Solitary Fibrous Tumor of Penile Root: Case Report and Literature Review

Mohammed S. Al-Marhoon[1]* and Suad Al Jahdhami[2]

[1]Urology Division, Department of Surgery, Sultan Qaboos University Hospital, University Medical City, Muscat, Oman

[2]Department of Pathology, College of Medicine and Health Sciences, Sultan Qaboos University, Muscat, Oman

Received: 15 July 2024

Accepted: 22 October 2024

*Corresponding author: msalmarhoon@gmail.com; mmarhoon@squ.edu.om

DOI 10.5001/omj.2027.28

Abstract

Background: Solitary fibrous tumor (SFT) is a rare spindle-cell mesenchymal tumor of myofibroblastic origin. SFT of the penis is extremely rare with only four cases reported in the literature. We report the case of a 37-year-old man with a small, gradually enlarging, painless lesion at the right root of his penis, present for four months. Magnetic resonance imaging (MRI) showed 4 × 2.5 cm intensely enhancing heterogenous mass, arising from the soft tissue of right inferio-lateral penile root. The excision was performed through a perineal approach and histopathological examination confirmed the diagnosis of SFT. Although benign in nature, SFT can mimic malignant lesions like fibrosarcoma. Close follow up is recommended due to the possibility of local or distant recurrence. We have also added the first ever literature review of past cases of penile SFT in the literature.

Keywords: Fibrous; Tumor; Penile; Oman

Introduction

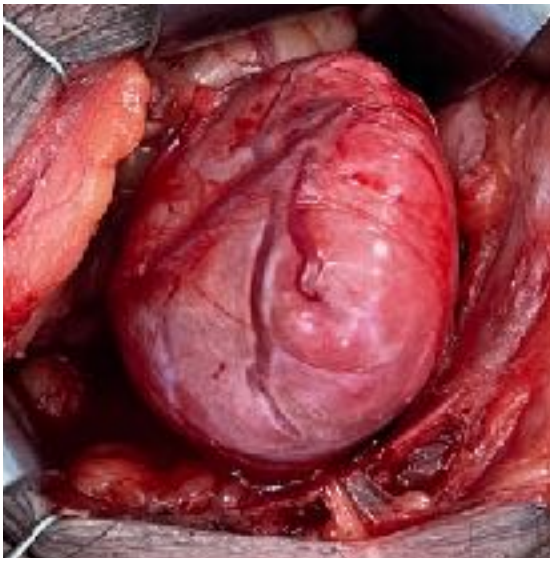
Solitary fibrous tumor (SFT) is a rare spindle-cell mesenchymal tumor of myofibroblastic origin which rarely metastasizes. This tumor was first described by Muray in 1942 as a pleural based lesion.[1] Thirty percent of SFT occurs in sites other than the pleura (extrapleural). Deep muscles of proximal extremity, head, neck, and retroperitoneum are common locations for extrapleural SFT.[2]

To the best of our knowledge, only four cases of penile SFT have been reported in the literature, published in 2015,[3] 2017,[4] 2019,[5] and 2023,[6] which will make the present report the fifth in literature. A literature review of past cases is also added.

Case Report

A 37-year-old man presented with a small, gradually growing lesion at the base of his penis over four months. Physical examination revealed a well-defined, nodular non-fluctuant, non-tender, painless solid mass, ~ 4 × 3 cm at the right penile root. No palpable lymph nodes were detected. No abnormalities were detected on laboratory analysis, including testicular tumor markers.

Magnetic resonance imaging (MRI) showed a 4 × 2.5 cm intensely enhancing heterogenous mass arising from the soft tissue of the right inferio-lateral root of penis, abutting (but not invading) the tunica albuginea and the spermatic cord. Under general anesthesia, the tumor was excised via a perineal incision. Intraoperatively, the mass was observed had clear boundaries with an evident capsule. It originated deep from the root of penis and located close to the right corpus cavernosum, but not involving the spermatic cord or the urethra. Blind and sharp dissections were performed around the mass, which was sharply excised after ligation of a basal vascular stalk **[Figure 1].** The patient was uneventfully discharged on the first postoperative day. Follow up every six months was recommended, with imaging as needed.



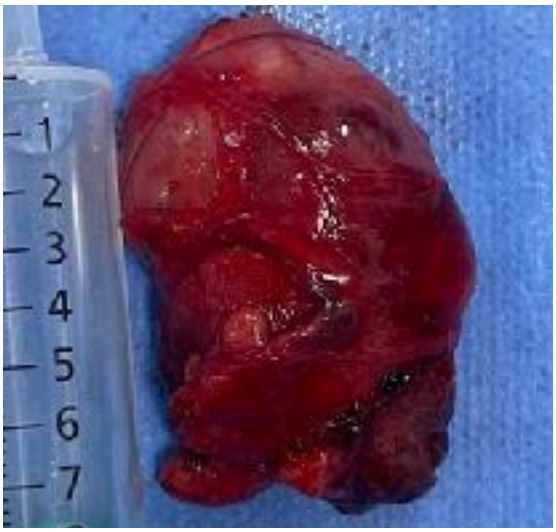
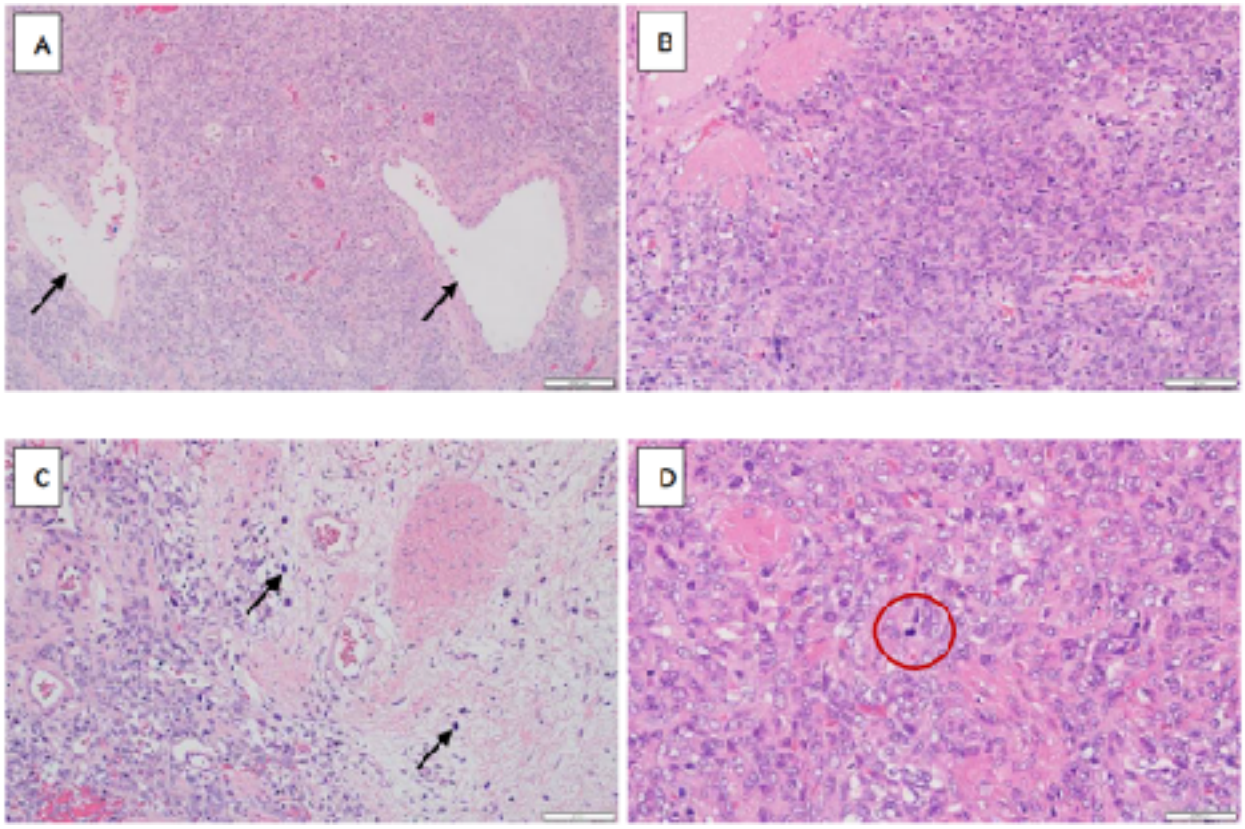


Figure 1: Gross views of the lesion (A) before excision and (B) after excision.

Gross examination showed an encapsulated nodular tumor measuring 5 × 3 × 1.4 cm with smooth external surface with congested blood vessels. The cut surface was heterogeneous, with yellow, white, and hemorrhagic regions. Microscopy revealed an encapsulated well circumscribed spindle cell neoplasm, composed of hypercellular patternless sheets of fairly uniform oval-to-spindle cells set in highly vascular and variable scant fibrocollagenous stroma. Occasional thick short fibrous bands and hypocellular tumor zones were seen particularly at the periphery with the stroma appearing markedly edematous, partly myxoid and rich in dispersed mast cells. The tumor cells had elongated plump vesicular nuclei, inconspicuous nucleoli, and scant eosinophilic cytoplasm, with low mitotic activity of 2–3 mitosis /10 higher power fields (HPF). No necrosis or significant cytological atypia were identified.

The neoplastic cells surrounded variably sized thin and thick-walled blood vessels, some of which were large ectatic with irregular branching walls "staghorn-like" and others are small capillary sized appearing focally arborizing. There is no tumor infiltration of surrounding attached fibrofatty tissue. The spindle tumor cells showed diffuse strong positive staining for signal transducer and activator of transcription 6 (STAT-6), cluster of differentiation 99 (CD99), and B-cell lymphoma 2 (BCL2). CD34 was focally positive in some tumor cells and also highlighted many blood vessels. The spindle tumor cells were negative for S100, desmin, smooth muscle actin (SMA), cluster of differentiation 31 (CD31), D2-40, and human herpesvirus 8 (HHV8), and calponin. These features were consistent with SFT [Figure 2].



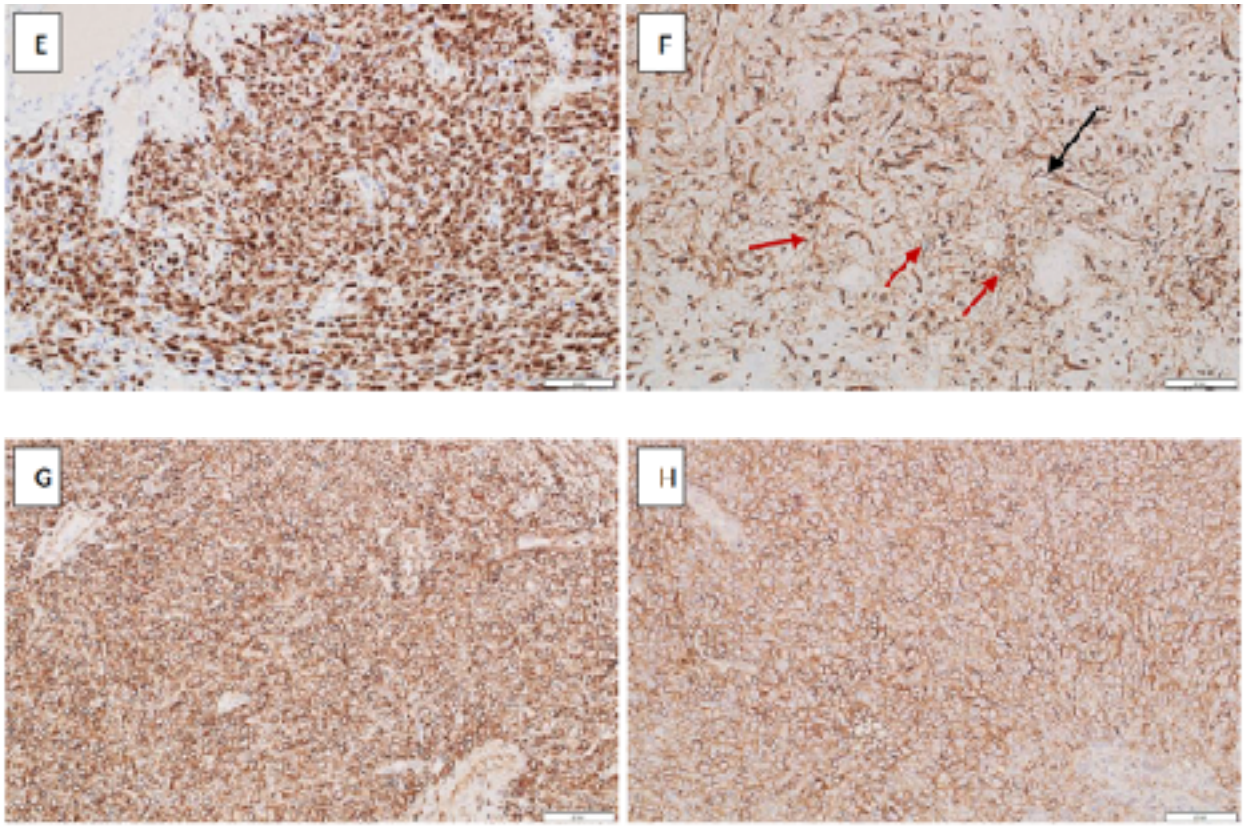


Figure 2: (A) Hematoxylin & eosin (H&E) stained section of the penile mass showing spindle cell neoplasm with prominent large ectatic branching 'staghorn-like' blood vessels (arrows) [magnification ×100]; **(B)** H&E stain showing tumor consisting of hypercellular patternless sheets of fairly uniform oval to spindle cells [magnification ×200]; **(C)** H&E stained section of tumor showing focal hypocellular edematous partly myxoid areas rich in scattered mast cells (arrows) [×200]; **(D)** H&E stained section showing a mitotic figure (circle) [×400]; **(E)** STAT6 immunohistochemical stain reveals diffuse strong positive nuclear staining in tumor cells [×200]; **(F)** CD34 immunohistochemical stain is focally positive in some spindle tumor cells (red arrows) and also stains blood vessels (black arrow) [×200]; **(G) & (H)** BCL2 and CD99 immunohistochemical stains are diffusely positive in tumor cells; respectively [×200].

Discussion

Solitary fibrous tumors (SFT) are rare mesenchymal neoplasms of fibroblastic origin representing less than 2% of all soft-tissue tumors.[7] They manifest as a slow growing, often asymptomatic mass, typically found in middle-aged men and women. Clinical presentation depends on the location of the tumor. Tumors occurring in the abdomen or pelvis give symptoms due to the compression of the neighboring organs.[8] Spinal tumors present with localized pain due to spinal cord compression or a palpable mass.[9] Abdominal and pelvic tumors present with abdominal or back pain.[10] Prostate tumors present with urinary retention and constipation,[11] or voiding difficulties, hematuria, incidental imaging findings and lower abdominal discomfort.[12]

Penile SFTs are extremely rare, slow-growing, painless, and benign.[3] They are unlike malignant penile lesions like fibrosarcoma of the corpus cavernosum which are characterized by pain, enlargement, penile erection and urinary tract obstruction.[13] To the best of our knowledge, only four cases of penile SFTs have been reported in the literature, which makes the present case the fifth [Table 1].

Table 1: Reported cases of penile solitary fibrous tumor (SFT) compared with the present case.

Country, year	Authors	Age (years)	History and presentation	Treatment and outcome
Italy 2015	Castellani et al.[3]	44	3-year history of slow-growing penile mass in dorsal corpus cavernosum near glans penis. Slight pain during sexual intercourse.	SFT excised. 6-month review: no recurrence. Status of sexual/ urinary functions not reported.
Germany 2017	Biel et al.[4]	67	4-weeks of painless swelling on left peno/scrotal area. Constant partial erection, more near penile base. Recent history of thrombosis and pulmonary embolism.	Golf-ball-sized SFT excised from penile base under spinal anesthesia. 3-month review: no recurrence. Erectile function preserved.
Turkey 2018	Çubuk et al.[5]	55	One year history of gradually growing tumor on right corpus cavernosum, increasingly affecting sexual intercourse.	SFT (5 × 5 cm) excised. 2-year review: no recurrence. Sexual/urinary functions preserved.
India 2023	Jain et al.[6]	34	Gradually growing painless perineal mass arising from left corpora cavernosum.	Large perineal SFT (9.8 × 3.2 cm), excised under spinal anesthesia. 2 year review: no recurrence. Sexual/urinary functions preserved.
Oman 2025	Al-Marhoon and Al Jahdhami (Present Case)	39	4-month history of small, growing painless lesion at penile base.	Perineal SFT (5 × 3 × 1.4 cm) excised under general anesthesia. Sexual/urinary functions preserved.

Table 1 indicates that each case of penile SFT presented as a slow-growing, painless mass in men aged 34 –67. In no case did the tumor invade the urogenital system. All were resolved by surgical excision. Post surgery, all patients remained disease-free. In addition, cases are distributed over Europe, Middle East, and South Asia, showing remarkable geographical diversity.

Further, in all five cases, tumor locations were different. The two patients who reported discomfort during sexual intercourse had tumors in the penile shaft, presumably causing mechanical interference during intercourse.[3,5] Similarly the elderly German patient's persistent partial erection nearer the penile base is attributable to pressure from perineal SFT.[4] The other two patients (including ours), whose tumors were at the base of the penis, did not report any urogenital issues [Table 1]. This may mean that penile SFTs behave no differently from non-penile SFTs, where patient discomfort is attributed to mechanical pressure on proximal organs.[9–12]

Table 1 also reveals that all reported penile SFT cases are very recent. This suggests that the extreme rarity of penile SFT cases is attributable to under-reportage. Actual prevalence could be significantly higher. Thus, it is advisable for clinicians to include penile SFT in differential diagnosis, keeping a high index of suspicion.

In the literature, there is no gold-standard test to diagnose SFTs. However, ~10% of SFT patients were reported to have hypoglycemia due to increased production of insulin like growth factor 2 (IGF-2).[14] Radiological studies cannot distinguish SFT from other solid tumors. On computed tomography (CT) scans, SFT typically appears as a homogeneous, well-defined mass without invasive features. However, variations in enhancement, necrosis, and

hemorrhage can make it difficult to distinguish from other tumors, limiting differential diagnosis options.[8,10] Therefore tumor sampling via needle biopsy is recommended for the differential diagnosis of SFT.[12] Close follow up for at least five years post-treatment has been suggested for SFTs in oral cavity, deep extremity, female genital tract, but there are no standard guidlines.[15] Individual follow-up strategies usually include imaging and physical examination.[7] The treatment of choice is surgical resection. Disease recurrence or malignancy can occur in 10%–30% of cases.[16] Significant risk factors for recurrence include high mitotic index, necrosis, and Ki67 index.[16]

Conclusion

SFT rarely occurs in genital tract and penile SFT is among the rarest, with only four cases reported in the literature. However, there is a strong possibility of under-reportage. Therefore, it is advisable to include penile SFT in differential diagnosis and maintain a high index of suspicion. Surgical excision is the standard treatment, which also helps rule out malignancy. Long-term follow-up is necessary to monitor potential recurrence.

Disclosure

The authors declare no conflicts of interest. Informed consent was obtained from the patient.

References

1. Ruan HJ, Huang AH, Cheng S, Fu GX. [Clinicopathologic features of solitary fibrous tumor in urogenital system]. Zhonghua Bing Li Xue Za Zhi 2016 Apr;45(4):248-251.

2. Myoteri D, Dellaportas D, Nastos C, Gioti I, Gkiokas G, Carvounis E, et al. Retroperitoneal solitary fibrous tumor: a "patternless" tumor. Case Rep Oncol Med 2017;2017:4634235.

3. Castellani D, Sebastiani G, Maurelli S, Andrisano A, Mazzone L, Feroce A, et al. Solitary fibrous tumor/hemangiopericytoma of the penis: report of the first case. Urologia 2015;82(2):127-129.

4. Biel A, Chmelar C, Kusche D. [Penile solitary fibrous tumour - a rare penile lesion. Case report and review of literature]. Aktuelle Urol 2017 Apr;48(2):156-158.

5. Çubuk A, Yanaral F, Üçpınar B, Sarılar Ö. Solitary fibrous tumor/hemangiopericytoma of the penis. Turk J Urol 2018 Dec;45(Supp. 1):S143-S146.

6. Jain DK, Pandey H, Saini S, Patne S. Large solitary fibrous tumor (SFT) of the penis- a case report and review of literature. BMC Urol 2023 Aug;23(1):131.

7. Gold JS, Antonescu CR, Hajdu C, Ferrone CR, Hussain M, Lewis JJ, et al. Clinicopathologic correlates of solitary fibrous tumors. Cancer 2002 Feb;94(4):1057-1068.

8. Shanbhogue AK, Prasad SR, Takahashi N, Vikram R, Zaheer A, Sandrasegaran K. Somatic and visceral solitary fibrous tumors in the abdomen and pelvis: cross-sectional imaging spectrum. Radiographics 2011;31(2):393-408.

9. Yang EJ, Howitt BE, Fletcher CD, Nucci MR. Solitary fibrous tumour of the female genital tract: a clinicopathological analysis of 25 cases. Histopathology 2018 Apr;72(5):749-759.

10. Fernandez A, Conrad M, Gill RM, Choi WT, Kumar V, Behr S. Solitary fibrous tumor in the abdomen and pelvis: a case series with radiological findings and treatment recommendations. Clin Imaging 2018;48:48-54.

11. Ronchi A, La Mantia E, Gigantino V, Perdonà S, De Sio M, Facchini G, et al. A rare case of malignant solitary fibrous tumor in prostate with review of the literature. Diagn Pathol 2017 Jul;12(1):50.

12. Tanaka EY, Buonfiglio VB, Manzano JP, Filippi RZ, Sadi MV. Two cases of solitary fibrous tumor involving urinary bladder and a review of the literature. Case Rep Urol 2016;2016:5145789.

13. Liu Z, Zou W. Fibrosarcoma of the corpus cavernosum: case report and literature review. BMC Surg 2021 Jan;21(1):20.

14. Rosenkrantz AB, Hindman N, Melamed J. Imaging appearance of solitary fibrous tumor of the abdominopelvic cavity. J Comput Assist Tomogr 2010;34(2):201-205.

15. Jia Q, Zhou Z, Zhang D, Yang J, Liu C, Wang T, et al. Surgical management of spinal solitary fibrous tumor/hemangiopericytoma: a case series of 20 patients. Eur Spine J 2018 Apr;27(4):891-901.

16. Tolstrup J, Loya A, Aggerholm-Pedersen N, Preisler L, Penninga L. Risk factors for recurrent disease after resection of solitary fibrous tumor: a systematic review. Front Surg 2024 Jan;11:1332421.