



## Functional Urology

## Excision of recurrent penile schwannoma with neurovascular bundle sparing: A novel surgical approach

Sandeep Sai Voleti<sup>a</sup>, Christopher J. Warren<sup>b</sup>, Nicholas R. Parker<sup>b</sup>, Melissa Stanton<sup>c</sup>, Aqsa A. Khan<sup>b</sup>, Shelley S. Noland<sup>d</sup>, Nahid Punjani<sup>b,\*</sup><sup>a</sup> Mayo Clinic Alix School of Medicine, Scottsdale, AZ, USA<sup>b</sup> Mayo Clinic Arizona Department of Urology, Phoenix, AZ, USA<sup>c</sup> Mayo Clinic Arizona Department of Pathology, Phoenix, AZ, USA<sup>d</sup> Mayo Clinic Arizona Department of Plastic & Reconstructive Surgery, Phoenix, AZ, USA

## A B S T R A C T

Penile schwannomas are rare, often painless lesions usually growing on the dorsum of the penis. A young and otherwise healthy male with recurrent painful penile schwannomas and decreased libido was successfully treated with surgical excision. Through fine dissection of the nerve fascicles leading to the primary schwannoma, the lesion was successfully removed without compromising erectile or ejaculatory function. This novel approach allowed for significant symptomatic relief and improved quality of life.

## 1. Introduction

Schwannomas are benign peripheral nerve sheath tumors which originate from Schwann cells, whose primary purpose is to maintain the myelin layer of peripheral nerve axons.<sup>1</sup> These tumors are often well-circumscribed and attached to peripheral nerves, usually occurring in the head and neck regions. The incidence of peripheral schwannomas is around 0.6 per 100,000 people.<sup>2</sup> In rare cases, they can occur in the penile region. To date, only 40 cases of penile schwannoma have been reported.<sup>3</sup> Prior literature reports use of doppler enucleation of penile schwannomas or excision of a single asymptomatic nodule. In this case, we present a 33-year-old healthy male with recurrent and progressive penile schwannomas managed with surgical excision in a multidisciplinary manner.

## 2. Case presentation

A 33-year-old male with urological history limited to prior removal of scrotal cysts initially presented four years prior with abnormal curvature of the penis with erection and palpable and tender abnormalities at the dorsum of the penis near the base, along with recurrent scrotal cysts. Penile ultrasound revealed subcutaneous soft tissue densities on the dorsum of the penis, including one with involvement around the neurovascular bundle. The patient elected to pursue scrotal cyst excision and penile exploration. Intraoperatively, he was degloved and a distal

lesion first excised and sent for frozen section revealed a spindle cell tumor origin. A decision was made to only remove additional superficial lesions, for a total of three. Pathology was consistent with penile schwannoma. Post-operatively, the patient no longer experienced discomfort with erection, curvature, and did not report any erectile dysfunction or change in sensation.

Four years later, the patient returned with complaints of growing penile lesions on the dorsum of his penis. This pain appeared to originate from his deeper lesions that were not excised previously. He experienced significant sharp pain and discomfort upon palpation of the lesions, as well as during sleep, sexual intercourse, and with erections causing him significant distress, decreased libido, and decreased overall quality of life. MRI of the pelvis revealed extensive penile involvement with numerous schwannomas (Fig. 1). There was confluent involvement of the posterior penis with multiple schwannomas involving both corpora cavernosa, as well as in the anterior penis. Compared to prior imaging, size and number of schwannomas had increased. To date, the patient has no known diagnosis of neurofibromatosis. Generally, these lesions are painless and therefore his discomfort was likely from mass effect during penile tumescence. Extensive counselling occurred regarding options, including the significant concern of neurovascular damage given the deep dorsal location. Options including observation and excision were reviewed, and he was counselled significantly on penile sensation loss and erectile dysfunction. Given the large impact to quality of life, he was interested in surgical excision.

\* Corresponding author.

E-mail address: [Punjani.Nahid@mayo.edu](mailto:Punjani.Nahid@mayo.edu) (N. Punjani).<https://doi.org/10.1016/j.eucr.2023.102458>

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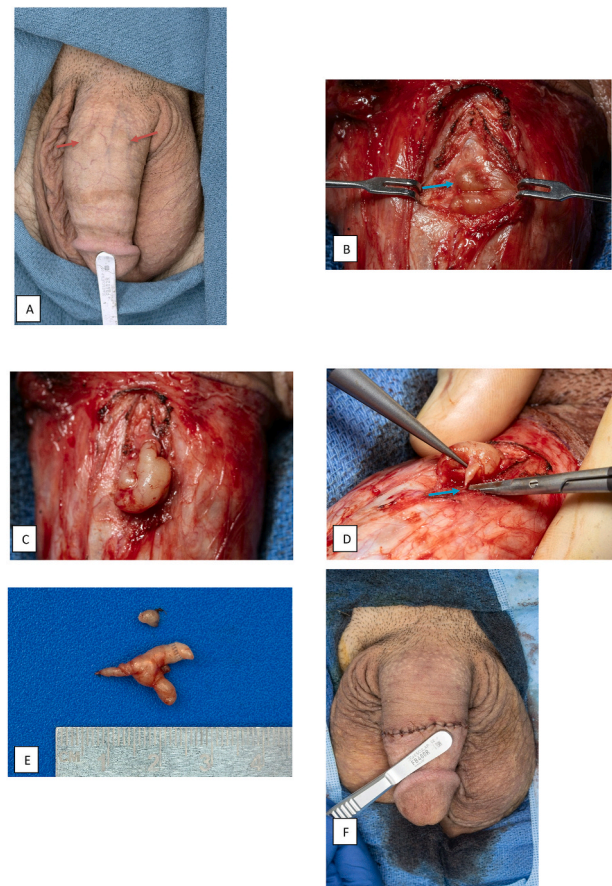
The patient was taken to the operating room for repeat excision (Fig. 2). A plastic surgery trained peripheral nerve surgeon assisted in the nerve-sparing given their expertise in schwannoma removal. Initially, the plan was to remove all palpable lesions, but given the concern for nerve injury, the patient elected to only treat the most painful midline dorsal lesion. The penis was degloved beginning with a circumferential incision at the level of previous circumcision. The skin and Dartos fascia were incised and blunt dissection was utilized to deglove the incision down to the base while maintaining the Buck's fascia. The index lesion responsible for the patient's discomfort was identified at the 12 o'clock position in the midline dorsum shaft at its base, deep to the Buck's fascia. This position is generally deficient of nerves and therefore was a safe position to enter. The tumor/mass was carefully circumscribed with meticulous blunt dissection and loupe magnification. The nerve to the mass was identified and the epineurium was opened to reveal multiple fascicles. The sole fascicle entering the tumor was isolated and found to be nonfunctional with intraoperative nerve stimulation. The sole fascicle was transected both entering and exiting the lesion. There were palpable densities present laterally on each side. However, as the primary lesion was responsible for causing the patient's discomfort, remaining lesions were not excised to minimize potential nerve damage. Finally, fascial planes and skin were closed with 4-0 chromic sutures. The final pathology confirmed penile schwannoma (Fig. 3).

At the one-month follow up, the patient reported improvement of symptoms. He endorsed significant improvement in pain, with no pain during erection or upon ejaculation. The patient has been referred to genetics for testing for schwannomatosis.

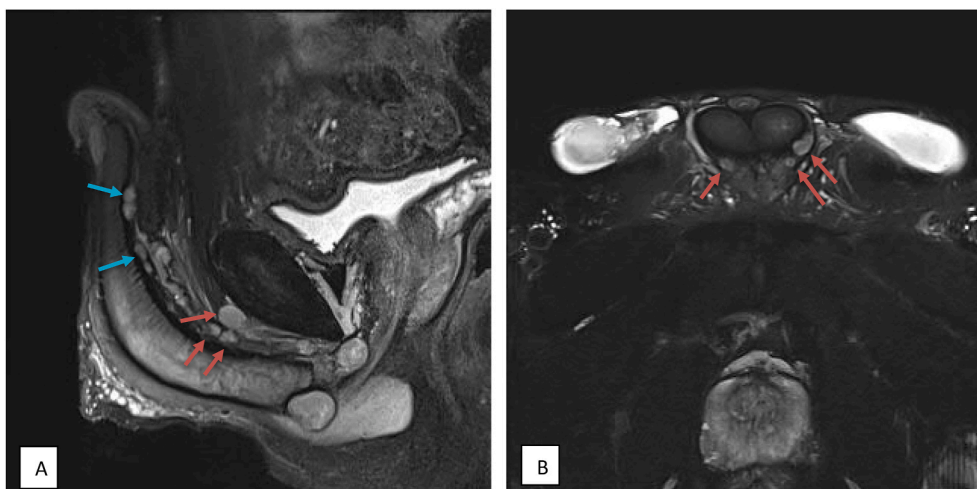
### 3. Discussion

Penile schwannomas are often slow-growing and painless masses occurring on the dorsum of penile shaft. However, some patients can experience painful symptoms secondary to mass effect that interfere with daily activities and sexual activity, leading them to seek medical attention. Often, definitive diagnosis of penile schwannoma requires histopathological analysis, and treatment is surgical excision. The primary concern during surgical excision of such lesions is preservation of sexual function.

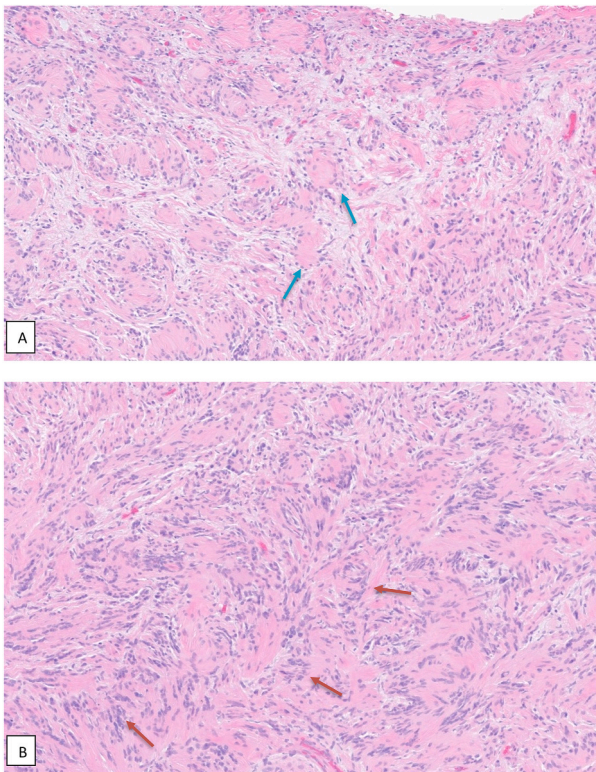
In the present case, careful attention was applied to preserve the primary neurovascular structures surrounding the schwannoma. Given the close proximity of the lesion to the neurovascular bundle, careful dissection of the nerve fascicles leading to the tumor is crucial for maximal nerve sparing. Further, excising the sole symptomatic lesion minimized the risk of compromising the neurovascular bundle. Prior reported cases successfully excised or enucleated asymptomatic lesions



**Fig. 2.** Intraoperative imaging of penile schwannoma and surgical technique. Grossly, palpable tissue masses are observed on the dorsum of the penis, near the base of the shaft (red arrows in Fig. 2 A). Primary schwannoma causing patient discomfort was identified in the midline dorsum shaft at the base, just deep to the Buck's fascia (blue arrow in Fig. 2 B). Superficial attachments of the tissue density were cut in order to partially mobilize the density and isolate the separate nerve fascicles leading to the tumor (Fig. 2 C). The final nerve fascicle anchoring the schwannoma was cut sharply with scissors (blue arrow in Fig. 2 D). Final gross specimen measured approximately 2 cm in width (Fig. 2 E). Post-operatively, gross appearance of tissue masses was less apparent (Fig. 2 F). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)



**Fig. 1.** MRI of the pelvis during return visit four years later highlighting extensive penile involvement with numerous schwannomas. There is confluent involvement of the posterior penis with multiple schwannomas involving both corpora cavernosa, with involvement appearing to be greater on the left side (red arrows in Fig. 1 A and Fig. 1 B). A few schwannomas are present in the anterior penis as well (blue arrows in Fig. 1 B). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)



**Fig. 3.** Final pathology of gross specimen excised during operation. Collagen spherules and ancient change are present on 10× magnification of specimen (blue arrows in Fig. 3 A) Verocay bodies are also present on 10× magnification of the specimen (red arrows in Fig. 3 B). Histopathology findings are characteristic of schwannoma and confirmed diagnosis. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

without compromising nerve function. This case reports a successful

approach to a patient with multiple growing and symptomatic lesions. Given the extensive nature of the penile lesions present in this case, treatment options must be discussed in close collaboration with the patient in regards to potential risks and benefits.

#### 4. Conclusion

This case highlights a novel surgical approach for excision of recurrent penile schwannoma with preservation of the neurovascular bundle given their origin from a non-functional nerve fascicle. Emphasis on symptom-causing lesions with preservation of remaining lesions may optimize symptomatic relief and minimize nerve damage.

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