Vietnam Journal of Community Medicine, Vol. 67, English version No. 1, 2026, 266-270

SURGICAL EXCISION COMBINED WITH SUPERFICIAL RADIATION THERAPY FOR THE TREATMENT OF PUBIC KELOIDS: A TWO-CASE SERIES

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Received: 12/05/2026
Revised: 23/05/2026; Accepted: 25/05/2026

ABSTRACT

Keloids of the pubic region are rare lesions that are difficult to treat and highly prone to recurrence. We report two female patients with pubic keloids of 35–45 years' duration, initially developing after acne-like inflammatory lesions and refractory to conservative treatment. One patient had previously undergone surgical excision with full-thickness skin grafting but developed severe recurrence. Diagnosis was established based on clinical and histopathological findings. Both patients underwent complete surgical excision combined with multilayer tension-reducing closure and early postoperative superficial radiotherapy with a total dose of 18 Gy. Primary wound healing was achieved in both cases without significant complications. Long-term follow-up at 2–3 years demonstrated marked improvement in pain, pruritus, and scar characteristics, with high patient satisfaction. Combined surgical excision and superficial radiation therapy may represent an effective therapeutic option for recurrent pubic keloids.

Keywords: Keloid; pubic region; superficial radiation therapy.

1. INTRODUCTION

Keloids are the result of abnormal wound healing characterized by excessive fibroblast proliferation and collagen deposition extending beyond the boundaries of the original wound [1]. The pubic region is particularly susceptible to keloid formation because of its high skin tension, moist environment, susceptibility to inflammation, and frequent mechanical irritation. Keloids in this area may cause pruritus, pain, discomfort, and significant impairment in cosmetic appearance, personal hygiene, sexual activity, and psychological well-being [2].

As the pubogenital region is a highly sensitive anatomical area, careful selection of reconstructive techniques for defect coverage is essential to achieve both functional and aesthetic outcomes while minimizing additional donor-site scarring associated with skin grafts or local flaps [3].

Management of keloids remains challenging because of recurrence rates ranging from 45% to 100% following surgical excision alone. In addition, prolonged use of high-dose local therapies may lead to adverse effects such as menstrual irregularities and hypertrichosis [4]. Current treatment strategies therefore emphasize multimodal therapy. Among these, surgical excision combined with early postoperative superficial radiotherapy has been shown to inhibit fibroblast proliferation and collagen synthesis during the early wound-healing phase, thereby reducing the risk of recurrent keloid formation. This combined approach has been reported to achieve therapeutic success rates exceeding 95% [5], [6]. In Vietnam, Le Huu Trac National Burn Hospital is currently the first and only institution implementing postoperative superficial radiation therapy for keloid treatment. Herein, we report our clinical outcomes in two patients with pubic keloids treated using this approach.

2. CASE REPORTS

2.1. Case 1

A 63-year-old woman with an otherwise unremarkable medical history presented with a 45-year history of pubic keloids. Her father and younger brother had a history of chest keloids. The lesions initially developed from acneiform eruptions and progressively enlarged over time, causing severe pain and pruritus. Multiple courses of intralesional corticosteroid injections had been ineffective. The keloid gradually enlarged and eventually covered most of the labia majora. The patient had previously undergone surgical excision followed by full-thickness skin grafting; however, the lesion recurred with greater severity, significantly impairing her quality of life and requiring intermittent antidepressant therapy.

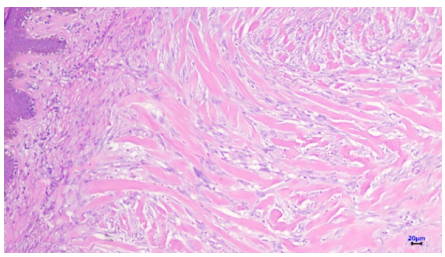
Preoperative examination revealed a pubic keloid measuring 20 × 10 cm, with an additional keloid located at the donor-site closure scar. The lesion covered most of the labia majora, resulting in marked difficulty with daily genital hygiene. Recurrent small purulent inflammatory foci were also observed on the scar surface.

The diagnosis of keloid was established based on both clinical and histopathological findings. Clinically, the diagnosis followed the 2015 Japan Scar Workshop Scar Scale (JSS) criteria. Histopathological examination demonstrated characteristic keloidal collagen bundles with irregularly arranged, eosinophilic hyalinized collagen fibers, confirming the diagnosis of keloid.

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A: Pubic keloid



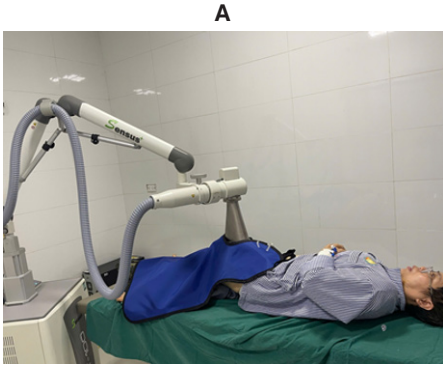
B : Keloidal collagen bundles within keloid tissue

Figure 1. Diagnosis of pubic keloid based on clinical and histopathological findings.

The patient underwent complete surgical excision of the pubic keloid with meticulous hemostasis and multilayer tension-reducing closure to minimize tension on the skin surface. Postoperatively, superficial radiotherapy was administered using the SRT-100 system (Sensus Healthcare, USA) with a total dose of 18 Gy delivered over 3 consecutive days, in accordance with radiation safety principles.



A



B

Figure 2. Illustration of the SRT-100 system (Sensus Healthcare, USA) (A) and the technique of superficial radiotherapy applied to the pubic region (B).

The patient was monitored postoperatively for general condition, including consciousness, hemodynamic and respiratory status, pain control (typically during the first 1–3 days), and received prophylactic antibiotics, anti-inflammatory agents, and anti-edema therapy. Local monitoring included assessment for seroma, hematoma, edema, wound infection, wound dehiscence, and radiation-related skin changes such as pigmentation changes or ulceration. Complete primary wound healing was achieved following surgery combined with superficial radiotherapy. Sutures were removed on postoperative day 14. Adjunctive therapies included corticosteroid tape, fractional laser therapy, and intralesional Triamcinolone injections. At 3-year follow-up, the scar size had markedly decreased from 20 × 10 cm to approximately 5 × 2 cm, with significant improvement in both JSS (Japan Scar Workshop Scar Scale) and POSAS (Patient and Observer Scar Assessment Scale) scores. The patient was satisfied with the treatment outcome.



Preoperative



Intraoperative



3-year follow-up

Figure 3. Treatment outcomes during follow-up.

Table 1. Clinical timeline of Case 1

Time	Clinical course and interventions	Outcomes
1980	Onset of pubic acneiform lesions, which progressively developed into painful and pruritic keloids.	No specific treatment was administered.
1980–2015	Multiple sessions of intralesional corticosteroid injections.	Poor response; the keloid continued to enlarge.

Time	Clinical course and interventions	Outcomes
~2015	Surgical excision followed by full-thickness skin grafting.	Rapid recurrence with recurrent purulent inflammation.
2015–2022	Persistent pain, pruritus, difficulty with genital hygiene, and recurrent infections, leading to significant psychological distress.	Intermittent antidepressant therapy was required.
2022	Admission to Le Huu Trac National Burn Hospital. A 20 × 10 cm pubic keloid covering the labia majora was identified; histopathological findings were consistent with keloid.	Diagnosis of severe recurrent pubic keloid was established.
02/2022	Complete excision of the lesion with multilayer tension-reducing closure using the Ogawa technique.	Favorable primary wound healing.
Postoperative days 1–3	Early postoperative superficial radiotherapy using SRT-100 with a total dose of 18 Gy.	No significant radiation-related complications were observed.
Postoperative day 14	Suture removal followed by adjunctive corticosteroid tape, fractional laser therapy, and intralesional Triamcinolone injections.	Complete wound healing without infection or wound dehiscence.
2022–2025	Regular follow-up for 3 years.	Scar size decreased to approximately 5 × 2 cm, with resolution of pain and pruritus, marked improvement in JSS/POSAS scores, and high patient satisfaction.

2.2. Case 2

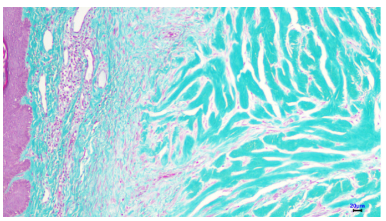
A 50-year-old woman with an otherwise unremarkable medical history and no family history of keloids presented with a 35-year history of pubic keloids. The lesions initially developed from inflammatory acneiform eruptions and progressively enlarged over time. The patient had undergone multiple sessions of intralesional corticosteroid injections and cryotherapy without significant improvement. Recurrent small abscesses with purulent discharge occasionally developed, causing considerable discomfort.

The patient underwent complete surgical excision of the keloid lesion. Local skin flaps at both wound edges were carefully undermined, followed by secure multilayer closure to minimize tension on the dermal and epidermal layers. Early postoperative superficial radiotherapy was administered with a total dose of 18 Gy. The wound healed uneventfully, and sutures were removed on postoperative day 14.

At the 2-year follow-up, the patient reported complete resolution of pruritus and was satisfied with the treatment outcome. However, mild scar elevation persisted in several areas compared with the surrounding normal skin. The patient continued maintenance therapy with silicone gel, corticosteroid-containing scar tape, and regular follow-up visits for long-term scar control.



A: Pubic keloid



B: Masson's trichrome staining (×100) demonstrating dark blue keloidal collagen bundles within the keloid tissue.



C: Surgical excision and wound closure



D: Clinical outcome at 2-year follow-up

Figure 4. Clinical course and treatment follow-up of the patient

Table 2. Clinical timeline of Case 2

Time	Clinical course and interventions	Outcomes
Approximately 35 years before presentation	Onset of inflammatory acneiform lesions in the pubic region, which progressively developed into extensive keloids. The patient had an unremarkable medical history and no family history of keloids.	Progressive enlargement of the lesions with persistent discomfort.
Several years before admission	Multiple sessions of conservative treatment with intralesional corticosteroid injections and cryotherapy. Recurrent small abscesses with purulent discharge occasionally occurred.	Poor response; the keloid continued to progress.
At admission	Clinical examination revealed a large pubic keloid. Masson's trichrome staining demonstrated characteristic keloidal collagen bundles.	Diagnosis of recurrent pubic keloid was confirmed.
At surgery	Complete excision of the keloid lesion was performed, followed by undermining of the local skin flaps and multilayer wound closure to reduce tension on the dermis and epidermis.	Adequate wound closure with good perfusion of the wound edges.
Postoperative days 1–3	Early postoperative superficial radiotherapy with a total dose of 18 Gy.	No significant radiation-related complications were observed.
Postoperative day 14	Favorable wound healing and suture removal.	No infection or wound dehiscence.
Follow-up at 2 years	Continued use of silicone gel, corticosteroid-containing scar tape, and regular follow-up visits.	Resolution of pruritus with high patient satisfaction; mild residual scar elevation persisted in several areas without further progression.

3. DISCUSSION

Keloids, particularly those occurring in the pubic region, are not merely cosmetic disorders but may profoundly affect physical health, psychological well-being, and social functioning. In addition to symptoms such as pruritus, pain, burning sensation, and tightness, the thick and rigid scar tissue may cause discomfort during walking, standing, and sitting. Furthermore, the pubic region is characterized by relatively thick skin containing abundant hair follicles and sebaceous glands, and is constantly exposed to a moist environment that predisposes to recurrent inflammation, delayed wound healing, and perikeloidal infection. Repeated mechanical irritation caused by clothing friction, hair removal procedures, or inappropriate cleansing products may further trigger recurrence [7].

An important but often underreported issue is the negative impact of pubic keloids on sexual activity and intimate relationships. The bulky and painful lesions may restrict skin mobility during intercourse, reduce sexual satisfaction, and lead to avoidance of sexual activity, marital difficulties, and psychological distress, including depression in severe cases. Many patients tend to conceal the disease because of embarrassment and therefore delay seeking medical attention for years or even decades until the lesions become extensive or repeatedly recur [8].

Intralesional therapy alone may temporarily suppress inflammation but cannot completely eliminate keloid tissue, resulting in a high recurrence rate. In addition, intralesional injection in the pubic region is technically challenging because of the limited anatomical space, high sensitivity, and presence of hair follicles and sebaceous glands. Patients often experience significant pain, making uniform injection throughout the lesion difficult. Local adverse effects, including tissue atrophy and infection, may further reduce treatment adherence [6].

Surgical excision alone is associated with recurrence rates ranging from 45% to 100%, particularly when tension-reducing techniques are not applied [4]. Pedicled flap reconstruction is not always an optimal option for pubic keloids because bulky flaps may distort the contour of the pubic region and create additional donor-site scars [3]. Similarly, although skin grafting may achieve wound coverage, the grafted area lacks hair follicles and may undergo secondary contracture, thereby adversely affecting cosmetic outcomes and psychological well-being. In addition, donor-site keloid formation remains a significant concern [8].

Postoperative radiotherapy plays a key role in keloid management by suppressing fibroblasts, inflammatory cells, and vascular endothelial cells, thereby reducing collagen synthesis and deposition and promoting normal wound healing. Many clinicians remain concerned about the safety and potential adverse effects of radiotherapy when applied to the pubic region. However, the SRT-100 superficial radiotherapy system delivers radiation only to the superficial skin layers, with a penetration depth of less than 5 mm [5]. According to Ogawa et al., when the biologically effective dose (BED) exceeds 30 Gy, the recurrence rate decreases to below 10%. Moreover, the risk of radiation-induced secondary malignancy remains very low, estimated at approximately 0.0335% (1 in 3,000 patients), which is considered clinically acceptable when patients are adequately counseled regarding the benefits and risks of treatment [9].

To minimize wound tension, we adopted the multilayer tension-reducing closure technique proposed by Ogawa, using slowly absorbable sutures for deep closure and Nylon 6-0 or 7-0 sutures for dermal and epidermal approximation [10]. We also suggest the development of customized compression garments or silicone-lined underwear specifically designed for pubic scars, as such products are currently unavailable in Vietnam. Continuous postoperative use of silicone gel or corticosteroid-containing scar tape may further optimize scar control. Regular follow-up visits are essential for early detection and timely management of recurrence.

In summary, patient education and early detection play important roles in the prevention and management of pubic keloids. Surgical excision combined with early postoperative superficial radiotherapy remains the cornerstone of treatment for reducing recurrence risk. In addition, appropriate genital hygiene, silicone gel, compression therapy, and long-term follow-up may contribute to improved treatment outcomes. Beyond conventional therapies, emerging biologic approaches targeting IL-4, IL-13, TGF-β, and PDGF pathways may represent promising future strategies for keloid management.

4. CONCLUSION

Surgical excision combined with early postoperative superficial radiation therapy achieved favorable wound healing and substantial improvement in clinical symptoms and scar appearance during long-term follow-up. This combined approach may reduce recurrence risk and improve quality of life in patients with recurrent pubic keloids. Comprehensive postoperative management, including silicone gel, topical corticosteroids, and regular follow-up, plays an important role in optimizing treatment outcomes.

Patient Consent for Publication

The patients received a full explanation regarding the purpose of this case report and provided written informed consent for publication of the clinical information and accompanying images. All personal information was anonymized and kept confidential throughout the publication process.

Conflict of Interest

The authors declare no conflicts of interest related to this study.

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