Disseminated tuberculosis manifesting as pulmonary, meningeal and spinal tuberculosis in an immunocompetent patient

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SUMMARY

Disseminated tuberculosis is characterised by concurrent tubercular involvement of two or more non-contiguous organs. It is an unusual presentation of tuberculosis, especially in the absence of immunodeficiency. We describe a young, immunocompetent patient who presented with fever, cough, headache, diplopia and paraparesis. On examination, the patient had positive Kernig's sign, right third cranial nerve palsy and bilateral sixth cranial nerve palsy, bilateral lower limb weakness and crepitations on lung auscultation bilaterally. Chest radiogram revealed bilateral pulmonary tuberculosis. CT of brain showed hydrocephalus and MRI of spine showed collapse of lumbar vertebrae with paravertebral cold abscess. Sputum microscopy was positive for acid fast bacilli, cerebrospinal fluid analysis was suggestive of tubercular meningitis and CT-guided biopsy of the vertebral lesions revealed caseating granulomas with acid fast bacilli. The patient received antitubercular therapy with initial treatment with steroids and he improved clinically at the end of a 9-month treatment.

BACKGROUND

Tuberculosis (TB) is an important health concern of developing nations. However, the sheer number of people living in endemic countries makes TB a major problem haunting mankind on this planet, both by mortality and by its effect on economic growth. TB affects the lungs as well as extrapulmonary tissues. Disseminated TB is defined by concurrent involvement of more than two contiguous organs by TB.¹ However, disseminated TB is a relatively rare disease, especially in an immunocompetent person. We report such an unusual immunocompetent patient who presented with concurrent tubercular infection of lungs, meninges and vertebrae.

CASE PRESENTATION

A 25-year-old man was brought by his father with complaint of weakness in both legs and inability to walk without support for last one-and-a-half month. He also complained of headache, vomiting and intermittent fever for 3 months. The patient was also troubled by double vision and drooping of right eyelid for last 2 months. He had low backache for 2 months and productive cough for 1 month. He denied history of weakness in upper limbs, or any sensory or bowel and bladder complaints. His appetite was markedly decreased and he had lost about 15 kg weight in the last 3 months. He had no history of contact with any TB case.

On clinical examination, he was conscious and oriented with normal higher mental functions. He had neck stiffness with a positive Kernig's sign. Examination of the back revealed a kyphotic deformity of lower back in the lumbar region with a palpable paravertebral soft tissue collection. Marked tenderness was present on palpation of spinous processes. His right eye movements were restricted in adduction, elevation and depression. In addition, adduction of both eyes was impaired. Thus, he had features of right third and bilateral sixth nerve palsy. Motor system examination showed a reduced tone in both lower limbs. He had grade 3/5 MRC (Medical Research Council) power in muscles of both lower limbs. Bilateral knee and ankle jerks were diminished and planters were bilateral flexors. Sensory examination was normal. He did not have any positive cerebellar or extrapyramidal features. Chest auscultation revealed bilateral scattered crepitations.

INVESTIGATIONS

Patient's routine laboratory evaluation revealed normal blood counts, haemoglobin, kidney and liver function tests. However, his erythrocyte sedimentation rate was 98 cm at the end of 1 h by Westergren's method. Chest radiograph showed bilateral pulmonary infiltrates suggestive of TB (figure 1). Contrast-enhanced CT brain (figure 2) showed abnormal enhancement along sylvian

Figure 1 Chest radiograph showing bilateral infiltrates suggesting military tuberculosis.

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Figure 2 CT of the brain showing communicating hydrocephalus.

fissures and cortical sulci. Third and both lateral ventricles were dilated. It had features of obstructive hydrocephalus with abnormal meningeal enhancement consistent with meningitis. MRI of lumbosacral spine with contrast (figure 3A–D) revealed lost intervening disc space at L3/L4 level with left laterolisthesis of L3 over L4 vertebra with end plate irregularities. Signal intensity alteration was noted in L2, L3 and L4 vertebrae. Kyphosis was seen in the lumbar spine with marked scoliosis with convexity towards the left. Soft tissue lesion displaying signal intensity alterations with heterogeneous postcontrast enhancement was seen in prevertebral and paravertebral space extending from L1/L2 to L4 level suggesting a cold abscess. The paravertebral abscess was also extending to medial fibres of the right psoas

muscle and left paraspinal muscles at L4/L5 level. Mild clumping of the cauda equine nerve roots was also seen. MRI findings as described were suggestive of spinal TB (Pott's spine).

A sputum smear microscopy with Ziehl–Neelsen (ZN) stain was positive for acid fast bacilli. Cerebrospinal fluid (CSF) examination was carried out which showed 150 cells/mm³, which included 95% lymphocytes and 5% neutrophils, but was negative for acid fast bacilli. CSF protein levels were 180 mg/dl, sugar was 58 mg/dl and chloride was 109 mEq/l. Thus, the CSF picture was suggestive of tubercular meningitis. Furthermore, a CT-guided biopsy of the vertebral lesion was carried out. Histopathology of the specimen revealed caseating granulomas with acid fast bacilli on ZN staining. Thus, our patient had laboratory confirmed pulmonary, meningeal and spinal TB.

TREATMENT

The patient was started on antitubercular therapy with isoniazid, rifampin, pyrazinamide and ethambutol for 3 months followed by isoniazid and rifampin for 6 months. He was initially given a short course of corticosteroids with dexamethasone which was tapered over 4 weeks. The patient was advised bed rest for the initial 4 months in view of spinal TB, followed by gradual mobilisation and physiotherapy.

OUTCOME AND FOLLOW-UP

At the end of antitubercular therapy, patient's cough, fever, headache, vomiting and diplopia were relieved. His right third and bilateral sixth cranial nerve palsies were also relieved.

Figure 3 (A–D) MRI of spine showing loss of intervening disc space at L3/L4 level with left laterolisthesis of L3 over L4 vertebra with end plate irregularities. Signal intensity alteration seen in L2, L3 and L4 vertebrae. Kyphosis in lumbar spine is visible with marked scoliosis with convexity towards the left. Clumping of cauda equine nerve roots is seen in axial T2-weighted image.

Patient recovered power in both lower limbs and was able to walk without support.

DISCUSSION

Mycobacterium tuberculosis usually gains access to the human body through inhalation of droplets leading to formation of a pulmonary focus which is usually contained by cell mediated immunity. If this leads to direct infection, it is called primary TB. Reactivation at a later age is called postprimary or secondary TB. This may spread to other organs by dissemination via blood. However, the factors which are responsible for reactivation and haematogeneous spread of tubercle bacilli to various organs include alcoholism, congestive heart failure, uncontrolled diabetes, chronic obstructive pulmonary disease or an immunocompromised state due to HIV infection, long-term steroid or immunosuppressant drug use, malnutrition, neoplasms and an inherited defect in cell mediated immunity.

Lungs are usually the first site of tubercular infection. Tubercle bacilli usually infiltrate the apices of lungs. However, in extensive pulmonary TB, there can be involvement of all lobes of the lungs. Similarly, in patients with haematogenously spread TB or military TB, there is extensive pulmonary involvement. Even in patients with extrapulmonary TB, the primary focus of infection is in the lungs, from where it can spread haematogenously to distant organs or via lymphatics to contiguous structures.

Spinal TB is one of the oldest described diseases of mankind. Skeletal TB accounts for about 10–35% of cases of extrapulmonary TB and overall approximately 2% cases of TB.¹ Spine is involved in about half of the cases with TB.² HIV infection is a major risk factor for spinal TB.³ However, our patient was HIV negative. Haematogeneous spread of mycobacteria from a pulmonary or lymph node focus leads to spinal TB. It is usual to find constitutional features before symptoms from spinal involvement are clinically manifested. The tubercular caseous necrotic material and tissue debris form a paraspinal cold abscess.

Kalita and Misra.⁴ found that 20 of 165 patients with tubercular meningitis had military pulmonary TB. They found that the military TB in these patients was of mostly reactivation type. None of their patients were immunocompromised. Hence, they hypothesised that malnutrition may be an important factor contributing to such dissemination of mycobacteria. There have

been previous case reports of patients with disseminated TB. Ayaslioglu *et al*⁵ described a case of disseminated TB with pulmonary, lymph node, splenic and scrotal involvement. Kishore *et al*⁶ reported extensive TB affecting lungs, eyes, testes, brain, bone, kidneys, liver, spleen and possibly the gastrointestinal tract. Das *et al*⁷ presented a case with multidrug resistant disseminated TB involving pleura, pericardium, peritoneum and intra-abdominal lymph nodes.

In the absence of any obvious predisposing illness or immunodeficiency, dissemination of TB in our case can be explained by deficiency of cell mediated immunity due to malnutrition.

Learning points

- ▶ Disseminated tuberculosis (TB) represents an extreme form of tubercular infection.
- ▶ Though immunocompromised persons are predisposed for such dissemination, it may occur in immunocompetent patients also. Malnutrition may be a contributory factor.
- ▶ Any patient with pulmonary or extrapulmonary TB should always be screened for TB of other organs.

Competing interests None.

Patient consent Obtained.

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