Neuroimaging Highlight

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MRI of Spinal Nocardial Abscess

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A 75-year-old female with severe chronic obstructive pulmonary disease [COPD] presented to the emergency department with a history of progressive left leg weakness for two weeks and a sudden onset of right leg weakness a day prior to admission. The patient was on prednisone (10mg/d) for a year and the dosage had been recently increased a week earlier because of worsening COPD. The morning after admission, the patient developed complete lower paraplegia with mid-thoracic sensory levels. A magnetic resonance image (MRI) of the spine demonstrated extensive edema (Figure 1) and mild swelling of the thoracic cord. The pre-gadolinium T1 and T2-weighted images were suboptimal due to patient motion but suggested a focal mid-thoracic spinal cord lesion. Post-gadolinium T1-weighted MRI images (Figure 2, 3) revealed three adjacent ring-enhancing intramedullary lesions in a multiloculated pattern at T6 and T7 levels. The enhancement rim was conspicuously regular and thin, with no evidence of nodularity, thus favoring a diagnosis of multiloculated intramedullary abscess over tumor.

A CT scan of the head with contrast showed no evidence of intra-cranial infection. Chest x-ray showed hyperinflation consistent with COPD but no focal lesions. She underwent a T6 and T7 laminectomy and durotomy for aspiration of the abscess. A swollen spinal cord was seen at surgery and purulent material was drained from all the locules. The aspirated fluid was cultured, showing positive growth of *Nocardia asteroides* species. Intravenous sulfamethoxazole/trimethoprim and cefotaxime were then administered. Postoperatively the patient developed respiratory complications and was transferred to the intensive care unit. At discharge ten days later, there was partial recovery of sensation in the right leg with persistence of flaccid paraparesis.

Nocardia species are gram-positive, aerobic, branching filamentous organisms with variable acid-fast staining[1] that commonly cause infections in immunocompromised patients.[2] The most common cause of nocardial infection in humans is *N. asteroides*, which presents as lung disease by inhalation.[3] The central nervous system (CNS) is a common secondary site of infection, usually due to hematogenous dissemination from an extracranial source like the lungs.[3] Though secondary CNS infection is found in up to 44 % of those with systemic nocardial infection,[4] it can also be the primary site in up to 38% of patients.[5] Cerebral abscesses due to nocardial infection have been well-documented in the literature, and tend to be multiloculated, demonstrating ring enhancement after contrast injection.[3-6] However, spinal cord infection is extremely rare and has been reported only a few times in the literature.[6-12] We present a case of a multiloculated spinal intramedullary nocardial abscess demonstrated using MRI.

Nocardia infections usually occur in the immunocompromised host and have been reported in patients with lymphoma, tuberculosis, AIDS, solid tumors, hematological malignancies and organ transplant recipients on immunosuppressive drug therapy.[2] Central nervous system infections form a common secondary site of infection and are usually associated with high morbidity and mortality.[10] Supratentorial abscesses are seen more commonly than infratentorial lesions and these are single in 54% and multiple in 38% of cases.[13]

Nocardia infection of the spinal cord is extremely rare and usually presents as an intramedullary lesion,[6-11] with only one

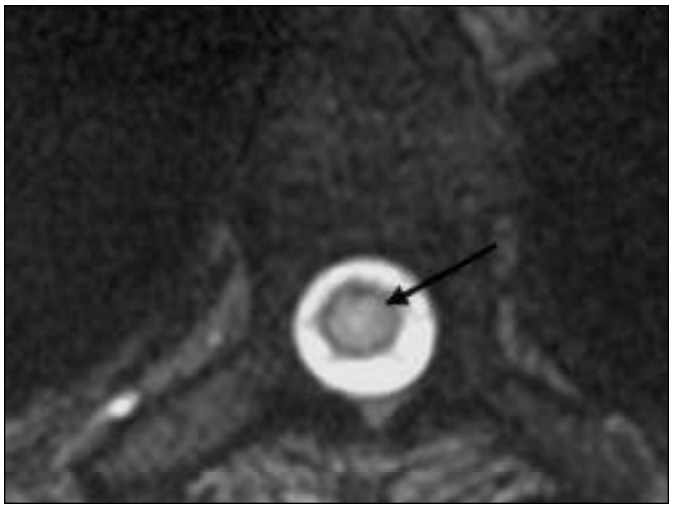

Figure 1: *T2 weighted axial image reveals hyperintensity within the thoracic cord suggestive of edema.*

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Figure 2: *Post-gadolinium T1 weighted sagittal image reveals a multiloculated ring enhancing lesion within the thoracic spinal cord at T6-T7 level.*

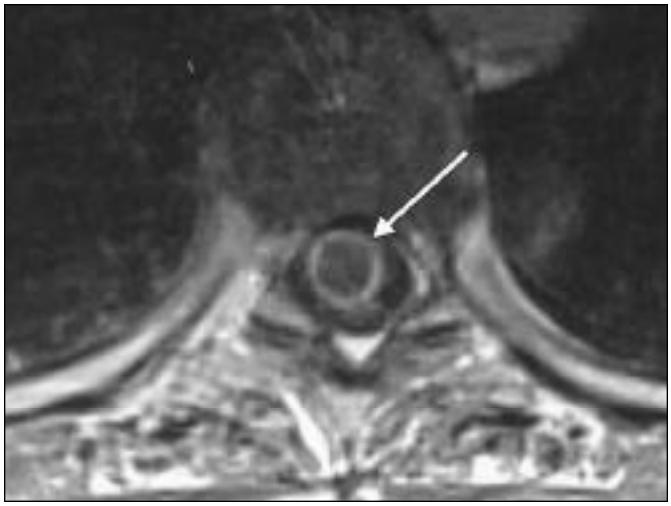

Figure 3: *Post-gadolinium T1 weighted axial image through the area of interest shows one of the ring enhancing locules.*

reported case showing a solitary intramedullary abscess without extraneurological involvement.[12] It has been associated with cerebral and cerebellar abscesses,[6,9,11] hilar mass,[11] chest infiltrates and mastoid abscess.[10] Intramedullary involvement of the spinal cord is typically reported as unilocular and ring enhancing.[6,9,10,12] There have also been few cases of nocardial epidural abscesses reported in the literature.[14-17] To the best of our knowledge this is the first case of nocardial spinal abscess presenting in a multiloculated pattern rather than the usual unilocular variety. This multiloculated appearance seen in our case resembles the more common appearance of intracerebral nocardia abscesses, which are often described as single or multiple, multiloculated and ring enhancing.[7,8,18,19] The differential diagnosis of such ring enhancing lesion in the cord includes tumor, demyelination and infections such as tuberculosis, cysticercosis and fungi.

The usual signs of infection in the immunocompromised patient are commonly blunted,[20,21] therefore making imaging an essential tool in early diagnosis. Diagnostic imaging can also help in differentiating between neoplastic and infectious etiologies, both of which can occur in immunocompromised patients. This case illustrates that nocardial infection should be high on the differential diagnosis of any intramedullary spinal abscess in an immunocompromised patient since early diagnosis and treatment may help decrease the high morbidity and mortality of the disease.

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