

Presacral Schwannoma Resembling Lymph Node Metastasis in a Patient with Locally Advanced Prostate Cancer

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ABSTRACT

Introduction: Schwannomas originating in the pelvic region are rare and present diagnostic challenges when they coexist with malignancies.

Case Presentation: A 58-year-old man with urinary frequency and an elevated prostate-specific antigen level underwent preoperative imaging. T2-weighted magnetic resonance imaging (MRI) of the prostate identified an irregular hypointense lesion with extracapsular invasion, as well as a presacral nodule resembling lymph node metastasis. The presacral nodule exhibited an intermediate signal intensity on the apparent diffusion coefficient map that was derived from diffusion-weighted images. Dynamic contrast-enhanced MRI revealed persistent enhancement in the presacral node, while the prostate tumor exhibited strong early enhancement followed by washout. Pathological and laparoscopic findings confirmed the coexistence of locally advanced prostate cancer and pelvic schwannoma.

Conclusions: MRI is useful not only in detecting prostate cancer but also in differentiating lymph node metastases from schwannoma.

INTRODUCTION

Schwannomas are typically benign tumors that exhibit slow growth and encapsulate the affected nerve. They can develop in various anatomical locations, with the head and neck region being the most common site. However, occurrence in the pelvis is rare. Diagnostic methods for schwannomas typically involve the use of computed tomography (CT) or magnetic resonance imaging (MRI) [1-4]. However, in cases where schwannomas arise outside the head and neck region and are complicated by malignant tumors, distinguishing them from lymph node metastasis can pose diagnostic challenges. In this case report, we present a rare occurrence of presacral schwannoma in a patient with locally advanced prostate cancer, exhibiting features that mimicked lymph node metastasis.

CASE PRESENTATION

A 58-year-old male patient was referred to our institution due to urinary frequency and an elevated prostate-specific antigen (PSA) level. The serum PSA level was 12.9 ng/mL, while the concentrations of lactate dehydrogenase and pyridinoline cross-linked telopeptide

domain of type 1 collagen were within the normal ranges. On T2-weighted MRI, an irregular hypointense lesion was observed in the peripheral zone of the prostate on the right, accompanied by extracapsular invasion (**Figure 1**).

A well-defined nodule was identified in the presacral region with a slightly higher signal than that of the skeletal muscle. Diffusion-weighted imaging (DWI) showed hyperintense lesions in the peripheral zone and on the right side of the presacral area. The apparent diffusion coefficient (ADC) map generated from DWI revealed a hypointense lesion in the right peripheral zone and an intermediate signal intensity lesion in the right presacral area (**Figure 1b**). Dynamic contrast-enhanced (DCE) MRI of the prostate revealed early enhancement with subsequent washout, while the presacral nodule exhibited gradual enhancement without washout (**Figures 1c-e**). The whole-body bone scan demonstrated no osteoblastic metastasis (**Figure 1f**), and the CT scans showed no distant metastasis. However, the presacral lymph node appeared swollen on CT (**Figure 1g**). Based on the findings of MRI, bone scan, and CT, locally advanced prostate cancer was suspected. The presacral node was suspected to exhibit either lymph node metastasis or a neurogenic tumor.

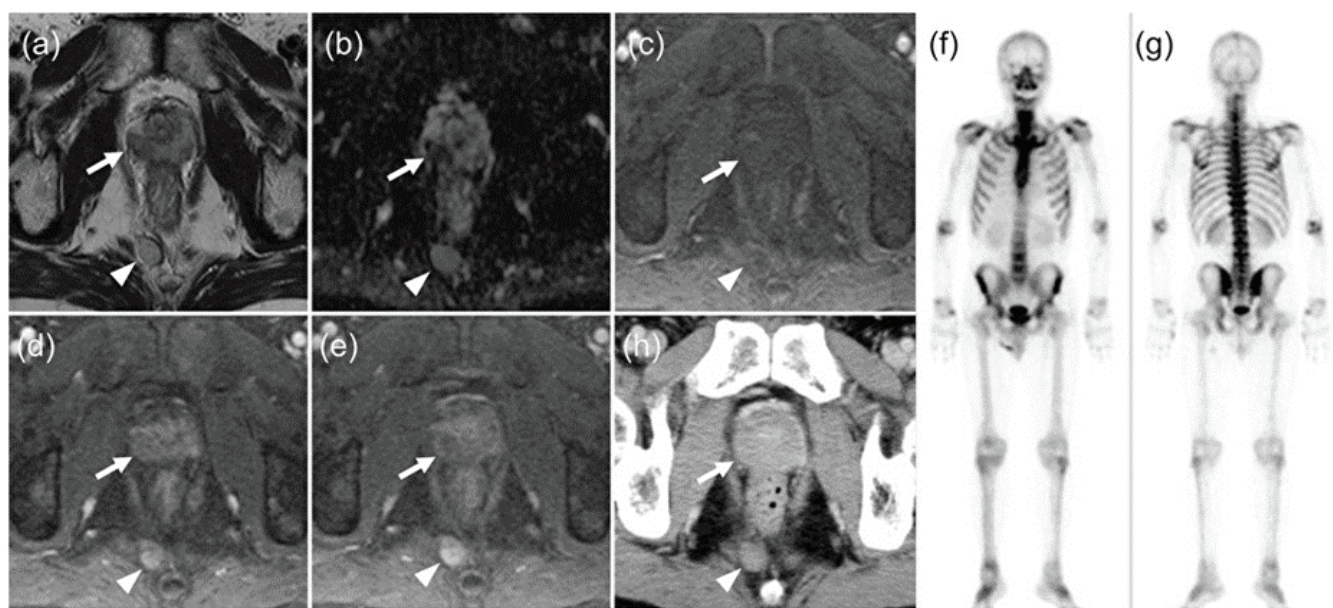


Figure 1. Magnetic resonance imaging, CT, and Tc-99m methylene diphosphonate bone scintigraphy. (a) Axial T2-weighted turbo spin-echo image reveals a hypointense lesion (arrow) within the right peripheral zone in the mid gland, exhibiting capsular invasion. The presacral nodule (arrowhead) exhibits higher signal intensity compared to that of the skeletal muscle; (b) The apparent diffusion coefficient map generated from diffusion-weighted imaging revealed a hypointense lesion (arrow) in the right peripheral zone and an intermediate signal intensity lesion (arrowhead) in the right presacral area. The signal intensity of the presacral nodule is higher than that of the prostate lesion; (c) Axial precontrast fat-suppressed T1-weighted image. Both the prostate lesion (arrow) and presacral nodule (arrowhead) are not detectable; (d) Arterial phase T1-weighted postcontrast image demonstrates mild heterogeneous enhancement (arrow) of the tumor in the right peripheral zone. The presacral nodule exhibited homogeneous enhancement (arrowhead); (e) Venous phase T1-weighted postcontrast image demonstrates washout (arrow) of the tumor. The presacral nodule showed marked and persistent enhancement without washout (arrowhead); (f,g) Whole-body bone scintigraphy using Technetium-99m methylene diphosphonate revealed no osteoblastic metastasis. (f) anterior. (g) posterior; (h) Portal venous phase contrast-enhanced CT demonstrated a well-demarcated presacral nodule (arrowhead) that is suggestive of lymph node metastasis. The tumor located in the right peripheral zone is barely discernible (arrow).

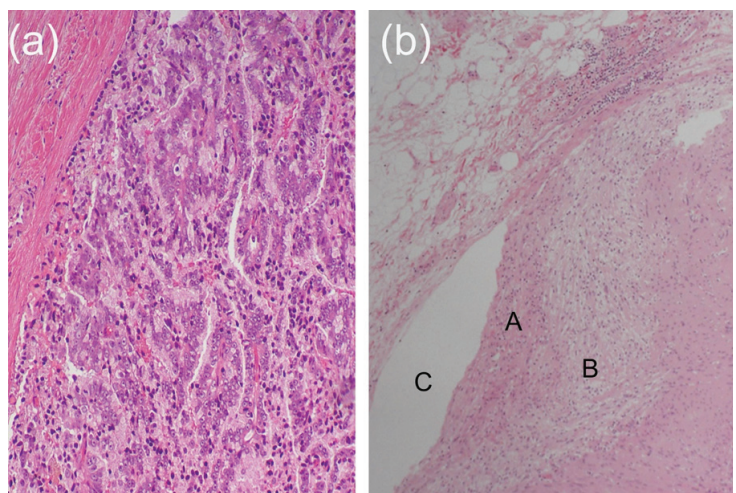


Figure 2. Photomicrographs of prostate cancer and schwannoma. (a) Photomicrography of the prostate biopsy specimen revealed prostate cancer with Gleason score 4+3. Hematoxylin-eosin staining, x400; (b) Photomicrograph of the region at the pericapsular invasion shows two distinct histological patterns. Densely packed spindle cells (A) are observed (Antoni A), as well as a less cellular area (B) (Antoni B) with cystic changes (C). Hematoxylin-eosin staining, x200.

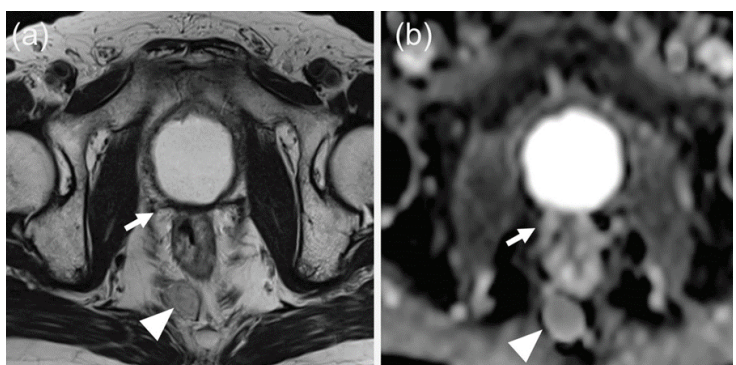


Figure 3. Magnetic resonance imaging five years after treatment. (a) Axial T2-weighted turbo spin-echo image showing no change in the size of the presacral nodule (arrowhead). There was no evidence of local recurrence of prostate cancer (arrow); (b) Apparent diffusion coefficient map showing no change in signal intensity of the presacral nodule (arrowhead). There was no evidence of local recurrence of prostate cancer (arrow).

Transrectal ultrasound-guided systematic 12-core biopsy of the prostate revealed prostate cancer with a Gleason grade of 4+3 with cribriform and fused glands (**Figure 2a**), and the laparoscopic findings of the presacral nodule were consistent with a schwannoma; therefore, lymph node dissection was not performed.

Histopathological findings of the surgical specimen revealed adenocarcinoma of the prostate, Gleason grade 4+3. The prostate cancer had invaded beyond the prostatic capsule, and a neurogenic tumor was found at the site of the neurovascular bundle. Histopathology of the neurovascular bundle showed densely packed spindle cells and fewer cellular lesions with cystic changes (**Figure 2b**), which are consistent with schwannoma. The surgical margin was negative for prostate cancer but was close. Therefore, postoperative radiotherapy to the prostate bed was performed, delivering a total dose of 66 Gy with a fractional dose of 2 Gy. The post-treatment course was uneventful with no recurrence or adverse events during the 5-year follow-up period. Five years after treatment, the presacral schwannoma remained unchanged, and no recurrence of prostate cancer was observed (**Figures 3a and 3b**).

DISCUSSION

Schwannomas occurring in the pelvic region are indeed uncommon [4], and differentiating them from metastatic tumors, such as lymph node metastasis or local invasion, can present challenges during the assessment of pelvic malignancies. To the best of our knowledge, there have been no reports of pelvic schwannomas occurring in conjunction with locally advanced prostate cancer. In this case report, a presacral schwannoma occurred on the ipsilateral side of the prostate cancer, making it difficult to differentiate lymph node metastasis from schwannoma. ADC map and DCE-MRI findings helped differentiate prostate cancer lesions from schwannoma, although they are not conclusive. Foci displaying higher signal intensity on ADC maps compared to prostate cancer, along with a gradual enhancement pattern on DCE-MRI, are important findings indicative of the presence of a schwannoma. The presence of high signal intensity on T2-weighted imaging is another important MRI finding in the diagnosis of schwannoma [4]. This is because prostate cancer shows low signal intensity on T2-weighted imaging. The best timing to start adjuvant radiotherapy for prostate cancer with a close surgical margin is not established, but some studies suggest that it should be performed within 4 months after surgery or after recovery of continence [5,6].

There are several strengths in this case report. First, DCE-MRI and ADC mapping proved to be valuable in differentiating between prostate cancer and schwannoma. Although DCE-MRI and ADC mapping were primarily developed for the detection of prostate cancer [7], it has also exhibited utility in distinguishing schwannomas. Second, there have been no reported cases of pelvic schwannoma complicated by prostate cancer. This case report provides valuable insights for distinguishing between schwannoma and lymph node metastasis originating from prostate cancer.

This case report has several limitations that need to be addressed. First, complete resection of the presacral schwannoma was not achieved, and comprehensive pathological assessment was absent. However, the resected specimens contained the schwannoma, and due to the potential morbidity associated with resecting the sciatic nerves, complete resection of all suspicious neurogenic tumors was not deemed necessary. Second, this is a single case report. Although schwannoma originating from the pelvic region is rare, conducting a large-scale cohort study is challenging. Nevertheless, further evaluation is warranted to confirm the findings of this report.

CONCLUSIONS

It is not appropriate to generalize a single case report to other cases without further scientific verifications. However, the MRI findings, such as a relatively high signal on ADC mapping and gradual enhancement without washout on DCE-MRI, provide suggestive evidence supporting the diagnosis of schwannoma rather than lymph node metastasis.

DECLARATIONS

Competing of Interest

The authors declare no competing interest in this study.

Acknowledgment

Not applicable.

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