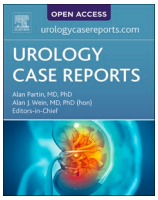
Urology Case Reports 61 (2025) 103048

Contents lists available at ScienceDirect

Urology Case Reports

journal homepage: www.elsevier.com/locate/eucr



Oncology

Traumatic retroperitoneal neuroma at the site of prior radical nephrectomy: A case report

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A B S T R A C T

We present a case of a 68-year-old male with past history of renal cell carcinoma and radical nephrectomy, who developed a traumatic retroperitoneal neuroma at the site of his prior surgery thirteen years later which initially was thought to be a cancer recurrence. We review the patient's past medical history, clinical presentation, and disease course. Finally, we provide a brief review of retroperitoneal peripheral nerve lesions and discuss current approaches to their management.

1. Introduction

Primary retroperitoneal tumors are rare, comprising only 0.1–0.2 % of all neoplasms.[1] Among them, 10–20 % consist of retroperitoneal nerve sheath tumors, which include benign entities such as schwannomas and neurofibromas, as well as malignant peripheral nerve sheath tumors often associated with Neurofibromatosis type 1.[2,3] However, reports on neuromas are exceedingly rare. Here, we present a case of a retroperitoneal traumatic neuroma occurring after prior nephrectomy, which, to the best of our knowledge, has not been previously reported in the literature.

2. Case presentation

A 68-year-old male presented with a mildly enhancing soft tissue nodule, identified on routine surveillance imaging, at the site of a left radical nephrectomy performed in 2004. The patient's past medical history was significant for a radical retropubic prostatectomy in 2004 for stage T1c prostatic adenocarcinoma. During that workup, imaging revealed a calcified left upper pole mass, which was presumed to be associated with a traumatic injury at the age of 16, and a 6.0 cm lower pole lesion that was deemed suspicious of malignancy. Given the patient's family history of prostate and kidney cancer in his father and grandfather, the patient was counseled on potential risk of malignancy and ultimately underwent a laparoscopic left radical nephrectomy and adrenalectomy. Pathological analysis of the specimen was significant for pT3 clear cell renal carcinoma grade 2 with negative surgical margins.

Given the patient's family history and young age at diagnosis, he elected to undergo long-term surveillance with cross sectional imagining allowing for early detection of potential recurrence. This surveillance demonstrated no evidence of residual or recurrent disease over the next several years. An incidental soft tissue nodularity exhibiting T2 hyperintensity, located immediately adjacent to the nephrectomy surgical clips, was first identified on follow-up MRI imaging in 2017. At that time, the findings were considered consistent with post-surgical changes or granulation tissue. The lesion demonstrated no concerning features including suspicious enhancement or diffusion restriction. Initially, the nodularity measured 1.4 cm × 1.0 cm and remained relatively stable in size from 2017 to 2024. However, between November 2024 and December 2024, it exhibited a notable increase in dimensions, from 1.8 cm × 1.7 cm–2.1 cm × 1.9 cm (Fig. 1). Although the patient remained asymptomatic during this period, the interval growth prompted clinical concern for potential local recurrence. In response to this, a CT-guided needle biopsy was performed, and histopathological analysis using hematoxylin and eosin staining alone revealed the lesion to be a traumatic neuroma, with no evidence of malignancy (Fig. 2). The patient was advised to continue with routine surveillance via cross sectional imaging.

3. Discussion

To our knowledge, this is the first reported case of a retroperitoneal traumatic neuroma at the surgical site after prior nephrectomy mimicking a local recurrence. In contrast to schwannomas and neurofibromas, which are Schwannian neoplasms originating from the nerve sheath, neuromas result from disordered axonal regeneration in the absence of an intact endoneural tube. Unlike other benign peripheral nerve tumors, neuromas are not true neoplasms but rather an aberrant

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https://doi.org/10.1016/j.eucr.2025.103048
Received 28 March 2025; Received in revised form 16 April 2025; Accepted 20 April 2025
Available online 21 April 2025

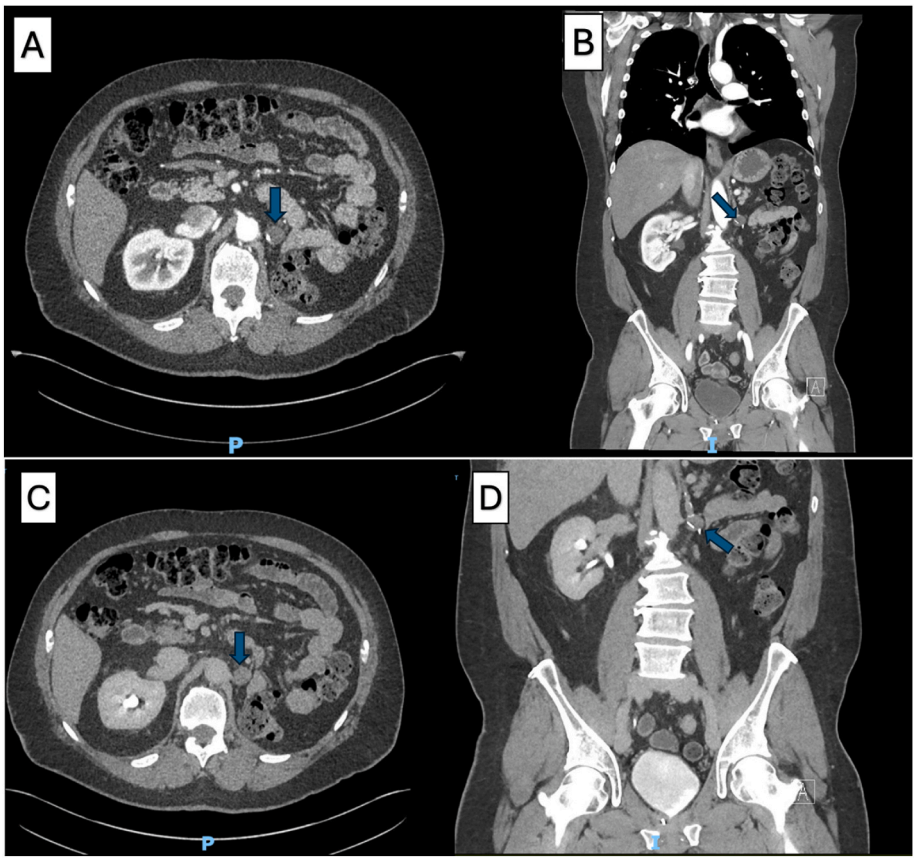

Fig. 1. Figure 1. Axial (B) and coronal (B) arterial-phase computed tomography (CT) images show a mildly enhancing soft tissue nodule. Delayed-phase axial (C) and coronal (D) CT images show a hyperdense mass at the nephrectomy surgical site.

hyperplastic response by peripheral nerves that lack malignant potential. Often the result of iatrogenic or traumatic injury, these primarily have been reported in the extremities but have also been identified in other anatomical locations, including head, neck, and trunk. A systematic review of the nerve distributions of neuromas reported that the most frequently involved nerves in the trunk are intercostal nerves (after mastectomy), ilioinguinal and genitofemoral nerves (after inguinal hernia repair), and branches of the pudendal nerve.[4]

It is important to note that the vast majority of reported retroperitoneal nerve sheath tumors are schwannomas, which are often initially misdiagnosed as gynecological tumors.[5–9] Neuromas exhibit distinct macroscopic and microscopic characteristics that aid in their differentiation from schwannomas. Grossly, neuromas typically present as a solitary, unencapsulated mass, whereas schwannomas are encapsulated and attached peripherally to a pre-existing nerve. Histologically, traumatic neuromas are characterized by a disordered proliferation of nerve twigs consisting of a mixture of axons, Schwann cells, fibroblasts, and perineurial cells as opposed to the pure population of Schwann cells arranged in alternating cellular and acellular areas in schwannomas.[10] On immunohistochemistry, schwannomas exhibit diffuse positivity for S-100 protein [11].

The flexibility of the retroperitoneal space allows for significant tumor growth before the onset of symptoms, leading to delayed diagnosis and larger tumor size at presentation. Thus, associated symptoms of retroperitoneal tumors are non-specific and depend on the adjacent structures compressed by the mass. Clinical presentation may include localized pain, paresthesia, abdominal discomfort, bowel or bladder irritation, or weight loss. Hence, the diagnosis of these lesions can be challenging. Computed tomography (CT), ultrasound, and magnetic resonance imaging (MRI) are primary diagnostic modalities; however imaging findings can be variable and insufficient at accurately differentiating between malignant and benign lesions. Although studies have shown that benign retroperitoneal nerve sheath tumors can exhibit significant FDG uptake, there are currently no well-established criteria to reliably distinguish benign from malignant lesions. As a result, the utility of positron emission tomography (PET) in this context remains limited.[12] Furthermore, while image-guided biopsy may serve as confirmatory testing, some studies warn against its practice due to potential complications and low diagnostic accuracy.[13]

Due to the low incidence of retroperitoneal nerve tumors, most of the current treatment knowledge is based on case reports and series. Given the limitation of biopsy, complete resection with negative margins remains the primary recommendation for most patients, as local recurrence is linked with incomplete excision.[9,14] Open, ventral laparoscopic, and retroperitoneoscopic surgical approaches are utilized, with some evidence suggesting that laparoscopic techniques offer reduced hospitalization rates, lower intraoperative blood loss, and decreased postoperative pain [15–17]. Retroperitoneal resections have been historically performed by various specialties including general surgery, gynecology, and urology, though early neurosurgical involvement may facilitate improved diagnosis and potentially reduce the risk of postoperative neurological complications.[1] Ultimately, a large-scale prospective study comparing surgical techniques and multidisciplinary approaches is needed to establish standardized treatment guidelines.

4. Conclusion

In this report, we discussed a rare case of a 68-year-old male with a history of renal cell carcinoma who developed a traumatic neuroma at the surgical site of a prior radical nephrectomy. In cases of suspected retroperitoneal tumors, imaging and histopathological studies are essential to assess malignant potential. For symptomatic or potentially

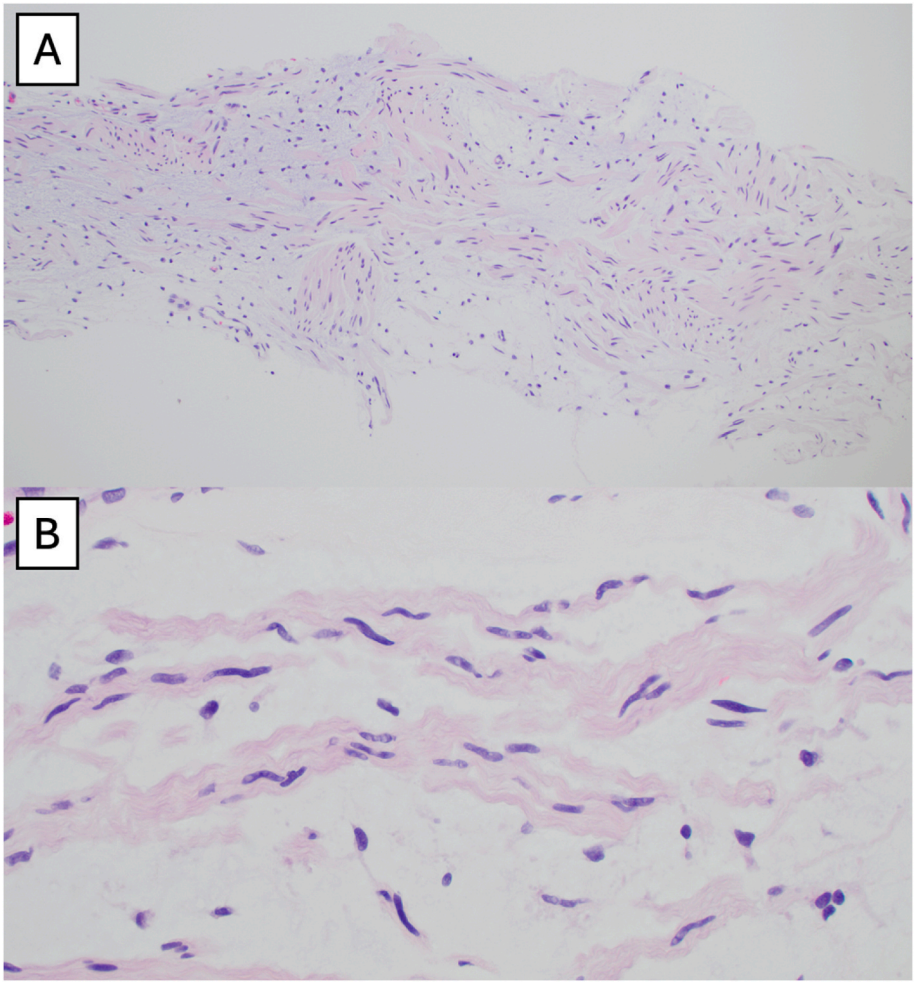

Fig. 2. Figure 2. 10x and 40x H&E stain slides show disordered bundle of nerve cells indicative of a traumatic neuroma (A&B).

malignant lesions, complete resection is currently the recommended first line treatment; however, the choice of primary specialty is influenced by tumor location and may necessitate interdisciplinary collaboration.

CRediT authorship contribution statement

Sadra Sepehri: Writing – original draft. **Ezra Baraban:** Writing – review & editing. **Mohammad E. Allaf:** Writing – review & editing. **Sunil Patel:** Writing – review & editing.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

1. Petkov M, Kornmann M, Bäzner UM, et al. Comprehensive neurosurgical and visceral surgical therapy of retroperitoneal nerve tumors: a descriptive and retrospective analysis. *World J Surg Oncol*. 2024;22:277. PMID: 39434082.
2. Gulati V, Swarup MS, Kumar J. Solid primary retroperitoneal masses in adults: an imaging approach. *Indian J Radiol Imag*. 2022 Jul 13;32(2):235–252. https://doi.org/10.1055/s-0042-1744142.
3. Brennan C, Kajal D, Khalili K, Ghai S. Solid malignant retroperitoneal masses—a pictorial review. *Insights Imaging*. 2013 Nov 29;5(1):53–65. https://doi.org/10.1007/s13244-013-0294-0.
4. Remy K, Raasveld FV, Saqr H, et al. The neuroma map: a systematic review of the anatomic distribution, etiologies, and surgical treatment of painful traumatic neuromas. *Surgery*. 2024 Oct 1;176(4):1239–1246. https://doi.org/10.1016/j.surg.2024.05.037.
5. Schindler OS, Dixon JH, Case P. Retroperitoneal giant schwannomas: report on two cases and review of the literature. *J Orthop Surg Hong Kong*. 2002 Jun 1;10(1):77–84. https://doi.org/10.1177/230949900201000114.
6. Gao C, Zhu FC, Ma BZ, et al. A rare case of giant retroperitoneal neurilemmoma. *J Int Med Res*. 2020 Sep;48(9), 300060520935302. https://doi.org/10.1177/0300060520935302. PMID: 32924705; PMCID: PMC7493258.
7. Kalaycı M, Akyüz U, Demirağ A, Gürses B, Ozkan F, Gökçe O. Retroperitoneal schwannoma: a rare case. *Case Rep Gastrointest Med*. 2011;2011, 465062. https://doi.org/10.1155/2011/465062. Epub 2011 Jul 14. PMID: 22606418; PMCID: PMC3350261.
8. Cury J, Coelho RF, Srougi M. Retroperitoneal schwannoma: case series and literature review. *Clinics*. 2007 Jun;62(3):359–362. https://doi.org/10.1590/s1807-59322007000300024. PMID: 17589680.
9. Wu Q, Liu B, Lu J, Chang H. Clinical characteristics and treatment strategy of retroperitoneal schwannoma adjacent to important abdominal vessels: three case reports and literature review. *Front Surg*. 2021 Jan 14;7, 605867. https://doi.org/10.3389/fsurg.2020.605867. PMID: 33585546; PMCID: PMC7874029.
10. Rainsbury JW, Whiteside OJ, Bottrill ID. Traumatic facial nerve neuroma following mastoid surgery: a case report and literature review. *J Laryngol Otol*. 2007 Jun;121(6):601–605. https://doi.org/10.1017/S0022215106004993. Epub 2006 Dec 4. PMID: 17140460.
11. Wu X, Meng H, Fan Q, Qi Z, Pan W. Image features and clinical analysis of retroperitoneal pelvic schwannoma: a case report. *BMC Neurol*. 2024 Jul 3;24(1):230. https://doi.org/10.1186/s12883-024-03715-y. PMID: 38961371; PMCID: PMC11221090.
12. Carone L, Messana G, Vanoli A, Pugliese L, Gallotti A, Preda L. Correlation between imaging and histology in benign solitary retroperitoneal nerve sheath tumors: a pictorial review. *Insights Imaging*. 2024 May 31;15(1):132. https://doi.org/10.1186/s13244-024-01709-5. PMID: 38816511; PMCID: PMC11139841.
13. Mastoraki A, Toska F, Tsiverdis I, et al. Retroperitoneal schwannomas: dilemmas in diagnostic approach and therapeutic management. *J Gastrointest Cancer*. 2013 Dec;44(4):371–374. https://doi.org/10.1007/s12029-013-9510-x. PMID: 23749630.
14. Zhang L, Gao M, Zhang T, et al. Surgical management of retroperitoneal schwannoma complicated with severe hydronephrosis: a case report. *Medicine*

(Baltim). 2018 Sep;97(39), e12528. https://doi.org/10.1097/MD.0000000000012528. PMID: 30278542; PMCID: PMC6181516.
15. Ji JH, Park JS, Kang CM, Yoon DS, Lee WJ. Laparoscopic resection of retroperitoneal benign neurilemmoma. *Ann Surg Treat Res*. 2017 Mar;92(3):149–155. https://doi.org/10.4174/astr.2017.92.3.149. Epub 2017 Feb 24. Erratum in: Ann Surg Treat Res. 2017 May;92(5):388. doi: 10.4174/astr.2017.92.5.388. PMID: 28289669; PMCID: PMC5344805.
16. Sato Y, Matsuhashi N, Sugie Y, et al. Total laparoscopic resection by medial-retroperitoneal approach using virtual navigation: two case reports of primary retroperitoneal schwannoma. *World J Surg Oncol*. 2022 Jan 4;20(1):3. https://doi.org/10.1186/s12957-021-02483-0. PMID: 34980150; PMCID: PMC8725496.
17. Zhang S, Cao Q, Li P, et al. A modified retroperitoneoscopic technique in supine position for primary retroperitoneal tumors: technique and clinical outcomes. *J Endourol*. 2016 Jul;30(7):799–804. https://doi.org/10.1089/end.2016.0114. Epub 2016 May 20. PMID: 27065301.