Concurrent intra-medullary and intra-cranial tuberculomas

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ABSTRACT

Although tuberculosis of the central nervous system is well known, the incidence of intra-medullary tuberculomas is low and a combination of intra-medullary with intra-cranial tuberculomas is extremely rare. This communication reports a case of disseminated (intra-medullary, intra-cerebellar and intra-cerebral) tuberculomas in a six-year-old girl initially presenting with a spinal tumour syndrome. Conservative treatment with anti-tuberculotic medications and a short course of injectable steroids resulted in complete resolution of her symptoms.

KEY WORDS: Tuberculoma, spinal cord, MRI

Intra-medullary tuberculomas are rare and constitute only 0.2 to 5% of all central nervous system (CNS) tuberculomas. The combination of intra-medullary and intra-cranial tuberculomas is extremely rare and only three cases have been reported in the literature so far. This communication reports a case of intra-cerebral, intra-cerebellar and intra-medullary tuberculomas in a young girl. The value of MRI for monitoring the efficacy of non-operative treatment is emphasised.

Case History

A 6-year old, fully immunised girl presented with six-week long asymmetric weakness in both the lower limbs, progressing to a point where she could no longer walk independently. She had no sensory involvement and was continent. Her father had taken complete anti-tuberculous treatment (ATT) for pulmonary tuberculosis two years ago. On examination, on Medical Research Council (MRC) grading her muscle power was Grade 2 in the right lower limb and Grade 3 in the left lower limb. Sensations were normal and she had bilateral ankle clonus with extensor plantar reflexes bilaterally. There was no evidence of cerebellar dysfunction, cranial nerve or upper limb involvement. Respiratory examination revealed no abnormalities and her chest radiograph was normal. On haematological examination, the leucocyte count was 10,500/cmm and the ESR at the end of one hour was 5 mm. Radiographs of her dorso-lumbar spine revealed no abnormalities. The Mantoux test and ELISA for HIV were negative.

The sagittal T1-weighted MRI images showed a fusiform dilatation of the spinal cord, at T8-9, with ill-defined hypointensity. The sagittal T2-weighted images showed hyperintensity at T7-10 segments with hypodensity at T8-9 level (Figure 1). The axial T2-weighted images revealed a rounded hypointense lesion within the spinal cord surrounded by oedema, suggestive of an intra-medullary lesion. On administration of Gadolinium-DTPA contrast, the lesion demonstrated ring enhancement at the T8 level. There was no abnormality in the vertebral bodies or the paraspinal soft tissues. This lesion, due to its characteristic location, size and classical ring enhancement with surrounding oedema, was thought to be typical of a tuberculoma. The pilot sagittal cut of the MRI revealed a tuberculoma in the brain as well. The MRI of the brain showed the presence of characteristic ring-enhancing lesions in the right frontal (Figure 2) and right cerebellar regions (Figure 3), with surrounding oedema. On T2-weighted
images, the cerebellar lesion had a hyperintense centre while the cerebral lesion had a hypointense centre.

The patient was treated with a four-drug ATT regimen [streptomycin, rifampicin, isoniazid (and pyridoxine) and pyrazinamide] for a period of two months, which was followed by rifampicin and isoniazid for an additional period of 10 months. She was also given injectable dexamethasone, as a bolus of 16 mg, followed by 4 mg thrice daily for three days. Dexamethasone was tapered off over the next four days.

Within a week, she started showing signs of recovery in the form of gradual improvement in her power. At discharge at the end of two weeks, she was able to walk with the aid of a walker. She continued making steady improvement in her neurological status. An MRI done at the end of 3 months showed a significant decrease in the size of the cerebral and cerebellar tuberculomas with resolution of oedema around the intra-medullary tuberculoma. At the end of a year she demonstrated a full neurological recovery and a repeat MRI showed complete resolution of the cerebral and cerebellar tuberculomas. However, a residual granuloma with surrounding gliosis was seen in the thoracic segments of the spinal cord.

**Discussion**

Extra-pulmonary tuberculosis occurs as a result of haematogenous spread from a primary focus, usually the lung. CNS involvement is less frequently encountered as compared to the involvement of other systems and is seen in up to 10% of patients with systemic tuberculosis. Dastur found that 50% of cases with CNS involvement were below 10 years of age. The brain is far more commonly affected than the spinal cord; Citow and Ammirati report the ratio to be 42:1. This may have something to do with the relative masses of neural tissue in them. There may be no evidence of extra-neural tuberculosis in up to a third cases of neutrotuberculosis. Therefore, the absence of an extra-neural source, as in our case, should not rule out the possibility of tuberculous aetiology.

The most frequent manifestations of CNS tuberculosis are tuberculous meningitis and intra-cranial tuberculomas. The most common form of intra-dural spinal tuberculosis is meningitis. Intra-medullary tuberculomas are rare and constitute only 0.2 to 5% of all CNS tuberculomas. Arseni and Samtica found only five intramedullary tuberculomas in their series of 210 cases of CNS tuberculosis. Kumar et al reported that three of their six cases had other intra-cranial tuberculomas in addition to their brainstem lesions, but none of them had a spinal cord lesion. Bucy and Oberhill reported six cases of tuberculomas of the spinal cord, out of these three had other CNS tuberculomas, they did not specify where. There have been few reports subsequently. Concurrent intra-medullary and intra-cranial tuberculomas are rare with only three cases being reported in the literature. The combination of these with intra-cerebellar tuberculomas is even less common.

MRI has revolutionised the imaging of tuberculomas and the diagnosis can be made with reasonable certainty, avoiding the need for an invasive procedure. Intracranial tuberculomas have been described as low-intensity lesions with or without central hyperintensity (because of varying amount of caseous necrosis) on T2-weighted images and as hypo to isointense lesions on T1-weighted images. The differential diagnosis of intramedullary tuberculomas includes granulomas such as tuberculomas and cysticercal granulomas, and neoplastic lesions such as astrocytoma, metastasis or lymphoma. Intense peripheral enhancement may be explained by prominent vascularity seen on microscopy. Some of these lesions also show hypointensity on T2-weighted images. However, in this case, the clinical picture and the size of the lesion combined with the classical ring enhancement and surrounding oedema was thought to be typical of a tuberculous granuloma. The resolution of the pathological changes in the brain as well as the spinal cord as seen on the MRI after the institution of anti-tuberculous treatment confirmed our belief.

MRI was useful to monitor the response to treatment and obviate the need for surgery, which is not without its risks. The polymerase chain reaction (PCR) is a useful and effective adjunct in the diagnosis of CNS tuberculosis, especially when...
combined with MRI and has been recently added to our diagnosti-
cr armamentarium. A combination of the PCR and the 
MRI can enable us to make a diagnosis of neurotuberculosis
with a reasonable degree of certainty, without resorting to an
invasive biopsy. At the time the patient presented to us, this
facility was not available and we had to rely on the clinical
response to the anti-tuberculous treatment to confirm the di-
agnosis of tuberculosis in our patient.

There have been proponents of both, surgery and conserva-
tive management of intra-medullary tuberculomas. Our pa-
tient demonstrated gratifying clinical response to anti-tuber-
culous therapy and anti-oedema measures. The conservative
treatment was also successful in achieving complete clinical
neurological recovery over a period of one year, which was ac-
companied by almost complete resolution of the tuberculomas.
This report emphasises the fact that intra-medullary tu-
berculoma can be associated with the presence of intra-cranial
tuberculomas, though the latter could be asymptomatic. Al-
though screening of the brain helped us pick up the presence
of intra-cranial tuberculosis, there is insufficient evidence to
recommend such screening on a routine basis. However, the
case does prove that medical treatment can achieve a good
clinical outcome and that surgical intervention may not al-
ways be indicated. Surgery should be reserved for cases show-
ing progressive deficit in spite of adequate medical manage-
ment.

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