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Excision and Unilateral Inguinal Skin Graft Reconstruction on a Four-Year Old Penile Granuloma

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ABSTRACT

Background: Foreign substance injections into the penile subcutaneous tissue to enlarge the penis frequently produce disastrous complications, such as penile granulomas. Here we reported a case of penile granuloma along with our reconstruction technique.

Method: This report presents a 57-year-old male with a 4-year-old granuloma with recurrent ulcers. A penile reconstruction was conducted using unilateral inguinal full-thickness skin graft. Patient was discharged after one week and followed with regular visits to the outpatient clinic for 6 months.

Results: No complication was reported post-surgery and wounds recovered well. However, the patient complained on reduced sensation and pain on the penile tip, and inability to erect after 6 weeks post-surgery. After 6 months post-surgery, the patient can retain erection with remaining sexual dissatisfaction.

Conclusion: Inguinal full-thickness skin grafts provide adequate coverage for penile reconstruction in granuloma excision. Eventually, regaining sexual function and satisfaction remain an intricate challenge to face

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BACKGROUND

The history of soft tissue injections dated back to the 19th century. In 1899, an Austrian surgeon was first documented injecting a foreign substance, mineral oil or Vaseline, to substitute an absent testis.[1] However, the body cannot metabolize interstitial exogenous oils, which could cause subcutaneous deposition, inflammation and tissue proliferation.[1,2] Paraffin injections was very popular in the period of 1900 to 1914. During these times, the first cases of paraffinomas appeared leading to its discontinuation during the World War 1.[3] On the other hand, silicone is a synthetic and more stable material. Although considered as chemically inert, liquid silicone could unpredictably cause adverse inflammation and tissue destruction. Liquid silicone have been used in the past, but on August 1991, the Food and Drug Administration (FDA)[4] clarified their disapproval in the marketing of liquid silicone for injection for any cosmetic purpose. They stated that adverse effects of liquid silicone included movement of silicone to other body parts, inflammation, discoloration of surrounding tissue, and formation of granulomas. In the following years, however, they approved several forms of silicone, namely the Silikon 1000 and Adarto SIL-OL 5000 for use on retinal detachment related to cytomegalovirus retinitis and AIDS-related disorders.[4] Despite this, approved silicones were expensive and had limited availability. Many off-label silicones with unknown purity was used by medical and non-medical personnel for cosmetic purposes. These materials produced chronic inflammatory reaction with formation of vacuoles, histiocytes, polynuclear giant cells, lymphocytes, and hypertrophic connective tissues which frequently necessitate surgical resection.[3]

Despite the disastrous complications and clear warnings against its use for cosmesis, off-label liquid silicone cosmetic injections were still popular, especially in Asia.[1] Penile augmentations were often covertly conducted to achieve a higher self-esteem regarding penile size. Penile granuloma, siliconoma, paraffinoma, sclerosing

lipogranuloma,[5] or sometimes called vaselinoma, is a complication of inflammatory process and atypical tissue proliferation as a result of interaction of the human tissue with a foreign substance.[1] The term of the disease depends on the causative agent. They usually present with swelling, rigid mass, pain, ulceration, contracture, sexual dysfunction, and on some rare occasion, malignant transformation.[5] The main treatment up to this date is surgery, as non-surgical treatment found to be ineffective. Herein, we report a case of a 57-year-old male with a 4-year-old granuloma, our surgical technique and its cosmetic and functional outcomes.

CASE REPORT

A 57-year-old male came to the plastic surgery outpatient clinic in a secondary hospital. He complained on having difficulties engaging in sexual intercourse with his partner due to his deformed penis. Four years ago, he claimed to have received liquid injections on his penis for the purpose of penile enlargement. The injection was performed by a non-medical personnel in a non-sterile environment, consisting of three-staged injections within a one month interval. The first and second injections were on either side of the penile shaft, and the third was injected on the root of the penis. The volume of injected liquid and the type of liquid was unknown. After the third injection, the patient complained of having difficulties in sexual intercourse due to penile stiffness and inability to erect. He claimed to have multiple ulceration on his penis. Without consulting to a healthcare facility, the patient consumed oral antibiotics and applied topical betamethasone on the ulcers. He claimed that the ulcers frequently recur, and after four years, he finally came to seek help to a plastic surgeon. The patient had a history of uncontrolled hypertension and no history of diabetes mellitus or other comorbidities.

Upon admission, the patient presented with a rigid, fibrotic, pale-coloured mass around the shaft all the way from the root to the neck of the penis (Figure 1). There was no indication of an active inflammation, no tenderness, discharge, ulcers, strangulation, or inguinal lymph node involvement. According to his medical history and physical examination, the patient was diagnosed with penile granuloma and indicated for penile reconstruction.

Figure 1. Penile granuloma before surgery.

Prior to surgery, the patient was given 1 gram of intravenous Ceftriaxone. The patient was operated under spinal epidural anaesthesia. The circumferential mass surrounding the penile shaft extended to the scrotal area. Excision was meticulously carried out circumferentially, degloving the skin and taking care not to breach the superficial fascia above the corpus spongiosum and cavernosum (Figure 2). The urinary catheter helped guide the depth and location of the urethra in order to avoid urethral laceration. All parts of the granuloma were removed successfully (Figure 3). Considering the extent of the mass and the lack of scrotal skin, we chose to cover the penis with full thickness skin graft (FTSG) from the left groin region (Figure 4). The FTSG was used to cover the degloved penile shaft in a spiralling manner, secured using 5/0 PGA sutures on the edges, and some anchoring sutures along the center of the graft. The remaining raw surface on the scrotum area and the graft donor site was closed primarily. A temporary drain was placed on the most inferior scrotal suture (Figure 5). The surgery took three hours with an estimated 100 ml of intraoperative blood loss.

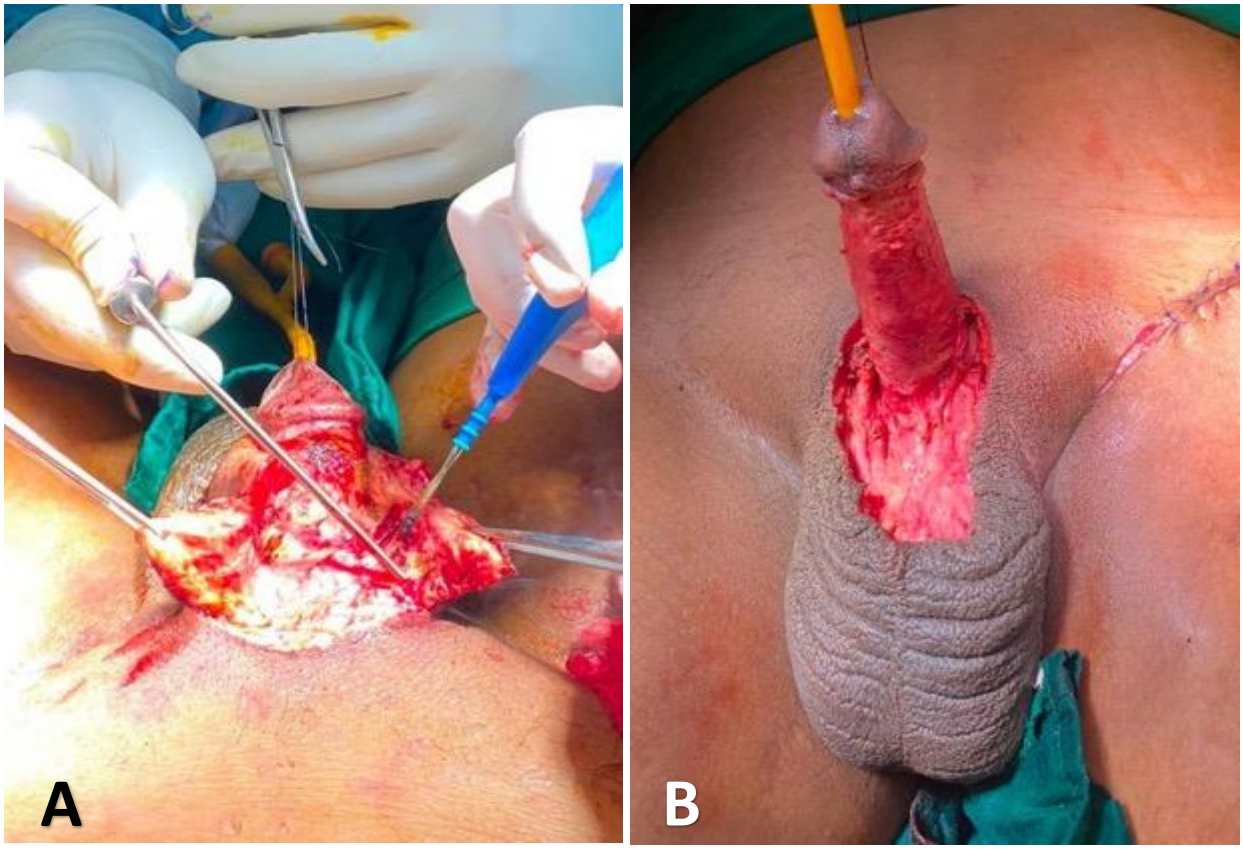

Figure 2. Granuloma excision. A: starting from the dorsal penis, penile skin and granuloma was excised circumferentially down to the scrotum, following the depth of granuloma infiltration. B: denuded penis.

Figure 3. Excised granuloma.

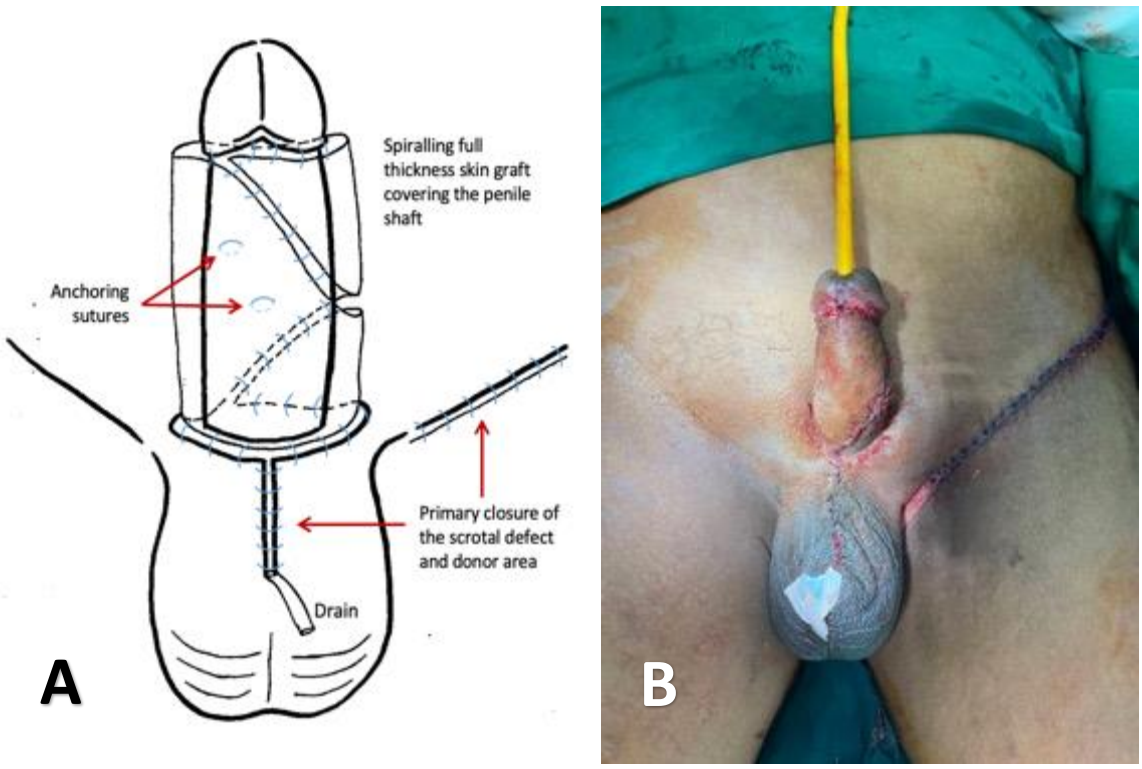

Figure 4. Full thickness skin graft elevation from the left groin.

Figure 5. Full thickness skin graft covered the penile shaft in a spiralling manner and primary closure of the scrotum and donor site. A: surgery design, B: completed defect closure.

The patient was monitored for 7 days in the hospital ward. There was no hematoma, wound dehiscence, infection, or necrosis in the first week. The temporary drain was removed and the patient was discharged. He remained catheterized until three weeks post-surgery. His penis was fixated at a cranial position to minimize movement and prevent wound dehiscence. Weekly follow-up and wound care revealed acceptable graft healing at two weeks with delayed healing on the penile-scrotum fold, and hyperpigmentation indicating probable ischemia at the distal part of the shaft (Figure 6A). On the following weeks, the hyperpigmented distal shaft evolved into necrosis and was conventionally treated (Figure 6B). The patient admitted a reduced sensitivity and prickling sensation on the glands and penile shaft. On the 8th week, he

reported his first successful erection and ejaculation upon prolonged stimulus. Evaluation of the penile function 6 months post-surgery was conducted using the International Index of Erectile Function (IIEF-15) (Table 1). The patient was asked 15 questions (5 domains) regarding his erectile function and sexual experience post-surgery in the past 4 weeks with an ordinal scale from 0 to 5. From the results, the patient showed sexual dysfunction, decreased intercourse satisfaction, and overall decrease in sexual satisfaction.

Table 1. Patient's International Index of Erectile Function (IIEF) Score

No.	Domain	Total Score Range	Patient's Score	Interpretation
1.	Erectile Function	1-30	10	Severe erectile dysfunction
2.	Orgasmic Function	0-10	10	Normal orgasmic function
3.	Sexual Desire	2-10	10	Normal sexual desire
4.	Intercourse satisfaction	0-15	5	Decreased intercourse satisfaction
5.	Overall sexual satisfaction	2-10	6	Decreased overall satisfaction

Figure 6. A: Two weeks post-surgery. The yellow arrow indicates hyperpigmentation on the distal part of the graft, showing signs of ischemia, while the rest of the graft healed nicely. The white arrow shows the penile-scrotal fold with delayed healing compared to the other sutures; possibly due to constant overextension of the fold upon fixation. B: Eight weeks post-surgery. The previously ischemic distal shaft turned necrotic and managed conservatively, while the penile scrotal fold healed nicely.

DISCUSSION

Siliconoma of the penis was not commonly found or reported.[6] There was no clear incidence of penile siliconoma and those who have it were hesitant to consult to a medical personnel until significant symptoms occur. This could be due to perceived taboo, self-consciousness, or shame regarding the deformed genitalia. Moreover, safe medical penile augmentation was rarely available in all regions of Indonesia. Those who seek penile enlargement may opted for unwarranted silicone injections for their availability and cheaper price.[6]

Regarding the timing of granuloma formation, some studies found a 4-5 years latent period.[7,8] Some other authors[2,6,9,10] reported granuloma formation within months after surgery, probably due to allergic reaction against the injected material. We believe that the timing of granuloma formation was unpredictable and may be affected by the type of substance and individual bodily response.

There have been no reports on spontaneous regression of penile granulomas.[1] Non-surgical therapy such as topical cream or steroid injection were found to be ineffective,[5] and the only definite treatment was surgery. Surgical reconstruction could be done by simple excision and primary sutures, or reconstruction using skin flaps or grafts

on larger mass. In 1996, Jeong et al[11] described a technique using bilateral scrotal flaps to cover the penile shaft. This technique utilizes the elasticity and easy expansion of the scrotal skin, making it easy to manipulate without having to preserve any specific vessel.[11] Other options for large lesions were Cecil's inlay surgery, split thickness skin graft, full thickness skin graft. Other surgical techniques for penile granuloma reconstruction were summarized in Table 2.

Table 2. Surgical techniques for reconstruction of penile granuloma

Author	Method	Surgery details	Results	Patients
Shaeer (2009)[16]	Granuloma excision with skin preservation.	One stage surgery. The penile skin was healthy with no granuloma infiltration. A circumferential sub coronal dorsal incision was made to remove the granuloma and penile skin was re-draped over the shaft.	A superficial ulcer healed spontaneously after 3 weeks with conservative treatment. The patient resumed sexual activity 5 weeks following the surgery.	1
Hwang et al (2011)[15]	Dartos musculocutaneous flap to cover a 4x5cm 3rd degree burn on the penile shaft with a history of silicone augmentation.	Two-staged surgery. Dartos musculocutaneous flap was elevated from the scrotum, 5mm lateral to the midline raphe (pedicle located over the anterior scrotal neck). The flap was transposed to the defect on the ventral penis. Donor site was closed directly. Eleven days after, the flap pedicle was occluded with tourniquet. Eight days after occlusion, the pulse-oximeter read 85% on the flap and the flap was separated from its pedicle.	The transposed skin was well attached, good oxygenation on the flap and erection of the penis was achieved 30 days post-operatively.	1
Inn FX et al (2012)[8]	Full skin excision followed by split thickness skin graft (STSG) from the groin.	One stage surgery. The fibrotic skin and subcutaneous tissue was excised from the penile shaft to the proximal scrotum. Thick STSG from the groin covered the penile shaft.	Wounds were fully healed after one month post-surgery. All patients were able to achieve full erection with normal sexual intercourse (timing not mentioned).	3
Shin et al (2013)[14]	T-style anastomosis only (group 1, n=20) and additional inverted V-shaped incision on bilateral scrotal flap (group 2, n-14).	One stage surgery. The penile shaft was degloved. Scrotal flaps were elevated and sutured with a T-style anastomosis on the coronal and dorsal penile body. the ventral aspect was incised with an inverted V-shape creating a diamond raw surface which was sutured in an inverted-Y	All flaps in group 2 survived; 3 patients had delayed wound healing, 1 wound infection, and 1 mild scar contracture at the penoscrotal junction. All patients were able to feel gentle touch. All experienced temporary dyspareunia or feeling of traction during erection. After 6 months, all patients reported satisfactory sexual activity and 2 patients	34

		manner to allow shaft lengthening (this method will be referred as the 'inverted V-Y').	reported a mildly shortened penis and traction.	
Kim et al (2014)[12]	Bipedicle anterior scrotal flap.	One stage surgery. The anterior scrotal skin was excised in a V or U-shape, separated on the midline. An inverted V-Y was done.	One patient had wound disruption which required secondary closure. All the other patients were discharged in 3 days, without significant complications or erectile dysfunction. There was no penile shortening or scrotal contraction. All patients were able to achieve normal sexual intercourse within 3 months post-surgery.	5
Fakin et al (2016)[13]	Bipedicle anterior scrotal flap	One stage surgery. The anterior scrotal flap was elevated (width: 66%, length: 80%). A circular excision was made to allow the penis to pass anteriorly. An inverted V-Y was done.	Minor complication such as partial necrosis (9%), haematoma of donor site (12%) and partial wound disruption (19%) occurred, two of which necessitate secondary closure (5%). The mean score of satisfaction was 4.37/5 in 38 patients (88%) (did not mention patients who scored <4). All patients successfully erected post-surgery and resumed sexual intercourse (timing was not mentioned).	43

Simple excision with primary sutures and reconstruction using scrotal skin usually produced favourable functional outcomes with satisfactory sexual experience.[5] Hamzah et al[7] reported a similar case using FTSG from the groin to cover the penile shaft in a spiralling technique. Their patient had no post-operative complication, achieved full erection and normal intercourse without mentioning the timing of each accomplished feat. Compared to this case, our patient had no urinary complications, but had some tissue necrosis which healed secondarily. Our patient achieved his first erection 8 weeks after surgery, but felt reduced sensation over his penis and difficulty getting an erection and ejaculation. Since after the surgery, the patient reported reduced sensitivity and prickling sensation on the skin of the glans and shaft. It is interesting since the glans was not manipulated in any way during the surgery, except for catheter insertion. We hypothesize that the excision of the shaft skin may have severed cutaneous nerves which run from the shaft to the glans. A cohort[17] of 1369 men also reported that circumcised men reported decreased sexual pleasure, lower orgasm intensity with more effort to achieve orgasm, and higher percentage of unusual sensations such as burning, prickling, itching, tingling, or numbness in the glans penis. Additionally, our patient had a history of premature ejaculation for 20 years and have not had intercourse over the past five years. The patient also admitted on having no active sexual partner and dissatisfaction in his sex life since before the surgery. Although his penis regained its length and mobility as before, his sexual satisfaction was still low.

CONCLUSION

This report illustrated a case of illicit penile enlargement gone wrong. Lack of education and perceived taboo among the topic of sexual organs could limit patients' knowledge on safe medical efforts for penile enlargement. Medical personnel should educate and emphasize the importance of sexual knowledge to the public, and provide a safe space for patients to consult. In this case, FTSG from the groin was reliable to cover the entire penile shaft, resulting in satisfactory cosmetic outcomes. Still, functional outcomes regarding sexual satisfaction was a challenge to tackle, and may need further referral to other specialties.

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Disclosure

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