

## Successful Penile Replantation With Cavernoglandular Shunt Procedure In Urban Setting: A Case Series

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**Purpose:** Traumatic penile amputation is a rare case with various etiologies. Penile reconstruction using replantation technique should be performed to prevent the decline of patients quality of life even in areas with limited facilities.

**Material and Methods:** We report three cases of total penile amputation in children after circumcision, who were successfully replanted by macro-surgical technique and cavernoglandular shunt procedure.

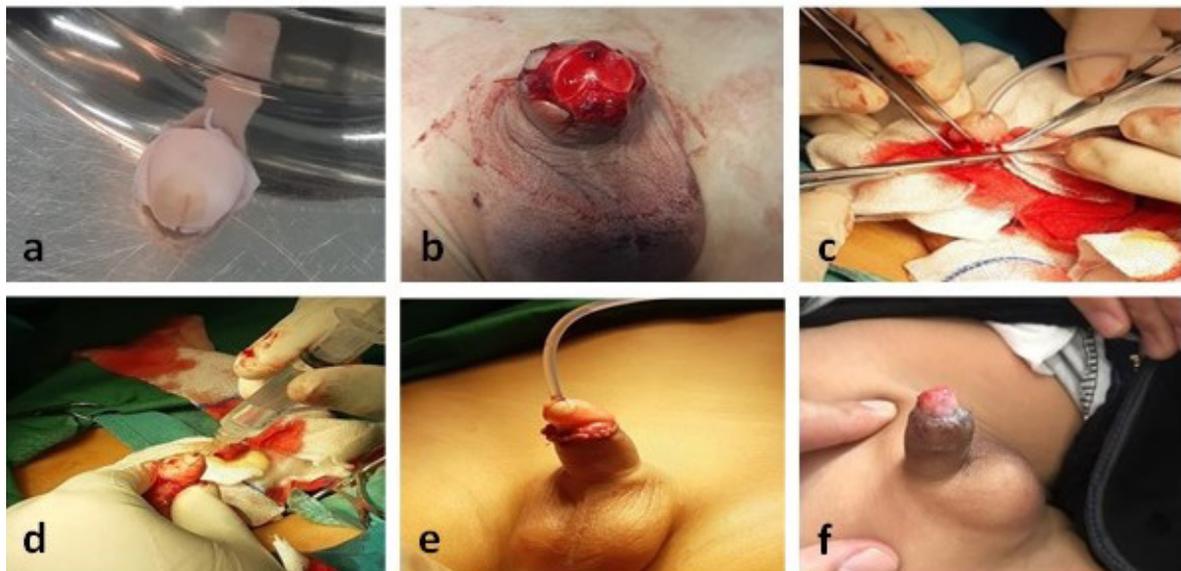
**Results:** Postoperative follow-up showed promising results with good micturition, erectile function, cosmetic, and minimal complications.

**Conclusion:** Matters affecting the successful penile replantation in macro-surgical techniques have been discussed. In addition, we also highlight the potential of cavernoglandular shunt procedure that can be used as an alternative treatment for penile replantation in limited facilities.

**Keywords:** amputation; cavernoglandular shunt; penis; replantation

### INTRODUCTION

Traumatic penile amputation is a rare medical emergency case worldwide. Penile amputation can be caused by self-inflicting amputation, felonious assault, or accidental trauma<sup>(1)</sup>. Since it is a rare case, there were only a few pieces of literatures reporting penile amputation incidences worldwide<sup>(2)</sup>, and up until now, there is no literature reporting the prevalence of penile amputation in Indonesia. Penile amputation can cause psychological effects



**Figure 1:** Case 1, The cut located above corona glands (a) and (b), Anastomosis of his urethra and the cavernosal bodies (c), cavernoglandular shunt procedure (d), after replantation (e), 2-months follow up after replantation (f)

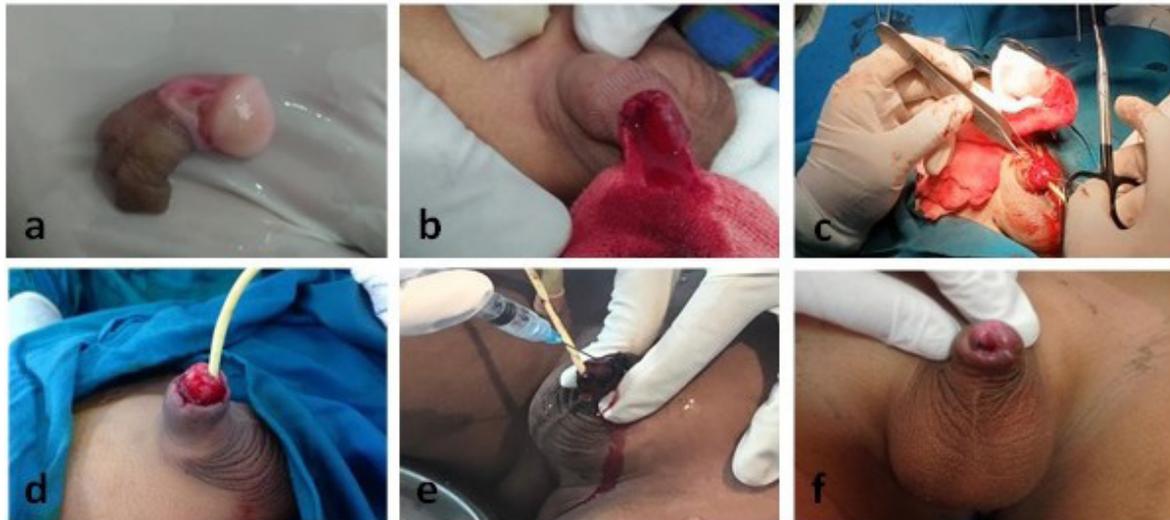
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**Figure 2:** Case 2, the cut located in the midshaft of the penile (a) and (b), 8-Fr Foley catheter was inserted transurethrally through the distal amputated part (c), after replantation (d), cavernoglandular shunt procedure (e), case 2 had meatal stenosis and already done meotomy (f)

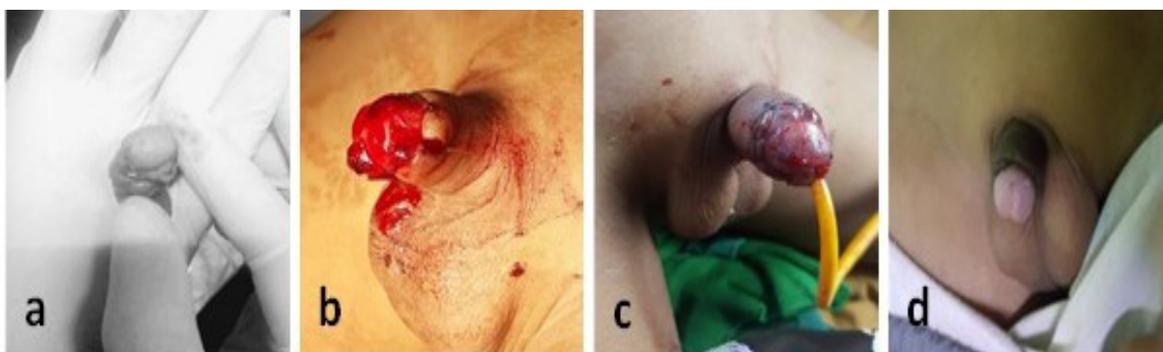
such as loss of self-esteem and depression. Besides that penile amputation can also cause dysfunction of sexual function and micturition which affect the patients quality of life<sup>(3)</sup>. Penile amputation is a medical emergency case that needs prompt treatment to prevent complications such as bleeding, infection, urethra stricture, and sexual dysfunction<sup>(4)</sup>.

One of the techniques developed to treat penile amputation is penile replantation. In early 1978, there was two successful replantation of penile amputation by using micro-replantation reported<sup>(5)</sup>. Micro replantation is the gold standard for the treatment of penile amputation. Unfortunately, this technique must be done in a hospital that is completed with microsurgery equipment. In 1929 Ehrich et al. reported a case of penile amputation treated with macro surgery. He reported that the patient had a good outcome following the surgery. The outcomes were normalized of micturition and sexual function within 2 years following the surgery<sup>(6)</sup>. Based on this report, macro surgery can be used as an alternative approach to treating patients with penile amputation in limited resource hospitals. In this case series, we reported a series of penile amputation treated with macro surgery procedure by using cavernoglandular shunt, we elaborate on the outcome of our patients.

### PATIENTS AND METHODS

In the last two years, We had three patients, age range from 7 to 10 years. The patients came to our emergency room with total penile amputation 6 hours post circumcision with a penile specimen amputated using a 0.9% saline solution bag in an icebox. All cases were carried out at a mass circumcision event performed by an inexperienced person under local anesthesia with the guillotine technique. On physical examination, the penis was completely amputated from the glans penis. In the first case, the cut was located above the corona glands (Figure 1), and in the other two cases, the cut was located in the midshaft of the penile (Figure 2b and 3b).

The patient was taken immediately to the operating room under general anesthesia. The cut surfaces were cleaned with sterile saline, an 8-Fr nasogastric tube or 8-Fr Foley catheter was inserted through the urethra of the amputated part, distal urethral into bulbar part [Figure 2c]. The same technique of replantation was applied in all cases with macrosurgical repair of corpus cavernosum and urethra without arterial-venous anastomoses. Anastomose corpus cavernosum was performed using synthetic monofilament non-absorbable suture 6/0 with continuous without locking suture technique (Figure 1c). Anastomose urethra uses 6/0 synthetic



**Figure 3.** Case 3, the cut located in the midshaft of the penile (a) and (b), after replantation (c), 2-months follow up after replantation (d)

monofilament absorbable suture with a simple suture technique. After an anastomose, a cavernoglandular shunt procedure was performed using a 16G needle contained with heparin at a dose of 50 – 70 IU/kgBW was injected into the glans penis to the corpus cavernosum (**Figure 1d**). A Cavernoglandular Shunt procedure improves venous circulation and arterial feeding from cavernosal imbibition.

After replantation surgery, intravenous antibiotics and analgetics were given. The nasogastric tube or Foley catheter was maintained and then the wound dressing was performed using a petroleum gauze combined with sterile gauze around the glans to keep the penis immobilized.

Wound care was carried out every day using 0.9% NaCl solution to clean the wound. After that, use tulle and moist NaCl gauze to dress the wound. The cavernoglandular shunt and heparin injection of 50-70 IU/kgBW dose was done through the glands to the corpus cavernosum during wound care by using sterile needle sized 16G once a day for 7 days (**Figure 2e**). Prior to this procedure, a topical spray of lidocaine was performed to reduce pain. After the 14th day of treatment, the catheter or nasogastric tube was removed then the patient was allowed to be outpatient on the 15th day.

## RESULTS

In follow up 2 months after replantation, one case had meatal stenosis and had already done meatotomy [Figure 2f], the other cases did not show any surgical complications [Figure 1f and 3d]. Overall cases showed normal urinary flow, normal sensation in the glans penis and good erectile function which was rated by early morning erection.

## DISCUSSION

The successful rate of penile replantation is influenced by the blood flow of sinusoidal-corporal to the distal of the penis (glans penis)<sup>(7)</sup>. Cavernoglandular shunt is a technique commonly used to treat patients with priapism<sup>(8)</sup>. The technique was done by insertion of 16G needle through glands penis to corpus cavernous. The purpose of the technique is to create an iatrogenic fistula to make an outflow for the blood from the corpus cavernous<sup>(9)</sup>. Heparin injection during this technique was done to prevent blood clots which can blockade the drainage of the vein and imbibition of the cavernosal artery. The outcome of those three cases was as good as the technique used by the microsurgery technique. Due to the limitation of resources in our hospital and the small size of the cavernous artery, we did not manipulate the dorsal artery of the penis and the cavernous artery. The previous study by Landstorm et al (2004) showed that the healing of the cavernous artery will increase the viability of penile replantation<sup>(10)</sup>. In this case series, we did not do anastomose of the cavernous artery and it did not affect the treatment outcome, so we concluded that anastomoses of the cavernous artery are not always needed in penile replantation procedure. Of the three cases above, the follow-up and wound care were done every day during hospitalization. We used normal saline to create a moist environment that has been proven to facilitate the healing process of the wound by preventing dehydration and enhancing angiogenesis and collagen synthesis together with increased

breakdown of dead tissue. The puncture through the glans penis to the corpus cavernous with an injection of heparin was done daily during hospitalization to make sure good vein drainage and imbibition of the cavernous artery.

Post-surgery monitoring was done by visual analysis. The outcome of the procedure was good, although the second case suffered from meatal stenosis. This was a common complication following the penile replantation procedure<sup>(11)</sup>. The other minor complications that can happen following micro and macro surgery are delayed wound healing or loss of sensation on the distal part of the penis<sup>(2,4)</sup>. Fortunately, we did not find any of that complication in our patients. This case series showed that there are no differences in outcome and complications after the procedure between macro surgery and microsurgery replantation. For this reason, macro surgery replantation with a cavernoglandular shunt can be used as an alternative in replantation procedures especially in hospitals with limited facilities.

## CONCLUSIONS

Based on our literature searching, this is the first case series reporting the use of cavernoglandular shunt technique as a combination of vascularization repair technique without arterial anastomosis in penile replantation procedure with promising visual and functional results. This method can be used as an alternative procedure to replantation in a hospital with limited facilities. For more objective evaluation, Doppler is advisable to use as a measure of the success of the revascularization procedure.

## CONFLICT OF INTEREST

The authors declare no conflict of interest

## REFERENCES

1. Tanagho EA, Lue TF. Anatomy of the Genitourinary Tract. In McAninch JW, Lue TF (editor) *Smith & Tanagho's General Urology* 19th ed. California: McGraw-Hill Education. 2020;1-15.
2. Babaei AR, Safarinejad MR. Penile replantation, science or myth? A systematic review. *Urol J Spring*. 2007;4:62-5.
3. Wihono F, Sigumonrong Y. Surgical Management (microsurgery) of Traumatic Penile Amputation: A Case Report. *Open Acces Maced J Med Sci*. 2019;7:1350-2.
4. Jezior JR, Brady JD, Schlossberg SM. Management of penile amputation injuries. *World J Surg*. 2001; 25:1602-9.
5. Garg S, Date SV, Gupta A, Baliarsing AS. Successful microsurgical replantation of an amputated penis. *Indian J Plast Surg*. 2016;49:99-105.
6. Jordan GH. Management of Penile Amputation. In Hohenfeller M, Santucci RA (editor) *Emergencies in Urology*. Berlin: Springer. 2007;270-4.
7. Jordan GH, Gilbert DA. Management of amputation injuries of the male genitalia. *Uro Clin North Am*. 1989;16:359-67.
8. Tay YK, Spornat D, Rzetelski-West K, Appu S, Love C. Acute management of priapism in men. *BJU International*. 2012;109:15-21.

9. Burnett AL, Bivalacqua TJ. Priapism: new concepts in medical and surgical management. *Urol Clin North Am.* 2011;38:185-94.
10. Landstrom JT, Schuyler RW, Macris GP. Microsurgical penile replantation facilitated by postoperative HBO treatment. *Microsurgery.* 2004;24:49-55.
11. Biswas G. Technical Considerations and Outcomes in Penile Replantation. *Seminars in Plastic Surgery.* 2013;27:205-210