ONE-STAGE MODIFIED BIPEDICLED SCROTAL FLAP IN PENILE SCLEROSING LIPOGRANULOMA SURGICAL RECONSTRUCTION: A CASE SERIES

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ABSTRACT

Introduction: *Sclerosing lipogranuloma is commonly encountered by urologists and plastic surgeons. Despite potential permanent damage, increasing penile size by injecting unusual substances, usually oil-based, becomes a trend in society. The immediate result, practicality, and affordability of the procedure caused penile shaft deformity, pain, and difficulties in sexual activity.* ***Objective:*** *This study aims to report three cases of modified scrotal flap reconstruction techniques to reconstruct heavily deformed penile shafts with satisfying results.* ***Case(s) Presentation:*** *Three males presented with painful enlarged and deformed penile shaft following a penile enlargement procedure by injection of unusual substances done by non-medical practitioners. Following penile sclerosing lipogranuloma diagnosis,lipogranuloma excisionand one-stage modified bipedicle scrotal flapwere conducted for all patients.* ***Discussion:*** *A reconstructive procedure is needed toeliminate painand restore sexual functions.Among available surgical reconstruction techniques, the bipedicled scrotal flap was more suitable in most limited healthcare setting for its less technical complexity, fewer complications, better aesthetic outcomes, and better sexual functions. All cases were reconstructed ina one-stage procedure, they were cost-efficient without losing their features.* ***Conclusion:*** *The one-stage modified bipedicled scrotal flap techniqueis a beneficialtechnique for penile reconstruction caused by sclerosing lipogranuloma, especially inhealth centers where patients reside in distant places.*

Keywords:*Sclerosing lipogranuloma, scrotal flap, reconstruction techniques.*

ABSTRAK

Pendahuluan: *Penebalan lipogranuloma penis kerap ditemui ahli urologi dan bedah plastik. Selain menyebabkan kerusakan jaringan permanen, memperbesar penis dengan suntikan bahan berbahan dasar minyak yang tidak jelas kandungannya telah menjadi sebuah tren sosial di masyarakat. Meski praktis, murah, dan instan, pembesaran tersebut berujung pada kelainan bentuk penis, nyeri, dan gangguan aktivitas seksual.* ***Tujuan:*** *Penelitian ini bertujuan untuk melaporkan tiga kasus deformitas penis berat yang dilakukan rekonstruksi menggunakan teknik modifikasi flap dari scrotum dengan hasil memuaskan.* ***Presentasi Kasus:****Tiga orang pasien datang dengan deformitas dan nyeri pada penis setelah penyuntikan bahan tertentu guna pembesaran penis oleh tenaga non-medis. Pasien didiagnosa dengan penebalan lipogranuloma pada penis dan dilakukan tindakan eksisi lipogranuloma dilanjutkan dengan penutupan satu tahap menggunakan modifikasi flap dari scrotum.* ***Diskusi:*** *Tujuan rekonstruksi penis adalah menghilangkan nyeri dan merestorasi fungsi seksual. Di antara berbagai teknik prosedur rekonstruksi, penutupan satu tahap menggunakan modifikasi flap dari scrotum merupakan teknik paling ideal di pusat kesehatan dengan keterbatasan fasilitas. Kompleksitas teknik dan komplikasi yang rendah, hasil yang baik secara estetik, dan fungsi seksual yang lebih baik merupakan keunggulan teknik ini. Prosedur rekonstruksi satu tahap diterapkan pada ketiga kasus untuk meraih keunggulan tersebut secara efisien.* ***Simpulan:*** *Penutupan satu tahap menggunakan modifikasi flap dari scrotum merupakan teknik rekonstruksi yang menguntungkan untuk kasus penebalan lipogranuloma penis pada pusat pelayanan di daerah terpencil untuk pasien dengan domisili yang jauh.*

Kata Kunci:*Penebalan lipogranuloma, flap skrotum, teknik rekonstruksi.*

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INTRODUCTION

The unpleasant appearance of the penile shaft with a history of unusual substances injection are key feature in diagnosing penile sclerosing lipogranuloma (PSL), also known as penile siliconoma or paraffinoma. Described first by Newcomer and Graham in 1971, this term is defined as the body reaction resulting from the insertion of high-viscosity fluids such as paraffin into the site of the body part.[1,2] It is characterized by the formation of the firm nodular formation of fat at the subcutaneous layer of the skin after the injection.[1,3] Failure of macrophages and neutrophils to neutralize foreign substances forms isolation of the foreign suspensions into granulomas.[4]

Penile augmentation could be done safely by medical standard procedure using penile prosthesis implantation because complications are clearly understood by medical practitioners.[5] However, penile augmentation using unusual substances done by a non-medical practitionerhas been reported in some countries including Eastern European and South-east Asia.[3,6] The practice was aimed to achieve more attractiveness in aspects of sexual pleasure for women, and in aspects of masculinity to gain some bravery image.[3,7,8] One of another motivation was aggressive behaviour among inmates in jail.[8]

The diagnosis of PSLcan be made through the history taking and physical examination of the penile. The unpleasant appearance of the penile skin due to the nodular formation is specific to sclerosing lipogranuloma. Oedema, irregular mass, ulceration, necrosis, accompanied by symptoms of sexual dysfunction such as erectile dysfunction, and lower urinary tract symptoms such as voiding difficultyalso have been reported as the clinical presentation found in PSL.[9] Currently, there is no standardized PSL classification. In Indonesia, Soebhali (2021) proposed a classification (Table 1) based on the involvement of the surrounding area of injection.[10]

Excision of the defective skin must be followed with surgical reconstruction procedures. Nowadays, many beneficial reconstruction techniques have been reported according to each patient's background and characteristics. Among them are primary suture, skin grafting, and scrotal flap.9 Many have reported scrotal flap techniques as a preferred option for reconstructing the destroyed penile skin.[9] Bilateral scrotal flap which is at risk of delayed wound healing at distal penile T- zone / T-style anastomosis and two stage bipedicle scrotal flap are among the available reconstruction techniques.[1,11] While each procedure carries its own risks of complications, these risks can be minimized by careful prediction and modification of the techniques.

Table 1. Soebhali Classification of sclerosing lipogranuloma of penis.[10]

Category	Content
Category 1	Minimal lesion, less than one-third of the penis, no suprapubic or scrotal involvement
Category 2	Lesion in the shaft penis, more than one-third of the penis, no suprapubic or scrotal involvement
Category 3	Lesion in the shaft penis, with suprapubic involvement, and half or less scrotal involvement category
Category 4	Lesion in the penis, suprapubic and more than half of the scrotum

We reported a one-stage modified bipedicled scrotal flap in treating three penile sclerosing lipogranuloma cases.1 This technique is modified to avoid complications of delayed wound healing and is modified as a single-stage procedure that is applicable in centers treating patients who reside in distant areas.

CASE(S) PRESENTATION

A 42year-old man presented with a complaint of swelling, discomfort, and an abnormally shaped penis within 1 month after being injected with unusual substances to increase penis size in a non-healthcare setting. No fever, penile discharge, or lower urinary tract symptoms were reported. He was married, worked as a tailor, and was sexually promiscuous. The patient had no surgical history, past medical illness or known allergic history, and denied using any medicational or recreational substances. On physical examination, the vital sign was normal. The genitalia externa was circumcised and there was generalized circumferential swelling all over the penile shaft (Figure 1). No penile discharge and no tenderness on palpation. The scrotum and testicular were normal, with no palpable inguinal lymphnode. The patient was later diagnosed with category 2 PSL. Three months after the surgery, the patient was assessed with the International Index of Erectile Function (IIEF-5) questionnaire scoring and found no sexual dysfunction (score 25).

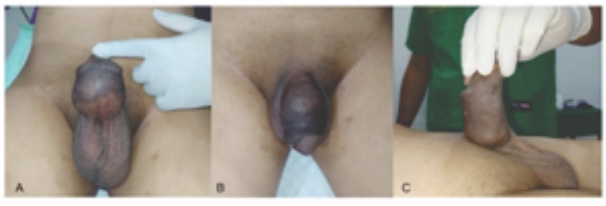

Figure 1. Generalized swelling all over the penile shaft before the surgical reconstruction: ventral view (A); dorsal view (B); and lateral view (C).

A 32year-old man presented with a complaint of swelling, wounded, and abnormal shaped penis within 3 weeks after being injected with unusual substances in a non-healthcare setting. No fever, penile discharge, or lower urinary tract symptoms were reported. He was married, works as an office worker, and was sexually promiscuous. The patient had no surgical history, past medical illness, or known allergic history, and denied using any medicational or recreational substances. On physical examination, the vital sign was normal. The genitalia externa was circumcised, had generalized circumferential swelling all over the penile shaft, and had a 4 cm irregular edge with a yellowish-slough base (Figure 2). No penile discharge and no tenderness on palpation. The scrotum and testicular were normal, with no palpable inguinal lymphnode. The patient was later diagnosed with category 2 PSL accompanied by a chronic wound. Three months after the surgery, the patient was assessed with IIEF-5 questionnaire and found no sexual dysfunction (score 25).

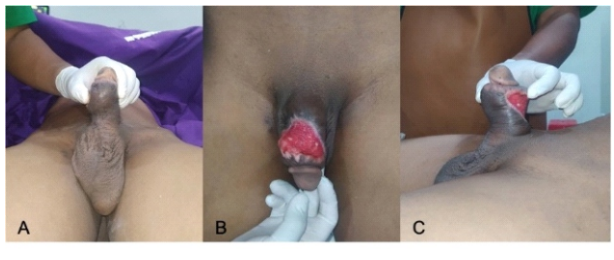

Figure 2. Generalized swelling all over the penile shaft before the surgical reconstruction: ventral view (A);Dorsal ulcer (B); and lateral view (C).

A 30year-old man presented with a complaint of swelling, nodular, and abnormallyshaped penis within 4 weeks after being injected with unusual substances when in jail. No fever, but there was discharge from the swollen penile shaft, and no lower urinary tract symptoms were reported. He was married, works as a technician, and was sexually promiscuous.The patient had no surgical history, past medical illness, or known allergic history, and denied using any medicational or recreational substances. On physical examination, the vital sign was normal. The genitalia externa was not circumcised and there was generalized circumferential swelling all over the penile shaft along with multiple wounds with yellowish discharge (Figure 3). The scrotum and testicular were normal, with no palpable inguinal lymphnode. The laboratory examination, it showed an increasing leukocyte count. The patient was later diagnosed with category 2 PSL. Three months after the surgery, the patient was assessed with the IIEF-5 questionnaire scoring and found no sexual dysfunction (score 25).

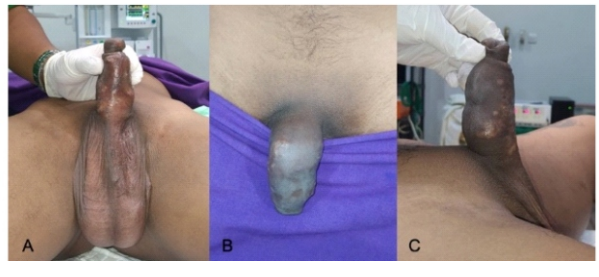

Figure 3. Generalized swelling and nodular all over the penile shaft before the surgical reconstruction: ventral view (A); dorsal view (B); and lateral view (C).

Penile shape reconstruction was performed using the one-stage modified bipedicled scrotal flap technique as proposed by Shin (2013).[1]The length of the scrotal incision was made by subtracting one half of penile shaft circumference from the penile shaft length. (Figure 4).

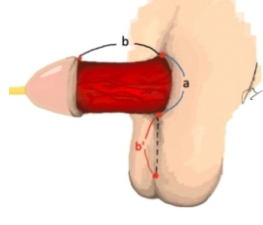

Figure 4. Pre-operative design measurement of the scrotal incision. The scrotal incision length (b') was total length of penile shaft (b) subtracted by one half of penile shaft circumference (a): $b' = b - a$. [1]

The patient was in a supine position under general or regional anesthesia. With a Foley catheterinserted, all skin with sclerosing lipogranuloma was excised (Figure 5).The scrotal incision was made based on the a forementioned measurement. Both of the distal scrotal flaps were sutured together in the dorsal and distal part of the denuded penile shaft while the proximal angle of the scrotal flap was sutured to the frenulum. The rest of the incision was sutured to cover the dorsal side of the denuded penile shaft so that the penile shaft was buried in the scrotum. In the final step, the inverted V-shaped incision was made on the anterior aspect of scrotum and closed in V-Y fashion with simple interrupted suture (Figure 6).

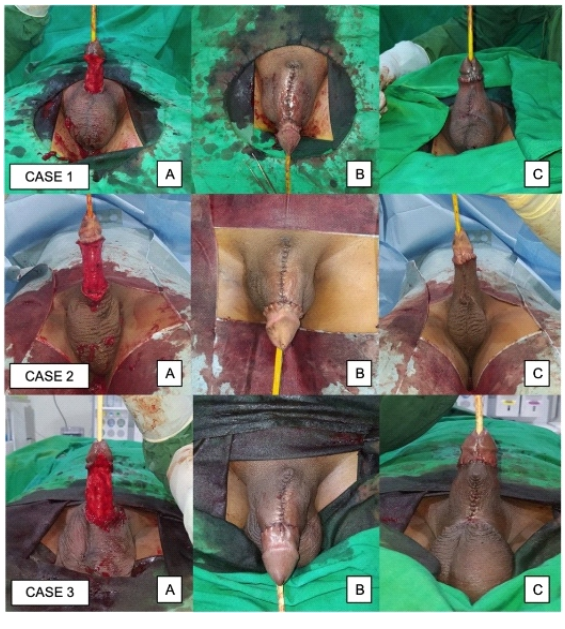

Figure 5. Skin excision of the penile circumferential granuloma (A), the penile shaft buried on the scrotal flap (B), and the V-Y shaped incision (C).

The patients were discharged on post-operation day 3 and followed up by day 7 at the outpatient clinic. We found no complications such as skin necrosis or delayed wound healing during the follow-up day (Figure 7).

The International Index of Erectile Function 5 (IIEF-5) questionnaire was used to measure the level of sexual satisfaction of patients 3 months after the surgery. All patients were satisfied with the post-reconstruction result (average IIEF-5 score of 25).

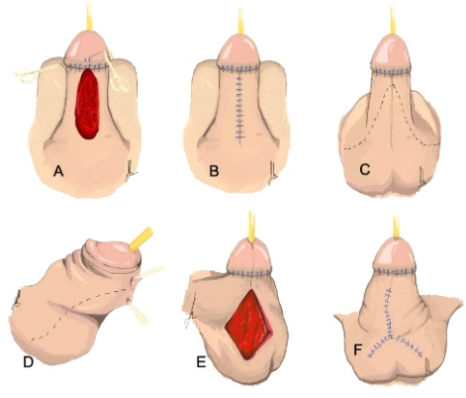

Figure 6. Surgical Technique Ilustration. Closure of distal penile shaft with simple interrupted suture (A). Dorsal longitudinal and subcoronal suture lines (B). Inverted V-shaped incision design (C). Lateral view of the V incision (D). The inverted V-shaped incision (E). Ventral suture lines (F).

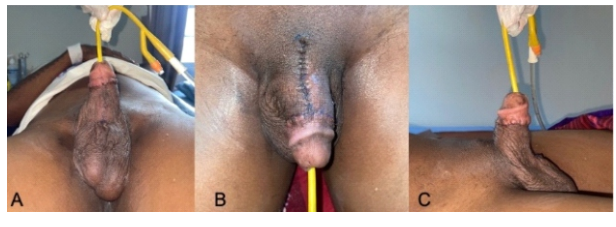

Figure 7. Case-1 day-7 post-reconstruction surgery. No complications were found: ventral view (A); lateral view (B); dorsal view (C).

DISCUSSION

Surgical reconstruction indication for penile sclerosing lipogranuloma was not only restoring penile appearance but also restoring sexual function.[1,9,10,12,13] Removing all the defective tissue is mandatory to prevent any complications from the inflammation reaction caused by the foreign substances inserted. Regarding many aspects in considering the choice of techniques, both aesthetic and functional aspects are important, but are not enough. As a health center in a remote area,considering the best technique is not only based on the a forementioned aspects but also on cost-effectivenessand time-saving efficiency.

Among many surgical options, some reported both split-thickness skin graft (STG) and full-thickness skin graft (FTG) are beneficial.[9,13] The STGeffectively covers a large surface of skin loss

and results in a good aesthetic outcome. However, the risk of graft contraction and color-changing skin is unavoidable.[9,11] The FTG is reported beneficial as it is of lower risk in hypertrophic scars and skin contracture.[14] The scrotal flap offers better aesthetic outcome due to the similarity of penile color and high flap viability.[9,11,15] The scrotal flap is convenient to use cover circumferential penile defects for its elastic feature. Another advantage is the intact tactile sensibility for erogenous sensation compared to the skin graft resurfacing.[2,11]

There are many scrotal flap techniquesin penile reconstruction, some of them are bilateral scrotal flap and bipedicled scrotal flap. That scrotal flapcommonly requiresventral and dorsal subcoronal T-style anastomosis. Based on Shin's study (2013), every scrotal flap technique that requires T- zone / T- style anastomosis suture at the distal side of the penile is at risk of poor blood supply and delayed wound healing leading to necrosis due to inadequate blood supply.[1] In our cases, the penile siliconoma reconstruction technique was the bipedicled scrotal flap, introduced by Shin.[1]

In this bipedicled scrotal flap technique,the T- style anastomosis is replaced with the anastomosis based on the V-Y plasty principle (Inverted V- shaped anastomosis).[1] The replacement of T-style anastomosis makes the modified bipedicled scrotal flap technique minimize the complication rate due to the low risk of necrosis in the T-zone side sutures.[1,11,16] The suture lines which are located on the dorsal longitudinal and subcoronal in bipedicled scrotal flap are also considered as the advantages of this technique because the location of the sutures preserves elasticity and prevents tension during penile erection.[11,17]

Similar opinion was proposed by Kim and colleagues (2014)[16] in using the bipedicled scrotal flap technique as the scrotal skin is extensible, giving a provision of expansile skin,and allowing normal erection. It also has several aesthetic advantages because of the same skin penile color.[16] The wound healing outcome is also better without the use of T-style anastomosis, indicating an abundance of vascularization supply from the scrotal pedicles of the pudendal artery.[12,18]Sung Kim et al (2019) find the disadvantage of this technique which we also discover. The technique still has some disadvantages due to the hair growth from the scrotal skin causing dyspareunia, and another disadvantage is the shortening of penile length in a flaccid state.[19]

As a two-stage procedure, the bipedicled scrotal flap will not be time and cost-effective in treating patients who live on many different islands. For this reason,the excision and reconstruction are carried out as a one-stage procedure.The patients underwent one anesthesia procedure and had a short length of stay. During the post-operation follow-up, the observation of skin survival is done strictly until the patient is safe to be discharged without any complication.All patients were assessed with the IIEF-5 questionnaire scoring and found no sexual dysfunction.

Among all surgical techniques in penile reconstruction for PSL, the one-stage bipedicled scrotal flap seems to be more suitable not only due to its aesthetic outcome, low suture tension, high flap viability, and low risk of delayed wound healing, but also due to its cost-effectiveness and time-saving efficiency. Besides all the superiority aspects, we have not yet been able to ensure that this technique can be applied to severe PSL categories that involve spreading unusual substances into the suprapubic and scrotal areas. Limited number of cases, short follow-up period, the absence of control group, and outcome-only measurement add the limitation of this report. Therefore, further research, longer follow up period, and increased variety of cases are needed to find the best reconstruction technique for other categories of PSL in the case of severe PSL categories.

CONCLUSION

Three cases of category 2 PSLthat underwent one-stage modified bipedicled scrotal flap have shown satisfying outcomes. This cost-effectiveness and time-saving efficiency technique can be considered to treat patients of distant and remote residences.

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