



Oncology

Penile squamous cell carcinoma originating from a silicone granuloma

Yi-Hsuan Chen^{a,b,c,d}, Jiun-Hung Geng^{a,b,c,d}, Jung-Tsung Shen^{a,b}, Yung-Chin Lee^{a,b,c,d},
Jhen-Hao Jhan^{a,b,c,d,*}

^a Department of Urology, Kaohsiung Municipal Siaogang Hospital, Kaohsiung, Taiwan

^b Department of Urology, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

^c Department of Urology, School of Medicine, College of Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

^d Graduate Institute of Clinical Medicine, College of Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

ARTICLE INFO

Keywords:

Silicone granuloma
Penile enlargement
squamous cell carcinoma

ABSTRACT

Penile enlargement has been a controversial issue throughout history. We presented a patient who had undergone a procedure involving the injection of subcutaneous liquid silicone over the penile shaft four years prior. He developed long-term negative consequences from inflammatory granulomas. The patient's condition worsened over time, causing pain and impairing his sexual function. Eventually, he was diagnosed with penile SCC caused by chronic inflammation. Although it is rare, it is important to be aware of this probability because, compared to penile granuloma resection for symptom relief, penile SCC requires a comprehensive survey and more aggressive surgical intervention.

1. Introduction

Throughout history, penile enlargement has been an important and controversial medical issue. Increasing length, girth, and function can be managed medically in a variety of ways, including with surgery and medication.¹ Penile injection of foreign substances was utilized to increase penile girth. Due to its safety and effectiveness, autologous fat grafts were frequently used.² But in nations, penile injection of various substances—including mineral oil, liquid injectable silicone, polyacrylamide 5% hydrogel, paraffin, and metallic mercury—that have not been proven to work because of unexpected reactions to foreign bodies is common.³ These treatments are not carried out by medical professionals and can result in serious complications.⁴

2. Case report

A 50-year-old man with diabetes mellitus and hypertension reported difficult urination for over three years that was also accompanied by penile ulcers. He had undergone a procedure involving the injection of subcutaneous liquid silicone over the penile shaft four years prior, but he denied ever experiencing any sort of traumatic incident or infectious sign. He sought assistance from our hospital's Urology outpatient clinic due to persistent dysuria that had recently worsened. Physical exams upon arrival revealed considerable penile swelling and prepuce

ulceration. The identification of the urethral orifice was challenging due to the ulcers and penile swelling (Fig. 1).

He underwent pelvic computed tomography for further survey. The pelvic computed tomography disclosed a soft tissue with a fluid-like lesion and local inflammation around the penis and scrotum, indicating a highly suspected penile granuloma (Fig. 2). We arranged wide resection of penile mass and circumcision with well preservation of the penile shaft, glans, and urethral orifice without skin graft reconstruction (Fig. 3). Following surgery, the granuloma was completely removed, and the urethra opening was left exposed and perfectly functional (Fig. 4). The wound healed successfully and was being closely followed in our outpatient department. The specimen was then sent for pathological examination, and the results showed grade 1a squamous cell carcinoma with a 2.3cm free from margin of malignant cells. Microscopically, the polypoid lesions are composed of complex and infiltrating nests of atypical squamous proliferation (Fig. 5). The diagnosis of penile squamous cell carcinoma was confirmed based on the histopathologic findings.

3. Discussion

Serious effects could result from injecting foreign materials for penile enlargement. Short-term side effects from the treatment included discomfort, ecchymosis, pigment changes, or, more seriously, embolism

* Corresponding author. Department of Urology, School of Medicine, College of Medicine, Kaohsiung Medical University, Taiwan.

E-mail address: ghostdeityj@gmail.com (J.-H. Jhan).

<https://doi.org/10.1016/j.eucr.2023.102595>

Received 12 September 2023; Received in revised form 12 October 2023; Accepted 18 October 2023

Available online 19 October 2023

2214-4420/© 2023 Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).



Fig. 1. Initial presentation of granuloma over the penis.



Fig. 3. Resection of the granuloma with preservation of the glans and urethral orifice.



Fig. 2. Pelvic computed tomography showed inflammation and soft tissue lesions.



Fig. 4. Post-operative picture.

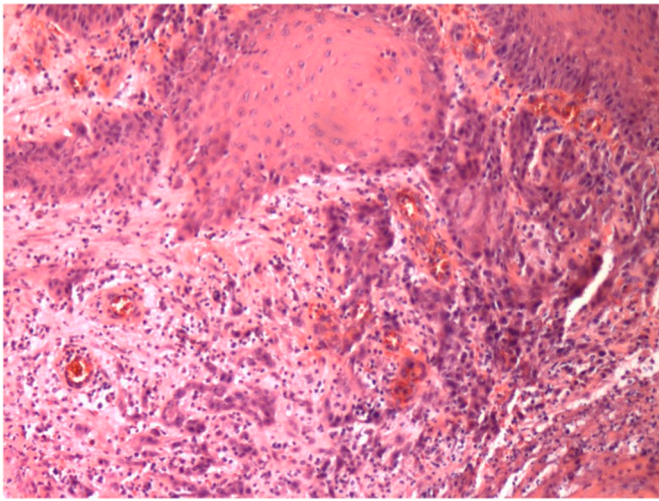


Fig. 5. Microscopically, the polypoid lesions are composed of complex and infiltrating nests of atypical squamous proliferation. The invasive tumor components are indicated by the circle.

and pneumonitis, while long-term negative consequences seen within months to years included silicone migration and non-inflammatory or inflammatory granulomas.⁵ One of the problems that has been most extensively discussed in prior research is granuloma. The materials' inability to be absorbed could cause immunological and inflammatory reactions.⁶ It began as a painless lump that later hardened, became fibrotic, occasionally painful, and ulcerated, changing its appearance and impairing the functions of urination and sexual function.⁷ Surgical excisions of these lesions are typically required, along with possible skin graft restoration.

Squamous cell carcinoma (SCC), which makes up more than 95 % of penile cancer, is a rare type of malignant tumor. The risk factors for penile cancer include poor hygiene, Human Papillomavirus (HPV) infection, phimosis, multiple sexual partners, and tobacco exposure.⁸ Surgery, lymph node dissection, radiation, and systemic chemotherapy are possible treatments for penile SCC. The prognosis of penile SCC is poor once metastasis occurs.⁹ Lack of solid second-line therapeutic evidence is a problem in clinical practice.¹⁰ Therefore, it's crucial to detect penile SCC early. In the present case, the development of penile SCC is caused by the injection of foreign material and chronic inflammation rather than HPV infection.

Prior research had not focused much on the connection between penile cancer and the injection of a foreign material. A total of 124 patients who had material injected into their penis were reviewed by Soebhali B et al. in 10 case studies and 26 case reports. In 70 cases, histology was recorded, and the majority of the specimens showed giant cell infiltration and lipogranuloma.¹¹ In a case of penile squamous cell carcinoma with paraffinoma, Syaeful Agung Wibowo et al. described a patient who had previously used silicone injection 35 years prior and developed sclerofibromatosis as a result.¹² The authors suggested that persistent inflammation following silicon injection might increase the risk of penile cancer.

In addition to penile SCC, three incidences of breast SCC following liquid silicon injection have been reported.¹³⁻¹⁶ The standard procedure for breast augmentation has changed from liquid silicon injection to prosthesis implantation. Breast SCC is a histologically rare form of breast cancer. After receiving silicon injections for 16 and 25 years, respectively, the patients were diagnosed with breast SCC. Despite the lack of strong evidence linking liquid silicon injection to breast SCC, the persistent inflammation that follows silicon injection is one of the risk factors for SCC development.

Penile SCC is a rare disease, but the patient with a history of penile foreign body injection that resulted in penile granuloma had a higher

risk of developing penile SCC. Granuloma and penile SCC are often confused because they affect similar populations with poor access to healthcare, and they can be hard to tell apart under a microscope. Penile SCC can occur with active granulomatosis, even on healed lesions, while granuloma rarely occurs alongside penile cancer. When there is clinical suspicion of SCC, a CT scan may be a good tool to assess potential SCC invasion of surrounding organs or the presence of metastasis. Additionally, an MRI should be considered as it offers superior soft tissue assessment. Intra-operative frozen sections are also a valuable method to secure clear and safe microscopic margins during the procedures for penile cancer. We did not perform an intra-operative frozen section in this case, but it should be considered when there is any suspicion of SCC.

According to Sinha P et al., dermoscopy can help distinguish between these two conditions, preventing unnecessary surgeries or delayed cancer detection by avoiding misdiagnosis. In cases of confirmed penile SCC, dermoscopy showed erosion with diverse vascular patterns, including small dot-like vessels, hairpin-shaped and linear vessels encircled by a whitish halo, as well as the presence of rosettes. When the therapy doesn't lead to improvement, it should raise suspicion in the clinician, prompting them to investigate other potential reasons for a persistent genital ulcer.¹⁷ We should be aware of the likelihood of penile SCC because, in contrast to penile granuloma resection for symptom relief, treating penile SCC necessitates a thorough examination and more aggressive surgical intervention.

4. Conclusion

A foreign body injection over soft tissue presented a number of issues, including long-term consequences in addition to safety and legal concerns. According to prior cases, a silicon granuloma is typically benign and can be removed surgically. However, we should be mindful of these situations since the clinical presentation may be comparable to penile SCC, which may be the result of prolonged inflammation following liquid silicon injection.

Ethics approval and consent to participate

Approval for the study was obtained from the Institutional Review Board of Kaohsiung Municipal Siaogang Hospital.

Consent for publication

Informed consent was obtained from the patient for the publication of this case report.

Availability of data and materials

The authors do not wish to share the patient's data. The privacy of this participant should be protected.

Funding

No funding sources contributed to this case report.

Authors' contributions

Jhen-Hao Jhan: performed the surgery and reviewed the related articles.

Yi-Hsuan, Chen: reviewed the related articles and was a major contributor in writing the manuscript.

Jiun-Hung Geng: reviewed the related articles and wrote the manuscript.

Jung-Tsung Shen: analyzed and interpreted the patient's image from the CT.

All authors read and approved the final manuscript.

Declaration of competing interest

The authors declare no conflicts of interest.

Acknowledgements

The authors would like to acknowledge Pathologist Chih-Hung Lin, the Department of Pathology, and the Statistical Analysis Laboratory in the Department of Medical Research at Kaohsiung Municipal Siaogang Hospital for their assistance.

Abbreviations

SCC Squamous cell carcinoma
HPV Human Papillomavirus

References

- Dillon BE, Chama NB, Honig SC. Penile size and penile enlargement surgery: a review. *Int J Impot Res*. 2008;20(6):519–529. <https://doi.org/10.1038/ijir.2008.14>.
- Kang DH, Chung JH, Kim YJ, et al. Efficacy and safety of penile girth enhancement by autologous fat injection for patients with thin penises. *Aesthetic Plast Surg*. 2012;36(4):813–818. <https://doi.org/10.1007/s00266-012-9891-4>.
- Xu L, Zhao M, Yang Z, et al. Modified penile augmentation by dermal-fat graft in post-hypospadias adults. *Aesthetic Plast Surg*. 2015;40(1):120–129. <https://doi.org/10.1007/s00266-015-0593-6>.
- Ramesh Sasidaran, Zain Mohd Ali Mat, Basiron Normala Hj. Low-grade liquid silicone injections as a penile enhancement procedure: is bigger better? *Urol Ann*. 2012 Sep-Dec;4(3):181–186. <https://doi.org/10.4103/0974-7796.102672>.
- Silberstein J, Downs T, Goldstein I. Penile injection with silicone: case report and review of the literature. *J Sex Med*. 2008;5(9):2231–2237. <https://doi.org/10.1111/j.1743-6109.2008.00911>.
- Inn FX, Imran FH, Ali MF, Ih R, Z Z. Penile augmentation with resultant foreign material granuloma and sequela. *Malays J Med Sci*. 2012 Oct;19(4):81–83.
- Soebhali B, Felicio J, Oliveira P, Martins FE. Sclerosing lipogranuloma of the penis: a narrative review of complications and treatment. *Transl Androl Urol*. 2021 Jun;10(6):2705–2714. <https://doi.org/10.21037/tau-21-228>.
- Misra Sanjeev, Chaturvedi Arun, Misra Naresh C. Penile carcinoma: a challenge for the developing world. *Lancet Oncol*. 2004 Apr;5(4):240–247. [https://doi.org/10.1016/S1470-2045\(04\)01427-5](https://doi.org/10.1016/S1470-2045(04)01427-5).
- Barski D, Georgas E, Gerullis H, Ecke T. Metastatic penile carcinoma - an update on the current diagnosis and treatment options. *Cent European J Urol*. 2014;67(2):126–132. <https://doi.org/10.5173/ceju.2014.02.art2>. Epub 2014 Jun 23. PMID: 25140224; PMCID: PMC4132593.
- Pizzocaro G, Algaba F, Horenblas S, et al. European association of Urology (EAU) guidelines group on penile cancer. EAU penile cancer guidelines 2009. *Eur Urol*. 2010 Jun;57(6):1002–1012. <https://doi.org/10.1016/j.eururo.2010.01.039>. Epub 2010 Feb 4. PMID: 20163910.
- Soebhali B, Felicio J, Oliveira P, Martins FE. Sclerosing lipogranuloma of the penis: a narrative review of complications and treatment. *Transl Androl Urol*. 2021 Jun;10(6):2705–2714. <https://doi.org/10.21037/tau-21-228>. PMID: 34295755; PMCID: PMC8261449.
- Wibowo SA, Wijanarko S, Ismail EA, Putra MDP. Total penectomy and perineal urethrostomy management of penile squamous cell carcinoma with paraffinoma in single center hospital: a rare case report. *Open Access Maced J Med Sci*. 2021 May 14;9(C):55–58. <https://doi.org/10.3889/oamjms.2021.5996>.
- Talmor M, Rothaus KO, Shannahan E, Cortese AF, Hoffman LA. Squamous cell carcinoma of the breast after augmentation with liquid silicone injection. *Ann Plast Surg*. 1995 Jun;34(6):619–623. <https://doi.org/10.1097/0000637-199506000-00009>.
- Smith LF, Smith TT, Yeary E, McGee JM, Malnar K. Squamous cell carcinoma of the breast following silicone injection of the breasts. *J Oklahoma State Med Assoc*. 1999 Mar;92(3):126–130.
- Toyonaka R, Ozeki J, Koyama Y, et al. A case of breast squamous cell carcinoma following breast augmentation with liquid silicone injection after 16 years. *Surg Case Rep*. 2022 Jan 28;8(1):22. <https://doi.org/10.1186/s40792-022-01378-w>.
- Nakahori R, Takahashi R, Akashi M, et al. Breast carcinoma originating from a silicone granuloma: a case report. *World J Surg Oncol*. 2015 Feb 22;13:72. <https://doi.org/10.1186/s12957-015-0509-6>.
- Sinha P, Ayub A, Madakshira MG, Praveen L, Bhattacharjee S, Alok K. Donovanosis or squamous cell carcinoma of penis: can dermoscopy solve this enigma? *Indian J Dermatol*. 2022 Nov-Dec;67(6):807–810. https://doi.org/10.4103/ijd.ijd_293_22.