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Penile Preservation in a Young Adult with Aggressive Spindle Cell Carcinoma: A Case of Wide Local Excision and Glanular Reconstruction in a Resource-Limited Setting

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A B S T R A C T

Penile sarcomatoid squamous cell carcinoma, also known as spindle cell carcinoma, is a rare and aggressive malignancy characterized by biphasic histology. Its management in young adults under 40 years of age is challenging, particularly in resource-limited settings where advanced diagnostic adjuncts like immunohistochemistry are often unavailable, necessitating reliance on morphological diagnosis and clinical acumen. We report the case of a 36-year-old uncircumcised male presenting with a rapidly growing, 2.5 cm exophytic glanular mass (cT2N0M0). Diagnostic workup relied on clinical assessment and morphological evaluation to rule out differentials, as immunohistochemical markers were unavailable. The patient underwent penile-sparing wide local excision (WLE) with intraoperative frozen section control (5 mm margins) and primary glanular reconstruction. Due to the high-grade histology and resource constraints preventing dynamic sentinel node biopsy, the patient was managed with a strict active surveillance protocol for the inguinal basin. Histopathology using Hematoxylin and Eosin (H&E) staining confirmed a high-grade malignancy with a predominant population of atypical spindle cells arranged in fascicles, consistent with Spindle Cell Carcinoma. Deep and lateral margins were negative. At 12-month follow-up, the patient remains disease-free with no evidence of local recurrence or inguinal lymphadenopathy. The International Index of Erectile Function (IIEF-5) score remained stable (23/25), indicating excellent functional preservation. In conclusion, penile preservation via WLE is a viable option for selected cases of Spindle Cell Carcinoma. In resource-limited settings where immunohistochemistry is inaccessible, accurate diagnosis relies on identifying characteristic morphological features on H&E staining combined with clinical history. Strict surveillance is mandatory to monitor for nodal progression in the absence of invasive staging.

1. Introduction

Penile squamous cell carcinoma (PSCC) represents a distinctive and complex malignancy within the genitourinary spectrum. Globally, it is considered a rare entity, accounting for significantly less than 1% of all malignancies in men within North America and Europe.[1] However, this statistical rarity in the developed world obscures a significant public health burden in developing nations, particularly across parts of Asia, Africa, and South America. In these regions, penile cancer is not merely a medical outlier but a prevalent condition deeply intertwined with socioeconomic determinants.[2] Incidence rates in these low-to-middle-income settings correlate strongly with lower socioeconomic status, limited access to preventative healthcare, and, most notably, the

prevalence of uncircumcised status in the population. The disparity in global incidence underscores the preventable nature of the disease, as neonatal circumcision has been established as a robust protective factor.[3] Conversely, in populations where circumcision is not routinely performed, the accumulation of smegma and the subsequent chronic inflammatory state—often exacerbated by phimosis—act as potent promoters of carcinogenesis. While the global incidence remains low, specific epidemiological pockets reveal alarming deviations from the norm. For instance, rural provinces in Indonesia, such as Bali, report age-standardized incidence rates as high as 2.1 per 100,000 men. This figure, significantly higher than the national average, suggests a distinct interplay of regional risk factors, potentially including cultural practices, hygiene standards, and varying prevalence of human papillomavirus (HPV) infection.[4]

The overwhelming majority of penile malignancies, approximately 95%, are squamous cell carcinomas (SCC) originating from the squamous epithelium of the glans or prepuce. However, penile SCC is not a monolithic entity; rather, it comprises a heterogeneous spectrum of histological subtypes with widely varying biological behaviors. These range from the indolent, low-risk verrucous carcinoma, which rarely metastasizes, to high-grade, biologically aggressive variants that pose an immediate threat to life.[5] Among these high-risk subtypes, sarcomatoid squamous cell carcinoma—interchangeably referred to as spindle cell carcinoma—represents the most aggressive and least common variant, accounting for merely 1% to 6% of all penile cancer cases. This variant poses a profound diagnostic and therapeutic challenge due to its unique biphasic histology. The tumor is characterized by the coexistence of a conventional dysplastic squamous epithelial component and a malignant mesenchymal spindle cell component. The presence of these spindle cells often mimics true mesenchymal sarcomas, such as leiomyosarcoma or fibrosarcoma, creating a significant diagnostic dilemma for pathologists, particularly when analyzing small biopsy specimens. The biological driver of this morphological plasticity is a complex molecular program known as epithelial-mesenchymal transition (EMT). In this process, polarized, differentiated epithelial cells undergo profound biochemical changes: they lose their cell-cell adhesion properties (classically associated with the downregulation of E-cadherin) and acquire a mesenchymal phenotype (associated with the upregulation of Vimentin). This transition is not merely cosmetic; it fundamentally alters the tumor's behavior. By shedding their epithelial constraints, these cells gain enhanced migratory capacity, invasiveness, and resistance to apoptosis, explaining the variant's propensity for rapid local invasion and early metastasis.

The classic demographic profile for penile carcinoma involves men in the sixth to eighth decades of life, with a median age of diagnosis falling between 50 and 70 years. Consequently, the presentation of a high-grade penile malignancy in a young adult under the age of 40 is an exceptional clinical entity, often termed the young patient paradox. The occurrence of such an aggressive tumor in a young male presents a unique set of challenges that extends beyond oncology into the realms of psychology and sexual function. In this demographic, the management necessitates a delicate and often difficult balance between ensuring oncological radicality and preserving quality of life. The psychological impact of traditional radical treatments, such as partial or total penectomy, is profound in young, sexually active men. The loss of the organ is frequently associated with severe psychosexual dysfunction, body dysmorphia, loss of libido, and major depressive disorders.[6] For a 36-year-old patient, the prospect of penile amputation is not viewed merely as a treatment but often as a catastrophic mutilation that threatens their identity and intimate relationships.

Historically, the surgical dogma for invasive penile cancer favored radicality; partial or total penectomy was the unquestioned standard of care to ensure clear margins. However, recognizing the immense psychological burden of these procedures, the paradigm in modern urologic oncology has gradually

shifted towards organ-sparing approaches. Techniques such as glansectomy, glans resurfacing, and wide local excision (WLE) with reconstruction are now increasingly employed, even in invasive cases.[7] The rationale is that if a negative surgical margin can be secured—current consensus suggesting that margins as tight as 3 to 5 mm are safe—the oncological outcomes are equivalent to penectomy, while the functional outcomes are vastly superior. However, applying this organ-sparing philosophy to the Spindle Cell variant remains controversial. Given the tumor's aggressive biology and tendency for deep infiltration via EMT, many surgeons fear that limited excision may lead to high recurrence rates. The decision to attempt penile preservation in a young patient with such a high-risk tumor requires a nuanced risk-benefit analysis, weighing the potential for local recurrence against the certainty of psychosexual morbidity.

The management of such complex cases is significantly complicated when they present in resource-limited settings. Modern oncological guidelines, such as those from the European Association of Urology (EAU), rely heavily on advanced diagnostic and staging modalities that may not be universally accessible.[8] The gold standard for diagnosing spindle cell variants involves a robust panel of immunohistochemical (IHC) markers to differentiate them from true sarcomas and melanoma. These markers confirm the co-expression of epithelial (cytokeratin) and mesenchymal (vimentin) antigens. In peripheral or resource-constrained facilities where IHC is unavailable due to cost or logistical barriers, pathologists face a daunting task. They must rely on Hematoxylin and Eosin (H&E) morphology—identifying the transition zone between squamous and spindle cells—and clinical history to formulate a diagnosis. This reliance on morphological diagnosis places a premium on clinical acumen and the identification of risk factors (such as phimosis) that favor a carcinoma origin over a sarcoma.[9]

Furthermore, the management of the inguinal lymph node basin—the single most important prognostic factor in penile cancer—presents a critical hurdle. For high-grade T2 tumors, guidelines mandate invasive staging via Dynamic Sentinel Node Biopsy (DSNB) or Modified Inguinal Lymph Node Dissection (mILND) to detect occult micrometastases. In many developing regions, the technology for DSNB (gamma probes, radiotracers) is often lacking. Additionally, patients frequently refuse prophylactic dissection due to the fear of morbidity, specifically disabling lymphedema. This leaves clinicians to rely on strict active surveillance protocols, a strategy that carries its own risks but is often the only viable option in the context of patient autonomy and resource limitations.[10]

This study aims to report the rare occurrence of an aggressive spindle cell carcinoma in a 36-year-old male—significantly younger than the median age of diagnosis—and to evaluate the feasibility of penile preservation surgery using Wide Local Excision with glanular reconstruction in a resource-limited setting. Unlike previous reports that focus heavily on the immunophenotypic profile of such tumors, this manuscript addresses the pragmatic reality of managing complex oncology in developing nations. We discuss the specific challenges of diagnosing this aggressive variant based purely on morphological features in the absence of immunohistochemistry and address the safety and ethical considerations of surveillance strategies for the inguinal lymph nodes when invasive staging is not performed. This case highlights the critical intersection of aggressive tumor biology, the imperative for functional preservation in young oncology patients, and the adaptive strategies required when optimal resources are constrained.

2. Case Presentation

A 36-year-old male presented to the Department of Urologic Oncology at Dr. Moewardi Regional General Hospital, Surakarta, Indonesia, with a chief complaint of a rapidly enlarging, painless mass on the distal penis. The patient noted that the lesion began as a small, indurated nodule six months prior to presentation. Over the preceding eight weeks, the mass exhibited an exponential growth phase,

becoming exophytic and prone to contact bleeding. The patient reported localized pruritus but denied dysuria, hematuria, or obstructive voiding symptoms. Systemic review was negative for fever, night sweats, or unintentional weight loss. The patient was uncircumcised with a history of phimosis since adolescence. He admitted to poor local hygiene, leading to chronic smegma accumulation and recurrent episodes of balanoposthitis. He was a non-smoker and denied a history of high-risk sexual behavior or prior sexually transmitted infections.

On general examination, the patient had a Karnofsky performance status of 100%. Vital signs were within normal limits. Local examination revealed a 2.5 cm x 2.0 cm exophytic, irregular mass originating from the dorsal aspect of the glans penis. The tumor surface was ulcerated with areas of necrosis (Figure 1). The lesion was firm and fixed to the underlying glans stroma, but crucially, palpation suggested mobility over the corporal bodies. The external urethral meatus was patent and uninvolved. Inguinal examination revealed a singular, palpable, mobile lymph node (approximately 1.0 cm) in the right inguinal region. The left inguinal basin was clinically negative.

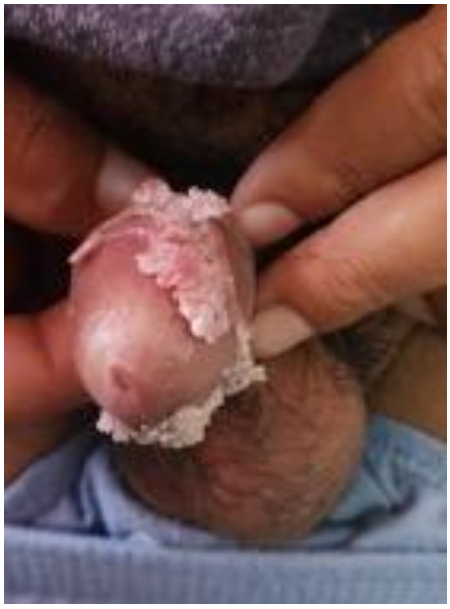

Figure 1. Clinical appearance of penile tumor on admission.

Laboratory investigations demonstrated a mild microcytic anemia (Hemoglobin 11.7 g/dL) likely secondary to chronic inflammation and minor tumor hemorrhage. Renal and liver function panels were unremarkable. To address the aggressive nature of the suspected malignancy and rule out distant metastasis with higher sensitivity than plain radiography, a contrast-enhanced computerized tomography (CECT) of the chest, abdomen, and pelvis was performed. Thoracic CECT showed no evidence of pulmonary nodules or mediastinal lymphadenopathy. Abdominopelvic CECT showed no retroperitoneal lymphadenopathy or visceral metastasis. The inguinal lymph nodes were visualized but did not meet radiological criteria for malignancy (short axis under 10mm, fatty hilum preserved), suggesting the palpable right node was likely reactive. Based on the clinical and radiological findings, the tumor was staged as cT2N0M0 (Stage IIA). The classification of cT2 was assigned due to the clinical suspicion of invasion into the corpus spongiosum (glans stroma).

Table 1. Summary of Clinical Findings on Admission

PARAMETER	CLINICAL FINDING / DESCRIPTION
1. Patient Profile & Demographics	
Age / Gender	36 Years Old / Male
Chief Complaint	Rapidly enlarging, painless mass on distal penis (6 months duration)
Predisposing Risk Factors	Uncircumcised status, History of phimosis, Poor local hygiene (chronic smegma accumulation)
2. General Physical Assessment	
General Condition	Well-nourished, Alert (Karnofsky Performance Status: 100%)
Vital Signs	BP: 132/78 mmHg | HR: 84 bpm | RR: 18/min | Temp: 36.4°C
Systemic Signs	Negative for fever, night sweats, or unintentional weight loss
3. Local Examination (Genitalia)	
Tumor Location	Dorsal aspect of Glans Penis
Tumor Dimensions	2.5 cm x 2.0 cm
Morphology	Exophytic, irregular, ulcerated surface with necrotic areas; fragile (contact bleeding)
Infiltration/Mobility	Firm consistency; fixed to glans stroma but mobile over corporal bodies; Urethral meatus patent and uninvolved
4. Regional Lymph Node Examination	
Right Inguinal Region	Single palpable node (~1.0 cm), mobile, non-tender
Left Inguinal Region	No palpable lymphadenopathy
5. Laboratory & Radiological Investigations	
Hematology	**Hemoglobin: 11.7 g/dL (Mild Microcytic Anemia)**; WBC: 7,600/uL; Plt: 279,000/uL
Biochemistry	Renal Function: Normal (Creatinine 1.1 mg/dL); Liver Function: Unremarkable
Imaging (CECT Chest/Abd/Pelvis)	**Thorax:** Clear lung fields (No metastasis). **Abdomen/Pelvis:** No retroperitoneal adenopathy. **Inguinal:** Nodes <10mm with preserved fatty hilum (Radiologically Benign).
6. Clinical Staging (AJCC 8th Ed.)	
TNM Classification	**cT2 N0 M0** (Stage IIA)

Abbreviations: BP = Blood Pressure; HR = Heart Rate; CECT = Contrast-Enhanced Computerized Tomography; WBC = White Blood Cell; cT2 = Clinical Tumor Stage 2 (Invasion of corpus spongiosum).

The patient was counseled extensively regarding the aggressive nature of the tumor. While partial penectomy was offered as the standard oncological option, the patient strongly refused radical amputation due to psychosexual concerns. A shared decision was made to proceed with a penile-sparing wide local excision (WLE) with intraoperative margin control, followed by glanular reconstruction. Under spinal anesthesia, a circumferential incision was marked on the glans epithelium. Unlike radical penectomy, where margins are measured in centimeters, a 5 mm oncological margin was measured from the visible tumor edge, a standard accepted for glans-sparing surgery. The tumor was dissected sharply off the glans stroma. The specimen was oriented and sent for frozen section analysis. The pathologist confirmed negative deep and lateral margins, ensuring complete excision of the malignant tissue while sparing the underlying corpus cavernosum and urethra. Following excision, the defect on the glans was substantial. A glanuloplasty was performed using primary closure with mobilization of the remaining glans wings to restore the conical shape of the penis. A 16Fr Foley catheter was placed to stent the urethra (Table 2).

Given the high-grade clinical presentation (cT2), the risk of occult micrometastasis was estimated at over 25%. The EAU guidelines recommend modified inguinal lymph node dissection (mILND) or dynamic sentinel node biopsy (DSNB). However, due to limited surgical resources for DSNB and the patient's refusal of extensive open inguinal dissection, citing fear of lymphedema complications, an invasive nodal intervention was not performed. Consequently, a strict active surveillance protocol was instituted, consisting of a high-resolution inguinal ultrasound every 3 months for the first two years. In the absence of immunohistochemical staining facilities, the diagnosis relied on high-quality hematoxylin and eosin (H&E) morphology combined with strong clinical correlation. The resected specimen revealed an ulcerated tumor with a biphasic appearance. H&E staining showed nests of atypical squamous cells transitioning into a predominant population of malignant spindle cells arranged in interlacing fascicles. The spindle component exhibited marked pleomorphism, hyperchromatic nuclei, and frequent mitoses (over 10 per 10 HPF). Extensive areas of tumor necrosis were observed, a hallmark of high-grade malignancy. While primary sarcomas (leiomyosarcoma, fibrosarcoma) are histological differentials, they are exceptionally rare in the penis. The presence of a transition zone from dysplastic squamous epithelium to spindle cells, combined with the patient's significant risk factors for carcinoma (uncircumcised status, chronic phimosis, smegma), strongly favored the diagnosis of a sarcomatoid variant of squamous cell carcinoma over a primary mesenchymal tumor. The final diagnosis in this patient was high-grade sarcomatoid (spindle cell) squamous cell carcinoma, pT2, margins negative.

The patient was discharged on postoperative day 2. At 12 months follow-up, the patient remains disease-free. No local recurrence observed. Serial inguinal ultrasounds at 3, 6, 9, and 12 months have shown no suspicious lymphadenopathy. The patient reports a satisfactory urinary stream. The cosmetic result is acceptable with a preserved glans contour. The International Index of Erectile Function (IIEF-5) score is 23 (no erectile dysfunction), confirming the success of the functional preservation strategy.

3. Discussion

Penile carcinoma is classically described as a malignancy of the geriatric population, with epidemiological data consistently placing the peak incidence in the sixth to eighth decades of life.[11] In Indonesia, national registries mirror global trends, with the highest age-specific incidence observed in men aged 65–76 years. Consequently, the presentation of a high-grade, aggressive malignancy in a 36-year-old male represents a profound deviation from the norm, constituting a clinical entity often referred to as the young patient paradox. This phenomenon is characterized not only by the

statistical rarity of the age group but also by the biological aggressiveness of the tumors encountered; younger patients frequently present with higher-grade lesions and a propensity for rapid progression that belies their robust immune competence (Figure 2).[12]

Table 2. Diagnosis, Treatment, Follow-up, and Outcome

CATEGORY	DETAILS / FINDINGS
1. Histopathological Diagnosis (H&E Morphology)	
Tumor Type	**Sarcomatoid Squamous Cell Carcinoma** (Spindle Cell Carcinoma)
Microscopic Features	Biphasic histology: Transition from dysplastic squamous epithelium to malignant spindle cells arranged in fascicles.
Tumor Grade	**High Grade (G3)**; Marked pleomorphism, frequent mitoses (>10/10 HPF), extensive necrosis.
Diagnostic Basis	Morphological identification of transition zones + Clinical history (Resource-limited setting: No IHC available).
2. Primary Surgical Treatment	
Procedure	Penile-Sparing Wide Local Excision (WLE)
Surgical Margins	**5 mm** gross margin from visible tumor edge.
Intraoperative Control	Frozen Section Analysis: **Negative** for deep and lateral margins.
Reconstruction	Primary Glanuloplasty (Mobilization of glans wings to restore conical shape).
3. Regional Lymph Node Management	
Intervention Strategy	**Strict Active Surveillance** (Patient declined invasive staging/Resource constraints).
Surveillance Protocol	High-Resolution Inguinal Ultrasound every 3 months.
Risk Stratification	High Risk (T2G3); Informed consent obtained regarding risk of occult micrometastasis.
4. 12-Month Follow-up & Outcomes	
Oncological Status	**Disease Free:** No local recurrence; No suspicious inguinal lymphadenopathy detected on serial ultrasound.
Sexual Function	**Preserved:** IIEF-5 Score = 23/25 (No Erectile Dysfunction).
Urinary Function	Satisfactory stream; No meatal stenosis.
Cosmetic Result	Acceptable glans contour; Patient reported high satisfaction.

Abbreviations: H&E = Hematoxylin and Eosin; HPF = High Power Field; IHC = Immunohistochemistry; IIEF-5 = International Index of Erectile Function (5-item).

Figure 2. The young patient paradox in this study.

In the context of resource-limited oncology, pinpointing the etiology becomes a crucial exercise in clinical deduction. Current molecular understanding of penile squamous cell carcinoma (SCC) delineates two distinct pathogenic pathways. The first is driven by high-risk human papillomavirus (HPV), particularly serotypes 16 and 18, which act through the viral oncoproteins E6 and E7 to disrupt cell cycle regulation. The second pathway is HPV-independent, driven instead by chronic inflammation, lichen

sclerosus, and precursor lesions such as differentiated penile intraepithelial neoplasia (dPeIN), often associated with p53 gene mutations. In our setting, the unavailability of p16 immunohistochemistry—a surrogate marker for HPV infection—prevented molecular subtyping. However, the patient's clinical history provided a vital surrogate for etiological classification. The patient was uncircumcised and had a long-standing history of phimosis and poor hygiene, leading to the chronic accumulation of smegma.[13] Smegma is not inherently carcinogenic, but its retention creates a microenvironment of chronic irritation and bacterial superinfection. This persistent inflammatory state promotes the release of reactive oxygen species and pro-inflammatory cytokines, which induce DNA damage and promote keratinocyte proliferation.[14] The chronic inflammation pathway is strongly associated with HPV-negative tumors, which historically carry a poorer prognosis than their viral counterparts. Thus, for the pathologist and clinician operating without advanced molecular diagnostics, the clinical profile of a young male with phimosis serves as a critical diagnostic clue: a spindle cell tumor in this context is statistically far more likely to be a dedifferentiated carcinoma driven by chronic irritation than a primary sarcoma.[15]

The defining histological feature of spindle cell carcinoma is its biphasic nature, characterized by the coexistence of recognizable squamous epithelial cells and a malignant spindle cell component.[16] This morphological plasticity is not merely a structural curiosity but the manifestation of a profound molecular reprogramming known as epithelial-mesenchymal transition (EMT). EMT is a fundamental biological process, essential during embryogenesis for tissue morphogenesis, but pathologically reactivated in cancer metastasis. In the context of this tumor, differentiated squamous epithelial cells, which are normally polarized and tightly adherent via E-cadherin-mediated junctions, undergo a phenotypic switch.[17] They downregulate epithelial markers (E-cadherin, desmoplakin) and upregulate mesenchymal markers (N-cadherin, vimentin, fibronectin). This molecular switch explains the aggressive biological behavior observed in our patient. Unlike classical SCC, which typically grows in cohesive nests or sheets that expand by pushing borders, cells undergoing EMT lose their cell-cell adhesion and acquire a migratory, fibroblast-like phenotype.[18]

This loss of cohesion facilitates the rapid infiltration of the subepithelial connective tissue and the corpus spongiosum, allowing individual tumor cells to dissect through collagen planes with ease. Furthermore, the acquisition of mesenchymal traits is often linked to the acquisition of stem-like properties, including resistance to apoptosis and anoikis (cell death induced by detachment from the extracellular matrix). This explains why spindle cell carcinoma is prone to early vascular invasion and metastasis, even when the primary tumor volume is relatively small.[19] In our case, the histopathological evaluation revealed extensive areas of necrosis. Necrosis in high-grade solid tumors is a hallmark of aggressive behavior; it indicates that the tumor's proliferative rate has outstripped its neovascular supply, leading to hypoxic cell death. This hypoxic environment often creates a feedback loop that further drives EMT and selects for the most aggressive, apoptosis-resistant cell clones. Thus, the microscopic finding of spindle cells combined with necrosis serves as a potent prognostic indicator, warning the clinician of a biology that requires immediate and decisive intervention.

The diagnosis of Sarcomatoid SCC presents a significant challenge in settings lacking immunohistochemistry (IHC). In well-resourced tertiary centers, the diagnostic algorithm involves a robust panel of markers: Cytokeratin and p63 to prove epithelial origin, Vimentin to confirm mesenchymal transition, and specific markers like S100, SMA, and Desmin to exclude melanoma and leiomyosarcoma, respectively. Without these immunophenotypic tools, the distinction between Spindle Cell Carcinoma and true primary sarcomas or amelanotic melanoma becomes a diagnosis of exclusion based heavily on morphology and probability.[20]

This diagnostic dilemma is not trivial; the therapeutic implications are vast. A primary sarcoma of the penis would necessitate a different staging approach and potentially doxorubicin-based chemotherapy, whereas sarcomatoid SCC is managed primarily as a high-grade carcinoma with taxane/platinum-based regimens. In the absence of IHC, we relied on the identification of a transition zone on Hematoxylin and Eosin (H&E) staining. This is the morphological smoking gun—areas where recognizable, dysplastic squamous components gradually merge into the spindle cell population. The identification of this zone confirms that the spindle cells are not a separate tumor entity but rather dedifferentiated epithelial cells. Furthermore, the concept of pre-test probability becomes a critical diagnostic tool. Primary sarcomas of the penis are exceptionally rare, accounting for a fraction of a percent of penile malignancies. In contrast, SCC is the overwhelming majority. When presented with a spindle cell tumor on the glans of an uncircumcised patient with a history of chronic inflammation, the probability of it being a dedifferentiated carcinoma is exponentially higher than it being a primary leiomyosarcoma. This underscores the importance of close communication between the urologic surgeon and the pathologist in low-resource environments. Clinical details—such as the patient's circumcision status and history of phimosis—often bridge the gap left by missing advanced diagnostics, allowing for a confident diagnosis based on the synthesis of clinical and morphological data.

Historically, the surgical management of invasive penile cancer was dictated by a dogma of radicality. For decades, partial or total penectomy was the unquestioned standard of care, particularly for aggressive variants like spindle cell SCC. The rationale was simple: the aggressive nature of the tumor demanded wide, geometric clearance to prevent local recurrence. However, this approach failed to account for the devastating psychosexual sequelae of penile amputation. For a young male in the prime of his life, the loss of the penis is not merely a physical disability but a catastrophic event leading to severe body dysmorphia, loss of sexual function, and profound psychological distress. The current consensus in urologic oncology has shifted towards organ-sparing approaches, driven by the realization that clearance does not necessarily require amputation. Wide local excision (WLE) has emerged as a safe and effective option for T1 and T2 lesions, provided that oncologically negative margins can be secured. A critical point of debate in the contemporary literature concerns the definition of an adequate margin. While classic teachings, such as the 2 cm rule, dominated the 20th century, modern pathological studies have demonstrated that penile SCC rarely extends more than a few millimeters beyond the visible tumor border in the microscopic plane. Consequently, recent guidelines suggest that closer margins of 3 to 5 mm are oncologically safe for glans-sparing surgery, provided that intraoperative frozen section analysis confirms the absence of tumor cells.[17,18]

In this case, the decision to proceed with WLE rather than partial penectomy was a calculated risk taken to preserve the patient's quality of life. We utilized a 5 mm margin controlled by intraoperative frozen sections. This surgical precision allowed for the complete resection of the tumor while preserving the structural integrity of the corpus cavernosum and the urethra. The subsequent reconstruction—glanuloplasty—restored the conical shape of the glans, allowing for a cosmetically acceptable result. The maintenance of the patient's International Index of Erectile Function (IIEF-5) score at 23/25 (indicating no erectile dysfunction) at the 12-month follow-up validates the functional benefit of this approach. It demonstrates that even in aggressive histological subtypes, organ preservation is feasible if executed with rigorous attention to surgical margins.

While the management of the primary tumor in this case was successful, the management of the inguinal lymph nodes remains the most contentious and illustrative aspect of providing oncology care in a developing nation. The status of the inguinal lymph nodes is the single most significant prognostic factor

in penile cancer; patients with nodal metastases have a survival rate that plummets below 50%, compared to >85% for node-negative patients. Current international guidelines, including those from the European Association of Urology (EAU) and the National Comprehensive Cancer Network (NCCN), are unequivocal: patients with tumor stages T1G3 (High Grade) or T2 are at high risk for occult micrometastases. The risk of harboring microscopic disease in clinically normal-feeling groins (cN0) in this demographic exceeds 25%. Therefore, the standard of care mandates invasive nodal staging via Dynamic sentinel node biopsy (DSNB) or modified inguinal lymph node dissection (mILND).

However, the application of these First World guidelines often collides with the realities of resource-limited settings. DSNB requires nuclear medicine facilities (technetium-99m sulfur colloid) and gamma probes, which are frequently unavailable in peripheral centers. Furthermore, mILND is a morbid procedure associated with high rates of complications, including wound dehiscence, skin flap necrosis, and, most notably, disabling lower limb lymphedema.

Our patient, constrained by personal choice regarding surgical morbidity, declined invasive nodal staging. This refusal presents a real-world ethical and clinical challenge: the conflict between guideline-adherent medicine and patient autonomy. In such scenarios, the clinician cannot simply abandon the patient. If the gold standard (invasive staging) is not feasible, the fallback strategy must be rigorous surveillance. We implemented a strict protocol of high-resolution inguinal ultrasound every 3 months. While ultrasound is less sensitive than DSNB for detecting microscopic deposits, it significantly improves sensitivity over palpation alone by identifying architectural changes in lymph nodes (such as loss of fatty hilum, cortical thickening) before they become palpable. The fact that the patient remains N0 at 12 months is encouraging, but it must be interpreted with caution. Literature suggests that the vast majority of nodal recurrences occur within the first two years post-surgery. Therefore, the surveillance must remain vigilant. This case underscores that while penile preservation is surgically feasible, the long-term oncological safety relies heavily on the management of the regional lymph nodes. The decision to forgo invasive staging introduces a risk of missing the window for curative lymphadenectomy should micrometastases be present.

The interpretation of this study must be tempered by its inherent limitations. First and foremost, as a single case report, the findings regarding the safety of WLE for spindle cell carcinoma cannot be generalized to all patients; it represents a proof of concept rather than high-level evidence. Secondly, the lack of immunohistochemical confirmation, while reflective of the resource-limited reality, introduces a degree of diagnostic uncertainty that would not exist in a fully equipped center. While the clinical and morphological evidence strongly supports the diagnosis, the absence of molecular markers is a limitation. Finally, the absence of invasive nodal staging represents a deviation from gold-standard guidelines. While this was driven by patient choice and resources, it introduces a risk of occult disease progression that requires continued, aggressive monitoring.[19,20]

4. Conclusion

The case of this 36-year-old male with spindle cell carcinoma of the penis serves as a potent illustration of the evolving complexities in modern urologic oncology, particularly when intersected with the constraints of resource-limited healthcare systems. First, it highlights the clinical imperative of recognizing the young patient paradox. Spindle cell carcinoma is a rare, aggressive entity characterized by epithelial-mesenchymal transition (EMT), a molecular mechanism that drives rapid invasion and necrosis. Clinicians must maintain a high index of suspicion when young men present with rapidly growing penile masses, even in the absence of traditional age-related risk factors. The association with chronic inflammation and phimosis in this case reinforces the need to view chronic dermatoses not merely as benign nuisances, but as potential carcinogenic incubators in

the uncircumcised population. Second, this report validates the feasibility of organ-sparing surgery. We have demonstrated that Wide Local Excision (WLE) with 5 mm margins is a viable primary treatment modality, even for high-grade histologies. By utilizing intraoperative frozen section control, we achieved negative oncological margins while preserving the glans penis. The excellent functional outcomes—preservation of sexual function and urinary patency—stand in stark contrast to the life-altering morbidity of radical penectomy. This supports a shift in surgical dogma: biology determines the prognosis, but anatomy should determine the reconstruction. Aggressive histology does not automatically mandate aggressive amputation if the tumor is geometrically localized. Third, the study elucidates diagnostic resilience in low-resource settings. In the absence of advanced immunohistochemistry, accurate diagnosis relies on the art of pathology—the meticulous identification of morphological clues such as the transition zone on H&E staining, synthesized with robust clinical risk assessment. This highlights the critical role of the surgeon-pathologist partnership in bridging the technology gap. Finally, and perhaps most critically, this case serves as a cautionary tale regarding nodal management. While local control was achieved, the management of the inguinal lymph nodes remains the primary determinant of long-term survival. The patient's refusal of invasive staging highlights a significant barrier to care. In such cases, strict, high-frequency radiological surveillance is not merely a follow-up routine; it is a life-saving safety net. In conclusion, the management of aggressive penile cancer in young adults is a balance of oncological rigidity and functional empathy. While resource limitations pose significant hurdles, they can be navigated through clinical acumen, surgical precision, and rigorous surveillance, allowing even patients with high-risk tumors the opportunity for survivorship with their physical and psychological integrity intact.

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