International Journal of Radiology Research
www.radiologyjournal.in
E-ISSN: 2663-4562, P-ISSN: 2663-4554
Received: 13-01-2021 Accepted: 28-01-2021; Published: 12-04-2021
Volume 3, Issue 1, 2021, Page No. 42-45

Disseminated Tuberculosis

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Abstract
Disseminated tuberculosis (TB) is a life-threatening disease resulting from the hematogenous spread of *Mycobacterium tuberculosis.* Miliary pattern on chest radiography is a common finding that has an important role in the early detection of the disease. Chest radiography and tuberculin test are not contributing in the diagnosis. Imaging studies are helpful adjunct tools for disseminated TB as they can help determine the involved sites and guide technicians to obtain appropriate specimens for diagnosis. Clinical confirmation of the diagnosis of disseminated TB is usually based on bacteriological or histological evidence.we report four cases of disseminated of Tuberculosis involving two and more sites.

Keywords: disseminated tuberculosis, hematogenous, *Mycobacterium tuberculosis*

Introduction

Disseminated tuberculosis is defined as the presence of two or more noncontiguous sites resulting from hematogenous dissemination of *Mycobacterium tuberculosis*, occurring as a result of progressive primary infection, reactivation of a latent focus with subsequent spread or rarely through iatrogenic origin. Disseminated tuberculosis is a life-threatening condition, especially if the diagnosis and treatment are delayed [1] The diagnosis is difficult because of its nonspecific clinical picture and the paucity of tools available for confirmatory laboratory diagnosis, such as low sensitivity of acid-fast bacilli (AFB) smear, time-consuming cultures, and the inability to easily detect miliary changes in chest X-ray. Only 1.5% of children with tuberculosis have skeletal involvement, mainly the spine and the major weight bearing joints. Multifocal skeletal disease is uncommonly reported in children and unlike in adults they involve the peripheral skeleton more commonly than the axial skeleton.

Tuberculous osteitis occur secondary to lymphohemato-genous dissemination at the time of initial pulmonary infection with local reactivation.

Sternal tuberculosis represents less than 1% of tubercular osteomyelitis.

We report five cases of disseminated tuberculosis ie

1. A case with miliary lung lesions with multiple osteolytic lesions of the skeletal system,
2. osteolytic lesions in cuboid and healed calcified grannoloma in rt apex.
3. spondylodiscitis with abd lymphadenitis
4. Sternal osteomyelitis with lung lesions – images not included.
5. TB dactylitis.

All cases are confirmed on histology study & revealed caseating giant cell granulomas with epithelioid cells with or without acid fast bacilli.

Case 1: A 32 year old male patient presented to the OPD with symptoms of abdominal pain and abdominal distension since 15 days, swelling of both lower limbs.

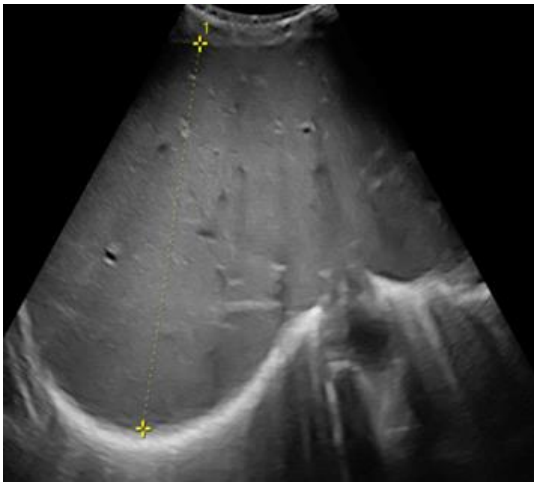

Fig 1: USG abdomen: calcified granuloma.

Fig 2: Chest X ray: Diffuse miliary opacities in bilateral lung fields.

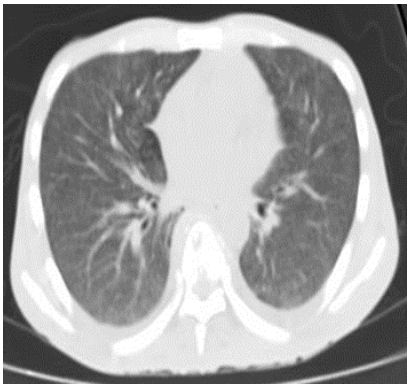

Fig 3: Axial CT lung window: Diffuse ground glass haziness with miliary nodules.

Fig 4: Axial CT abdomen window: Calcified granuloma in segment VI / VII right lobe of liver.

Fig 5: Skull lateral radiogram: Punched out lytic lesions in skull.

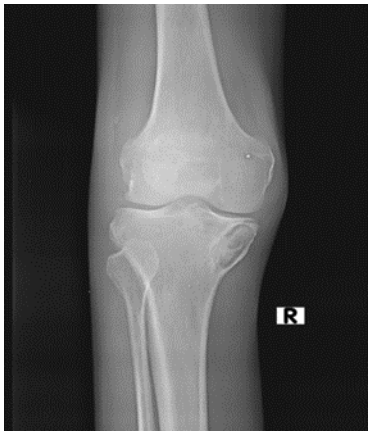

Fig 6: Right knee AP radiogram: Well-defined expansile lytic lesion in proximal medial tibial condyle with no obvious extension into the joint space.

Fig 7: Pelvis AP radiogram: Unilateral left sided sacro-illitis.

The following DD's were considered

1. Multiple myeloma - ruled because of age and biopsy.
2. Lymphoma,
3. Eosinophilic granuloma,
4. Metastases were considered and ruled out.
5. Disseminated tuberculosis was considered.

Case 2: Tuberculous spondy-discitis with classical paraspinal cold abscess and pulmonary granuloma.

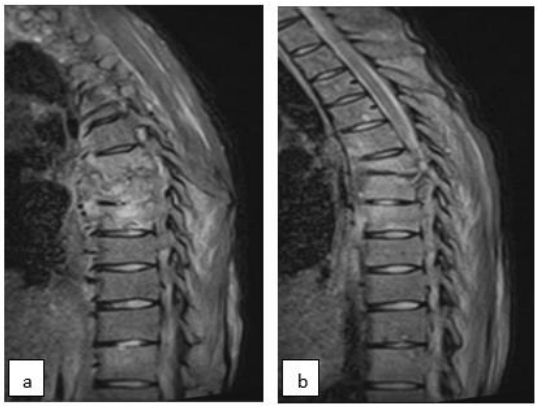

Fig 8: *A & b*: MRI STIR sequence: sagittal sections – Wedge compression fracture of D7 vertebra with reduction of intervertebral disc space and enhancing paravertebral collection – suggestive of tuberculous spondylodiscitis.

Case 3: MRI of isolated osteolytic lesion of cuboid bone with breach cortex with peripheral enhancing collection.

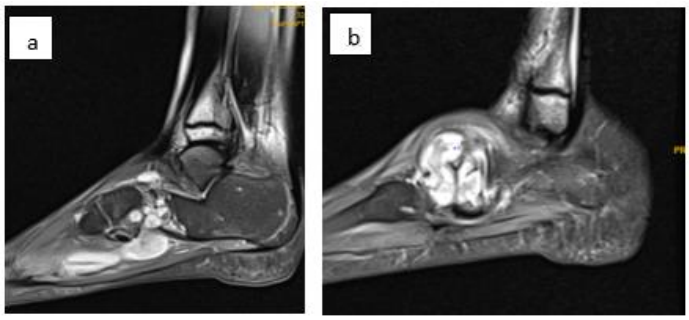

Fig 9: A & b: Sagittal PDFS: Breach in cortex of cuboid bone with associated multilobulated cystic lesion.

Fig 10: c & d: T1 sagittal sequence: Breach in cortex of cuboid bone.

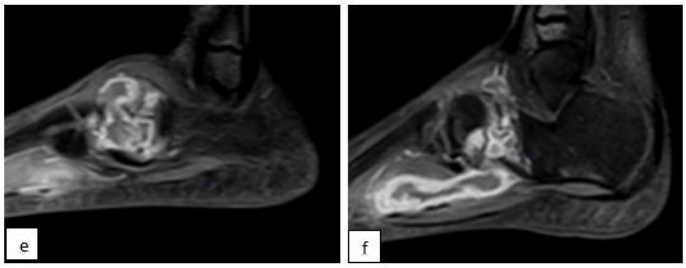

Fig 11: e & f: Sagittal Post contrast T1 fat saturated images: Multilobulated peripherally enhancing collection.

Case 4: 24 yr old with painful swelling of right proximal phalanx of 2nd and 4th toes with cervical lymphadenitis with osteolytic expansile lesion with break in cortex.

Discussion

Tuberculosis (TB) is a chronic infectious disease caused by *M. tuberculosis* and may invade all organs but mainly affect the lungs. The clinical presentation of TB is variable with symptoms reflecting the underlying organ involved.

Hepatic/ Splenic tuberculosis is rare [7] and constitutes less than 1% of all cases of this infection[1]. Hepatic tuberculosis may occur in primary and secondary tuberculosis, and is particularly common in disseminated tuberculosis. The miliary tuberculosis subtype is the most common form of hepatic tuberculosis. It presents as diffuse, multiple miliary micro-nodular lesions (2.0 cm in diameter on CT scan), often as a part of tuberculosis in the whole body. Imaging reveals findings of hepatomegaly and micro-nodular lesions, but it is extremely difficult to find non-calcified lesions < 0.5 cm in diameter with CT scan. Mixed tuberculosis, also known as miliary macro-nodular tuberculosis, has different coexisting pathological stages, including granulomas, liquefaction necrosis, fibrosis or calcification.

Reid *et al*, 1842 reported the first case of calvarial tuberculosis Strauss-1942, Mohanty [4] *et al* 1981 have also reported calvarial tuberculosis. Three types of the lesions of tuberculosis osteitis are described at conventional radiography. Perforating tuberculosis of the skull [4], diffuse tuberculosis of the cranium [5], circumscribed sclerotic type. CT demonstrates soft tissue swelling with accompanying destruction of one or both skull tables. A bony sequestrum may also be seen.

Skeletal tuberculosis is reported in Egyptian mummies dating back to 9000 BC. Skeletal tuberculosis is reported in Egyptian mummies dating back to 9000 BC. Skeletal TB entails for 10-35% of cases of extra pulmonary tuberculosis, and 2 percent of all TB cases. Up to 50% of the extra pulmonary tubercular infections occur in the spine. Tuberculosis can involve any bone, but it is rare in the Ischia, pubic bones, sternum, coccyx [6]. Tuberculosis of the shaft of tubular bones makes up less than 1% of all cases of skeletal tuberculosis.[7]Extra spinal tuberclar osteomyelitis in appendicular skeleton presents as a cold abscess, Brodie's abscess, cystic bone lesions, bone tumors, chronic pyogenic osteomyelitis or fungal/bacterial granulomatous lesions, and even sarcoma. Tuberculosis of tibial diaphysis (like our case) is very rare in Western Countries but high index of suspicion is required in patients of Asian or African origin with chronic inflammatory swelling over the leg with fewer or none constitutional symptoms.

Cystic lesions resulting from tuberculosis in the skeletal system are uncommon (like our case) and may appear in patients older than 30-40 years [8, 9].

Spine Radiographs may be normal in the early stage of disease plain films continue to be the initial screening procedure when infectious spondylitis is suspected[10]. This is because radiographic changes are often present at the time of the initial study. Earliest findings are radiolucencies and the loss of definition of the plate margins, later vertebral body destruction (predominantly anterior), loss of disk height, erosion of end plates, vertebral geodes, bone sequestration, sclerosis and paravertebral masses[3]. Advanced stages of the disease are characterized by: sclerosis from reparative processes, bony ankylosis, vertebral collapse and anterior wedging leading to progressive kyphosis and gibbus deformity [11]. MDCT technology evaluates radiographic findings and the lesion extent, due to its high contrast resolution and its tomographic nature.(Fig) The new MDCT technology provides excellent multiplanar reconstruction imaging for the assessment of bone and soft tissue infection, essential for presurgical planning. Intravenous contrast administration clearly shows the multiloculated cystic paraspinal masses, enhancing the granulomatous tissue and the walls of abscesses located in both bone and soft tissues. Four types of body destruction described ie fragmentary, osteolytic, subperiostal and localized, the fragmentary type predominates and consists of numerous residual bony fragments which frequently migrate into soft tissue masses. It is strongly suggestive of TB [10].

MRI is considered the method of choice in spinal infection because it combines high sensitivity with satisfactory specificity [12] as it enables anatomic localization of the disease in different

planes, allows early detection of disk and bone destruction, and depicts extension in bone and soft tissues, and assesses skip lesions in noncontiguous spinal TB.

Short time inversion recovery (STIR) sequence detects initial infective focus as inflammatory edema. Four different MRI patterns of disease are found in vertebral TB: paradiskal, anterior, central and posterior lesions [13]. Paradickal infection begins in the vertebral metaphysis, eroding the cartilaginous end plate, leading to disk space narrowing due to the infection itself or to disk herniation into the end plate. Due to osseous resorption, end plate demineralization with loss of cortical bone is observed. Compared to pyogenic spondylitis, TB typically shows more sharply destructive margins with absence of reactive sclerosis. Use of gadolinium is particularly useful for differentiation epidural fat and connective tissues, Abscessified collections phlegmons as well as in fluid collections. Anterior pattern the infection spreads underneath the anterior longitudinal ligament, Subligamentous dissemination stripes the periostium and the anterior longitudinal ligament from the vertebral surfaceand leading to anterior vertebral collapse, leading to kyphosisdue to combined ischemic and high pressure. MRI findings consist of a subligamentous abscess with contrast enhancement, preservation of the disks, and abnormal signal involving multiple vertebral segments with heterogeneous signal intensity. In central lesions the infection affects one single vertebral body. The disk remains healthy, since nutrition is provided from the adjacent vertebra. If the infection progresses, the whole vertebral body collapses, and can be confused with malignancy. Infection spreads to the contiguous vertebra or to the paraspinal space. MRI shows hypointense T1-weighted signal in a single vertebra and vertebral collapse with disk preservation. TB rarely affects the vertebral arch. The radiological pattern is frequently difficult to differentiate from metastasis, especially when disk space is preserved [12]. This occurs in only 5 % of cases [14].

TB dactylitis are younger than 6 years of age and its incidence among children with TB is reported to be 0.65–6.9%. The bones of the hands are more frequently affected than bones of the feet, with the proximal phalanx of the index and middle fingers the commonest sites for infection [16].clinical presentation will be painless swelling of a digit of a few months duration. The radiographic features of cystic expansion of the short tubular bones has led to the name of “spina ventosa” being given to TB dactylitis of the short bones of the hand. Periosteal reactions and sequestra are not common features but may occur. Sclerosis may be seen in long standing cases [17]. Diagnosis is confirmed on histology study revealed caseating giant cell granulomas with epithelioid cells with or whithout acid fast bacilli.

Conflict of Interest

Nil.

Funding

Nil.

Ethical Clearance

Obtained.

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