

Mycobacterium bovis Granulomatous Pachymeningitis after Intravesical BCG Immunotherapy

Sevcan Turk , John Kim 

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Intravesical adjuvant administration of attenuated live strain of *Mycobacterium bovis* or the bacillus Calmette–Guerin (BCG) is the choice of care for high-grade non-muscle invasive bladder cancer after resection.¹ BCG vaccine is also used to prevent *Mycobacterium tuberculosis* (TB) in many countries. Although mostly safe, intravesical injected BCG may stay in the urinary tract for more than a year and cause local or disseminated infection, especially in immunocompromised patients. Urinary tract-psoas abscess, pulmonary TB, mycotic aortic aneurysm, bone–joint infections, and even Guillain–Barre syndrome are some of the reported conditions.² We present a rare and possibly the first reported case of *M. bovis* intradural, extramedullary granulomas following BCG immunotherapy.

A 67-year-old male with a history of bladder cancer status post-transurethral resection of bladder tumor and adjuvant intravesical BCG administration in 2017 presented with altered mental status, back pain, tingling sensation in lower extremities, and back pain 2 years later. MRI showed a large intradural enhancing thoracolumbar mass (Figure 1). Lumbar puncture revealed elevated leukocyte of 435/mm³, protein of 2907 mg/dl, and low glucose of 28 mg/dl. He underwent L1–L4 laminectomies for intradural debridement and biopsy, with pathology showing soft tissue with chronic necrotizing granulomatous inflammation with no evidence of microorganisms. However, a broad range polymerase chain reaction (PCR) test and cultures were positive for *M. bovis*, most likely from his previous BCG therapy.

Follow-up MRI (Figure 2) showed posterior epidural rim-enhancing fluid collections from L2 to S1 levels. There was also pachymeningeal enhancement and high T2 signal of lower spinal cord. Proteinaceous material surrounding the cauda equina nerve roots was seen.

M. bovis is a causative agent of TB in cattle but can cause TB-like infection in humans. Diagnosis of TB requires a positive culture, PCR positivity, or a biopsy showing caseating granulomas.

BCG is the mainstay adjuvant therapy of bladder cancer. Osteomyelitis (Pott's disease), cerebral tuberculoma, ocular infections, cauda equina nerve root involvement, and other systemic complications have been described in the literature following BCG therapy. Although cases of *M. tuberculosis* spinal tuberculomas or granulomas have been described, there

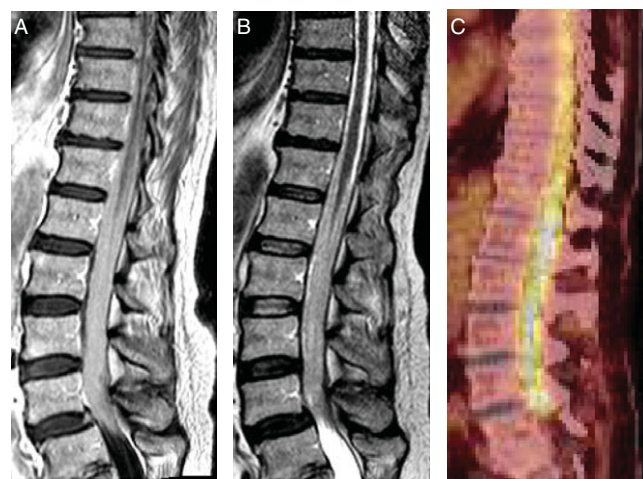


Figure 1: Contrast-enhanced T1-weighted images demonstrate a large intradural, extramedullary thoracolumbar mass encasing the cauda equina with thick leptomeningeal enhancement (A). There is also diffuse intrathecal T2 hypointense signal suggestive of material involving the conus and cauda equina nerve roots (B). PET-CT shows FDG uptake within the intradural mass and along the surface of the cord (C).

are no cases reported of *M. bovis* intradural, extramedullary granulomas following BCG therapy.³ Imaging features may be characteristic with central T2 hypointensity in TB granulomas.⁴ Most of the time, imaging findings are not specific, but *M. bovis* infection should always be considered in patients with bladder cancer therapy as the diagnosis may be delayed, as in our case.⁵ Differential diagnoses for intradural, extramedullary mass includes lymphoma, neurosarcoma, and TB. It is important to consider *M. bovis* tuberculoma and infection in patients with intradural extramedullary mass and prior history of BCG therapy.⁶

From the University of Michigan, Radiology Department, Neuroradiology Division, Ann Arbor, MI, USA (ST, JK)

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Correspondence to: Sevcan Turk, University of Michigan, Radiology Department, Neuroradiology Division, Ann Arbor, MI, USA. Emails: sevcant@med.umich.edu, johannk@med.umich.edu

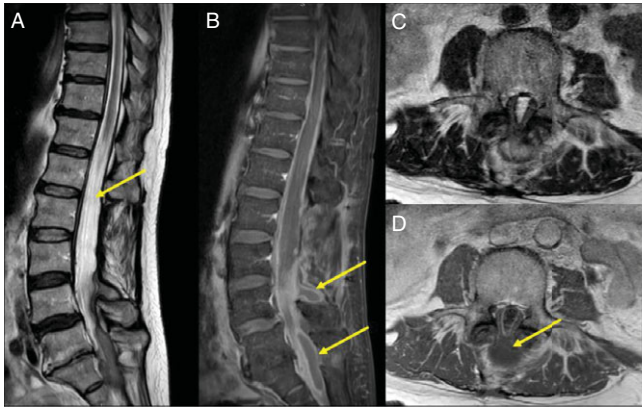


Figure 2: T2-weighted (A, C) and contrast-enhanced T1-weighted (B, D) images show increased T2 prolongation within the cauda equina and thecal sac with rim-enhancing collections.

DISCLOSURES

The authors have no conflicts of interest to declare.

STATEMENT OF AUTHORSHIP

ST and JK equally contributed to writing this case report.

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