CASE REPORT

Bilateral Single-Curvilinear Inguinal Incisions in Advanced Penile Cancer: A Novel Approach to Inguinal and Pelvic Lymphadenectomy

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Background: Penile squamous cell carcinoma (SCC) is rare in high-income regions but remains a significant oncologic burden worldwide. Nodal involvement is the most important prognostic factor, and early identification is critical.
The Case: A 56-year-old circumcised male presented with a six-month history of a progressively enlarging, foul-smelling fungating penile mass and bilateral inguinal lymphadenopathy. Biopsy confirmed moderately differentiated SCC. Imaging showed large bilateral inguinal nodal disease without distant metastasis. Laboratory findings revealed leukocytosis, thrombocytosis, and mildly deranged coagulation parameters. The patient underwent total penectomy with perineal urethrostomy, followed by bilateral inguinal and pelvic lymph node dissection through single-curvilinear incisions. Frozen-section analysis confirmed extensive bilateral nodal metastasis. Postoperatively, a localized left inguinal surgical site infection was treated conservatively. He was discharged on postoperative day seven with drains in situ and was recommended adjuvant chemoradiotherapy in accordance with NCCN Guidelines.
Conclusion: This case highlights the challenges of managing advanced penile SCC with bulky bilateral inguinal metastasis and demonstrates the utility of single-curvilinear inguinal incisions for comprehensive lymphadenectomy. Early recognition, accurate staging, and guideline-based multimodal treatment remain essential for optimizing outcomes.

Key words: Penile squamous cell carcinoma, inguinal lymphadenopathy, total penectomy, inguinal lymph node dissection, pelvic lymph node dissection.

Introduction

Penile cancer accounts for approximately 0.4–0.6% of male malignancies in North America and Europe, with regional prevalence reaching up to 10% in parts of Asia, Africa, and South America.[1] In 2020, the age-standardized global incidence and mortality rates were 0.80 and 0.29 per 100,000, respectively, corresponding to an estimated 36,000 new cases and 13,000 deaths worldwide.[2] The disease predominantly affects older men, with incidence peaking during the sixth decade of life.[3]

Socioeconomic disparities substantially influence disease burden. Patients in low-income regions commonly present with advanced disease due to limited access to healthcare, inadequate screening, and cultural stigma related to genital examination.[4] Delayed consultation often occurring months to years after symptom onset is observed in up to 50% of cases and contributes to the high rate of nodal involvement at diagnosis.[5] Established risk factors for penile cancer include poor genital hygiene, phimosis, tobacco use, obesity, and oncogenic HPV infection, while neonatal

circumcision provides protection by reducing smegma-associated chronic inflammation.[6,7]

HPV-related tumors, particularly those driven by HPV-16, account for 30–50% of cases and are typically of basaloid or warty histology. These variants exhibit distinct molecular characteristics and may have a slightly better prognosis compared with HPV-negative keratinizing subtypes.[8]

Clinically, penile carcinoma often begins as a localized lesion with potential extension into the glans, shaft, and corpora cavernosa. Flat, ulcerative tumors demonstrate earlier nodal dissemination and poorer five-year survival compared with papillary or exophytic lesions. Despite a clinically normal inguinal examination, 20–25% of patients harbor occult metastasis, emphasizing the need for accurate nodal staging.[9] Metastatic spread typically follows a predictable sequence involving the superficial inguinal, deep inguinal, and subsequently pelvic lymph nodes, including the external iliac, internal iliac, and obturator groups.[10] Nodal involvement remains the most important prognostic factor in penile cancer.

Negative FNAC in the context of persistent clinical suspicion should prompt repeat aspiration or consideration of excisional biopsy. While limited nodal disease may still be curable, extra nodal extension and pelvic metastasis are associated with markedly poorer outcomes.[11-13] Inguinal lymphadenectomy offers potential cure in appropriately selected patients but is associated with substantial morbidity, with reported complication rates of 30–50%, including wound breakdown, lymphedema, and lymphocele formation.[14]

Contemporary guidelines recommend fine-needle aspiration cytology (FNAC) rather than empirical antibiotic therapy for evaluating palpable inguinal nodes, with FNAC endorsed as the preferred first-line staging modality (ASCO–EAU 2024). Ultrasound-guided FNAC further enhances diagnostic accuracy, achieving near-100% specificity, although sensitivity for detecting micrometastases remains limited.[15]

This report describes a case of penile squamous cell carcinoma presenting with bulky bilateral inguinal lymphadenopathy, managed through total penectomy with perineal urethrostomy and bilateral pelvic and inguinal lymph node dissection performed via bilateral single-curvilinear inguinal incisions.

The Case

A 56-year-old circumcised male presented with a six-month history of a progressively enlarging, foul-smelling fungating penile mass associated with increasing pain and bilateral inguinal swelling. He reported having more than ten previous female sexual partners but denied any history of sexually transmitted infections. Physical examination revealed an ulceroinfiltrative lesion involving the glans and proximal shaft, accompanied by firm, fixed, bulky inguinal lymphadenopathy, more pronounced on the left (Figure 1).

Incisional biopsy of the primary lesion confirmed squamous cell carcinoma, whereas ultrasound-guided core biopsy of the inguinal lymph nodes was inconclusive.

Figure 1. Fungating ulceroinfiltrative penile mass involving the glans and penile shaft associated with bulky bilateral inguinal lymph adenopathy.

Laboratory results showed leukocytosis, thrombocytosis, and mildly deranged coagulation parameters, all of which were medically optimized prior to surgery. Contrast-enhanced abdominopelvic and chest CT imaging revealed bilateral inguinal lymphadenopathies (Figure 2), measuring 9cm × 6cm on the left and 4cm × 2cm on the right, with no evidence of pelvic or distant metastasis. Renal and hepatic function tests were within acceptable perioperative limits. Following multidisciplinary

tumor board discussion, definitive surgical management was recommended.

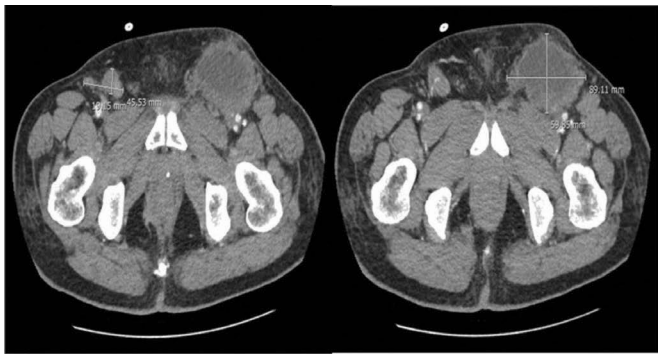

Figure 2. Contrast-enhanced abdominopelvic CT scan demonstrating bilateral inguinal lymphadenopathies measuring 9cm x 6cm on the left and 4cm x 2cm on the right with no radiologic evidence of distant metastasis.

Surgical Technique

The patient underwent total penectomy with perineal urethrostomy, followed by bilateral inguinal and pelvic lymph node dissection. Adequate exposure of both the superficial and deep inguinal nodal basins was achieved through bilateral single-curvilinear inguinal incisions (Figure 3), which also permitted superior extension for access to pelvic lymphatic drainage pathways.

Intraoperative frozen-section analysis demonstrated metastatic carcinoma in five of six (5/6) left inguinal lymph nodes and two of five (2/5) right lymph nodes, prompting immediate bilateral pelvic lymph node dissection through the same incisions.

The procedure was carried out with the dissection planes clearly exposed the femoral artery and vein, saphenous vein, and the iliac vessels within the pelvic field (Figure 4), allowing safe and systematic retrieval of nodal tissue while preserving critical vascular structures. Upon completion of lymphadenectomy, bilateral inguinal Jackson-Pratt (JP) drains were placed to reduce the risk of postoperative seroma and lymphocele formation. Graduated compression stockings were applied to minimize the risk of venous thromboembolism, given the extensive inguinal and pelvic dissection The total operative time was 7 hours, with an estimated blood loss of 0.5 L, and no intraoperative complications were encountered.

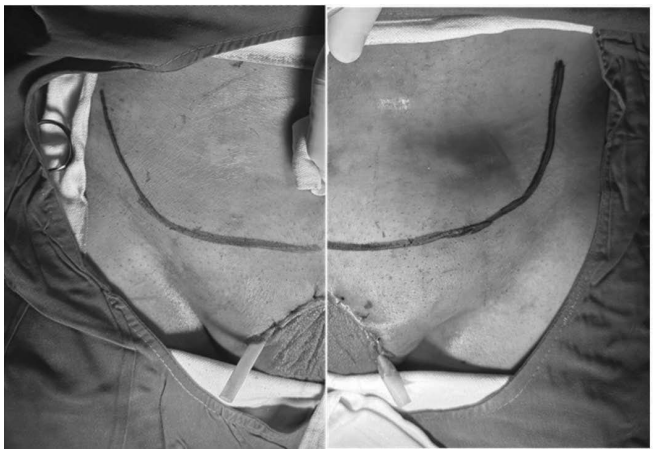

Figure 3. Intraoperative view illustrating bilateral single-curvilinear inguinal incisions used to access superficial, deep inguinal nodal basins. This approach permits superior extension toward the pelvic lymphatic drainage pathways when pelvic lymph node dissection is required.

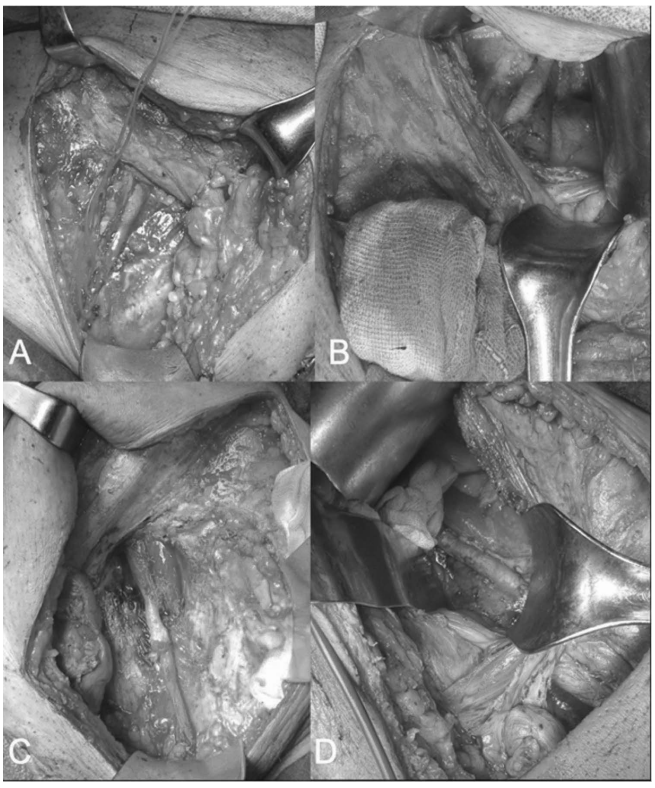

Figure 4. Intraoperative images demonstrating bilateral inguinal and pelvic lymph node dissections with clear exposure of major vascular structures. A. Right inguinal lymph node dissection showing the femoral artery, femoral vein, and saphenous vein. B. Right pelvic lymph node dissection illustrating the external and internal iliac vessels during nodal clearance. C. Left inguinal lymph node dissection demonstrating the femoral vessels and saphenous vein. D. Left pelvic lymph node dissection revealing the iliac vessels.

Postoperative Course

The patient recovered in the surgical ward, where early mobilization and drain monitoring were initiated. The perineal urethrostomy catheter was removed on postoperative day 5, following confirmation of adequate healing and patency.

On day five post-op, SSI was noted presenting with erythema, mild purulent discharge, and localized tenderness. There was no systemic involvement. The SSI was managed conservatively with wound irrigation, daily dressing changes, and culture-directed oral antibiotics, resulting in progressive clinical improvement. He was discharged on 7th post-op day with bilateral JP drains in situ, provided with detailed drain-care instructions and scheduled for close outpatient follow-up for wound evaluation and drain output assessment.

In accordance with NCCN Guidelines for penile cancer, the patient was counseled regarding the need for adjuvant chemoradiotherapy due to bilateral nodal metastasis and high-risk pathological features.

Discussion

Penile squamous cell carcinoma is aggressive when presenting with bulky nodal metastasis. FNAC remains first-line for palpable nodes, but false-negatives occur, particularly in necrotic nodes. Surgery remains the cornerstone for nodal control in advanced disease, while pelvic lymphadenectomy is indicated when multiple inguinal nodes are positive. The single-curvilinear incision allowed effective en bloc dissection while preserving vascular integrity.

Postoperative complications, particularly SSI, are common following groin dissections; conservative management is often effective in localized infections. Due to bilateral nodal disease, adjuvant chemoradiotherapy was recommended, consistent with NCCN guidelines supporting multimodal therapy in high-risk cases.

Conclusion

This case illustrates the complexity of managing advanced penile SCC with bulky bilateral nodal metastasis. Early recognition, accurate staging, and guideline-driven multimodal therapy remain essential. Bilateral single-curvilinear incisions provided safe and effective access for comprehensive lymphadenectomy. The patient was appropriately counseled for adjuvant chemoradiotherapy based on high-risk pathological features.

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