phallus and scrotum; (7) approximated wounds on the phallus and scrotum

Case 2

An eight –year male had necrosis of the skin used to cover a Snodgrass repair with dartos flap for mid-penile hypospadias. He now had deficiency of skin over the phallus to cover the fistula repair done after one year. So, modified CC procedure was performed as in the first case and the result was a normally looking phallus with good stream from the neo-meatus.

Case 3

Third case was a ten-year-old, follow-up case of proximal penile hypospadias with again a fistula in the coronal region. Skin deficiency at the time of redo surgery again necessitated the use of skin from scrotum and this child also did well with CC procedure.

Case 4

He presented as a four-year-old circumcised child with mid-penile hypospadias and there was not enough skin left to achieve tension-free skin cover after urethroplasty. CC technique helped in complication-free healing.

The summary of the four patients have been put together in **Table 1.**

All these patients have been in periodic follow-up with adequate meatal caliber and good anteriorly-directed projectile urinary stream. Although none of the cases except the first one has reached puberty, they have been counselled about the possibility of hair growth in the thin rim of scrotal skin used around the site of fistula repair and if bothersome the need to depilate them periodically. The first case has now been in follow-up for about 14 months and has not had any hair growth over the phallus.

Table 1: Use and Results of Cecil Culp technique in different patients

S.No.	Age (years)/ Sex (M/F)	Phallic anatomy and surgical history	Procedure performed	Postoperative complications
1	15 /M	Follow-up case of Penoscrotal hypospadias with penoscrotal transposition; staged surgeries for transposition, chordee correction with Bayar's flap and urethroplasty already done with a large fistula at the corona; skin was deficient to achieve cover after fistula closure	Urethro-cutaneous fistula closure done & staged CC* technique done to achieve successful repair	No local complication
2	8 /M	Follow-up case of midpenile hypospadias; earlier had a Snodgraft repair with Dartos flap cover and skin rearrangement; skin got necrosed and the resulting fistula did not have sufficient skin surrounding it for cover	Urethro-cutaneous fistula closure done & staged CC* technique was used for a successful outcome	No local complication
3	10 /M	Follow-up case of Proximal Penile hypospadias with chordee; had chordee correction with graft from inner preputial skin initially followed by a second stage urethroplasty with Left sided Tunica Vaginalis flap cover; developed a fistula at the level of corona with deficient skin for subsequent closure	Urethro-cutaneous fistula closure & staged CC* repair led to successful repair	No local complications
4	4 /M	A case of midpenile hypospadias who had undergone religious circumcision leading to tissue deficiency for reconstruction. Snodgraft procedure with reinforcement of local spongiosal tissue over the repair; This repair was primarily reinforced by CC technique.	CC* technique was used primarily in this case with severely deficient skin & had a good outcome	No local complication

***CC technique – Cecil Culp technique**

Discussion

The phallic anatomy of a hypospadias patient can be as varied as the variations in the anatomy of the urethral plate, glans, dorsally-hooded skin, location of the meatus, chordee, penoscrotal transposition, size of the phallus and penile torsion in different combinations. No single technique is the answer to all of these variations. Therefore, over time many techniques have been described to correct hypospadias. Complications are possible in hypospadias surgery as in any other surgery but this can also be attributed to the anatomy in a particular patient and availability of local tissues for reconstruction.

All such cases are difficult to operate where local tissues are deficient or unhealthy, both during primary surgery and more-so during redo surgeries for complicated hypospadias. In case the skin is deficient for final cover over urethroplasty, under-tension skin closure not only leads to ischemia and necrosis of the skin but also exposes the neourethra which has been reconstructed leading to dehiscence and fistula formation.

Using the modified CC technique to oppose the dartos and skin of scrotum as temporary reinforcement over the repair is a simple and effective method to achieve good results with less morbidity. This procedure provides a rich vascular bed for wound healing.[5] Although a short second surgery is needed with this technique to separate the phallus from the scrotum, this is nothing compared to the numerous surgeries and morbidity in a failed hypospadias surgery patient.

Several investigators have reported the benefits of this technique.[5, 6, 7] Weiss et.al. studied its benefits in a wide variety of patients including failed hypospadias, hypospadias after bladder exstrophy, penile curvature following circumcision and skin loss from trauma.[5] They reported a few complications like scrotal abscess, skin infections, fistula, diverticula, dehiscence, and stricture in their series of 39 patients. They also observed that there was no apparent scrotal skin transferred to the penile shaft at the time of final take down. None of the four patients in our series had any complication and we have also not observed any significant scrotal skin over phallus at the time of final closure and any complication arising therefrom.

In a series of 15 hypospadias patients with fistula, Ehle et. al. reported no recurrent fistula in any of their patients like in our series.[7]

Conclusion

Modified CC technique is an answer to the hypospadias cases with skin deficiency and has excellent outcomes in complicated hypospadias and redo-hypospadias cases.

Ethical Consideration

This study received ethical code from the ethical committee of Indira Gandhi Institute of Medical Sciences, Patna (792/IEC/2022/IGIMS- 15/11/2022)

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Not applicable

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Not applicable

Conflict of interests

There is no conflict of interest

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