

An Unusual Cause of Widespread Lytic Bone Lesions Caused by Sarcoidosis

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ABSTRACT

We present a case of a 59 year old asymptomatic lady who was found to have incidental findings of pulmonary, osseous and hepatic involvement with sarcoidosis. The osseous lesions were lytic and involved unusual sites such as the vertebrae and skull base. The initial clinical concern had been of multiple myeloma or disseminated metastases. Biopsy of material obtained following mediastinoscopy revealed chronic, non-necrotising granulomatous lymphadenopathy indicative of sarcoidosis. Cases such as this could greatly benefit from multidisciplinary team discussion particularly when the clinical picture is not typical of malignancy.

CASE REPORT

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A 59 year old lady presented to the ENT surgeons with a left facial palsy which commenced following a coryzal illness. She was a non-smoker with no weight loss, other respiratory symptoms or cutaneous abnormalities.

She was initially referred for a MRI to assess her facial nerve, although due to claustrophobia she instead underwent a head and skull base contrast enhanced (50mls intravenous Omnipaque, GE Healthcare, Ireland), computed tomography (four slice CT, Siemens, Volume Zoom). No intra-cranial or parotid abnormalities were seen and the left facial nerve canal was normal. However, well-defined lytic areas were seen in the clivus, right occipital condyle and left anterior arch of the atlas on bone window images (Figure 1). Appearances were suspicious of either multiple myeloma or disseminated metastases. Serum electrophoresis, renal and liver function tests were normal. A skeletal survey revealed lytic lesions in the left humerus and right distal femur on plain radiographs (Figure 2). Plain radiograph of the chest in the posterior-anterior view demonstrated multiple small nodules in the right mid zone and a bulky right hilum (Figure 3). A contrast enhanced CT thorax and abdomen was performed which showed extensive mediastinal lymphadenopathy extending

around the right upper lobe bronchus, multiple lung nodules (Figure 4), numerous low attenuation liver lesions (Figure 5) and widespread vertebral, rib and pelvic lytic lesions (Figure 6). The overall suspicion was of a right upper lobe bronchogenic malignancy with liver and skeletal metastases.

A targeted liver biopsy only revealed minimal periportal chronic inflammation with no evidence of fibrosis or neoplasia. The lady was referred to the respiratory team and she then underwent lung function tests and a mediastinoscopy. Although there were some difficulties in performing the lung function tests due to the facial nerve palsy, the lung function tests with a face mask were completely normal. The mediastinoscopy showed hard nodular tissue surrounding the right pulmonary artery. Biopsy of this tissue revealed chronic, non-necrotising granulomatous lymphadenopathy. No acid fast bacilli or mycobacteria were seen following Ziehl Neelsen stains and there was no evidence of neoplasia.

The overall appearances allowed a diagnosis of sarcoid. The patient has not required treatment with oral corticosteroids and there has been no significant progression in radiological appearances over the past year. In addition, the patient still has a facial palsy and is under the care of the ophthalmologists.

DISCUSSION

Sarcoidosis predominantly affects the lungs, skin, lymph nodes, eyes and liver [1]. Osseous involvement in sarcoid is uncommon [2], usually represents the chronic disease state of sarcoidosis and is often associated with cutaneous, lymphatic or visceral involvement [3]. Osseous involvement usually causes a cystic osteitis of the phalangeal bones of the hands and feet although any part of the axial or appendicular skeleton may be involved [4, 5]. Rarer skeletal manifestations include multiple lytic lesions, permeative lesions with progressive tunnelling and remodelling of trabecular and cortical architecture or destructive lesions with rapid progression resulting in pathological bone fractures [3].

Vertebral sarcoid is extremely rare [3, 6] and most patients will have a known diagnosis of sarcoid. Patients with vertebral sarcoid are usually symptomatic from the bone lesions and nearly always present with radicular back pain both during activity and at rest [7-13]. MRI in vertebral sarcoid usually demonstrates lesions which are low signal on T1-weighted images and high signal on T2-weighted images [14]. MRI appearances in vertebral sarcoidosis can be similar to multiple myeloma and osteolytic bone metastases [14].

Our patient was unusual as she had widespread skeletal, pulmonary and hepatic involvement but was completely asymptomatic. The only other description of extensive vertebral sarcoidosis in a completely asymptomatic patient was reported by Waanders et al. In that particular case, the patient was referred for investigations because of renal impairment [14].

The thoracic spine is the most frequently affected site in vertebral sarcoid, although any area of the spine can be involved [7]. Our patient had numerous lesions throughout her vertebral spine including the cervical spine but did not have any pain or abnormal neurology. There are only 11 other reports of cervical spine involvement in the literature [15]. All of these reported patients apart from one either had localised cervical pain or a neurological deficit.

The skull is also an unusual site for involvement with sarcoidosis [16]. In a series of 29 patients with bone sarcoid, only one patient had skull involvement [17]. Sarcoid lesions in the skull can appear as isolated lucent lesions with well demarcated margins or as multiple lytic lesions with no surrounding sclerosis or reactive change [16]. Skull lesions can have increased uptake on technetium Tc99m methylene diphosphonate whole-body bone scintigraphy (bone scan), and Gallium Ga67 scintigraphy thereby aiding the detection of these lesions [16]. The patient in this report had sarcoid involvement of the clivus. The majority of the cases in the literature with sarcoid involvement of the skull describe skull vault changes although petrous involvement has been reported [18]. The present report is the only known description of involvement of the clivus with sarcoid. This reascertains the fact that although unusual sarcoid can involve any bone in the body.

Parotid involvement in sarcoidosis occurs in 10-30% of patients with systemic sarcoidosis and in 6% of patients with sarcoidosis there is isolated involvement of the parotid gland [19]. Petrous involvement can also account for facial nerve palsy in these patients. Although our patient presented with a facial nerve palsy, no parotid or middle ear abnormalities were seen to account for this. It is likely then that the facial nerve palsy in this case occurred secondary to the preceding viral illness.

In summary, the patient in this report had a constellation of pulmonary, osseous and hepatic involvement with sarcoidosis but was completely asymptomatic. Multiple myeloma or disseminated metastases are frequently the differential diagnoses for osseous sarcoid lesions and were initially suspected in this patient. This case highlights that a diagnosis of sarcoidosis should be borne in mind in the presence of multiple lytic osseous lesions in a completely asymptomatic patient. Due to a continuing increase in all radiological investigations there is also an increase in the number of unsuspected abnormalities. Cases such as this could greatly benefit from multidisciplinary team discussion particularly when the clinical picture is not typical of malignancy.

TEACHING POINT

Sarcoidosis is an important differential diagnosis for multiple lytic osseous lesions. Patients with widespread pulmonary, osseous and hepatic involvement with sarcoidosis may be completely asymptomatic.

REFERENCES

1. Dempsey O, Paterson EW, Kerr KM, Denison AR. Clinical Review: Sarcoidosis. *BMJ* 2009; 339:b3206. PMID: 19717499
2. James DG, Neville E, Carstairs LS (1976). Bone and joint sarcoidosis. *Semin Arthritis Rheum* 1976; 6(1):53-81. PMID: 785605
3. Rockoff SD, Rohatgi PK. Unusual manifestations of thoracic sarcoidosis. *AJR Am J Roentgenol* 1985; 144:513-528. PMID: 3155892
4. Johns CJ, Michele TM. The clinical management of sarcoidosis. A 50-year experience at the Johns Hopkins Hospital. *Medicine* 1999; 78:65-111. PMID: 10195091
5. Wilcox A, Bharadwaj P, Sharma OP. Bone sarcoidosis. *Curr Opin Rheumatol* 2000; 12:321-330. PMID: 10910186
6. Atanes A, Gómez N, De Toro FJ et al. The bone manifestations in 94 cases of sarcoidosis. *An Med Interna (Madrid)* 1991; 8:481-486. PMID: 1751686

7. Mangino D, Stover DE. Sarcoidosis presenting as metastatic bony disease. *Respiration* 2004; 71:292-294. PMID: 15133352
8. Valencia MP, Deaver PM, Mammarappallil MC. Sarcoidosis of the thoracic and lumbar vertebrae, mimicking metastasis or multifocal osteomyelitis by MRI: case report. *Clin Imaging* 2009; 33(6):478-81. PMID: 19857811
9. Rice CM, Beric V, Love S, Scolding NJ. Neurological picture. Vertebral sarcoidosis mimicking metastases. *J Neurol Neurosurg Psychiatry* 2011; 82:188. PMID: 20573613
10. Suárez Alvarez L, Micó Giner L, Alberola Carbonell C, Calabuig Alborch JR. Osseous infiltration in a patient with sarcoidosis. *Eur J Intern Med* 2006; 17(5):366-7. PMID: 16864015
11. Packer CD, Mileti LM. Vertebral sarcoidosis mimicking lytic osseous metastases: development 16 years after apparent resolution of thoracic sarcoidosis. *J Clin Rheumatol* 2005; 11(2):105-8. PMID: 16357712
12. Rúa-Figueroa I, Gantes MA, Erausquin C, Mhaidli H, Montesdeoca A. Vertebral sarcoidosis: clinical and imaging findings. *Semin Arthritis Rheum* 2002; 31(5):346-52. PMID: 11965598
13. Ludwig V, Fordice S, Lamar R. Unsuspected skeletal sarcoidosis mimicking metastatic disease on FDG positron emission tomography and bone scintigraphy. *Clin Nucl Med* 2003; 28(3):176-9. PMID: 12592122
14. Waanders F, van Hengel P, Krikke A, Wesseling J, Nieboer P. Sarcoidosis mimicking metastatic disease: a case report and review of the literature. *Netherlands J Medicine* 2006; 64 (9):342-345. PMID: 17057273
15. Wendling D, Desmurs H, Royer F, Gil H, Dupond JL. Inaugural cervical vertebral sarcoidosis. *J Rheumatol* 2008; 35(2):362-5. PMID: 18260170
16. Fernández-Ruiz M, Guerra-Vales JM, Castelbón-Fernández FJ et al. Sarcoidosis presenting as an osteolytic skull lesion: a case report and review of literature on skull sarcoidosis. *Clin Rheumatol* 2007; 26:1745-1748. PMID: 17200801
17. Neville E, Carstairs LS, James DG. Sarcoidosis of bone. *Q J Med* 1977; 46:215-217. PMID: 866575
18. Ng M, Niparko JK. Osseus sarcoidosis presenting as a destructive petrous apex lesion. *Am J Otolaryngol* 2002; 23:241-245. PMID: 12105791
19. Baumgartner BJ, Sorensen DM, Willard CC. Pathology Quiz Case. *Arch Otolaryngol Head Neck Surg* 2002; 128:195-196. PMID: 11843731

FIGURES

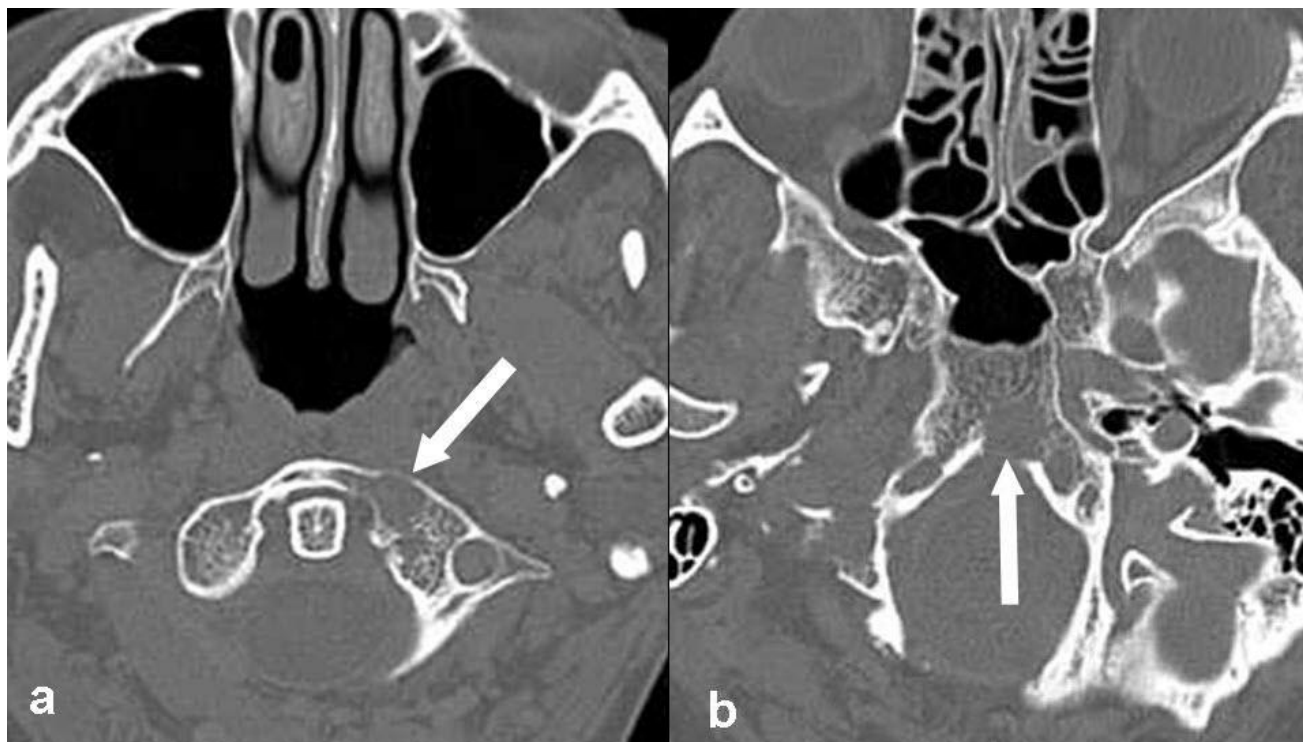


Figure 1: A 59 year old lady with widespread sarcoidosis. Contrast enhanced axial CT of the skull base in bone windows. Lytic lesions are seen in the left anterior arch of the atlas (Figure 1a, white arrow) and also in the clivus (Figure 1b, white arrow). (Protocol: four slice, Siemens, Volume Zoom, 280mAs, 120kV, 1mm slice thickness, W:2400, L:200, 50mls intravenous Omnipaque).

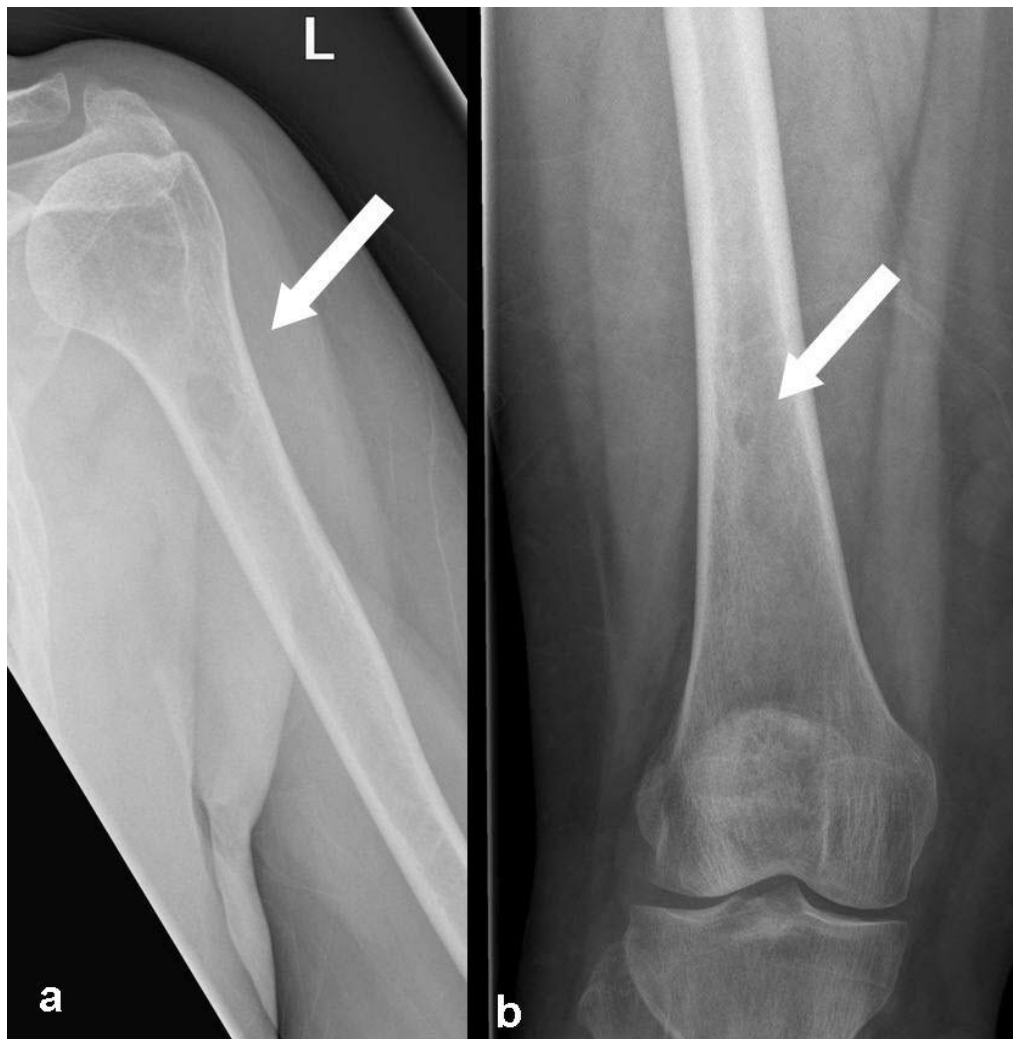


Figure 2: A 59 year old lady with widespread sarcoidosis. Plain posterior-anterior radiographs of the left humerus and right femur. Lytic lesions are seen in the left humeral shaft (Figure 2a, white arrow) and right distal femur (Figure 2b, white arrow).

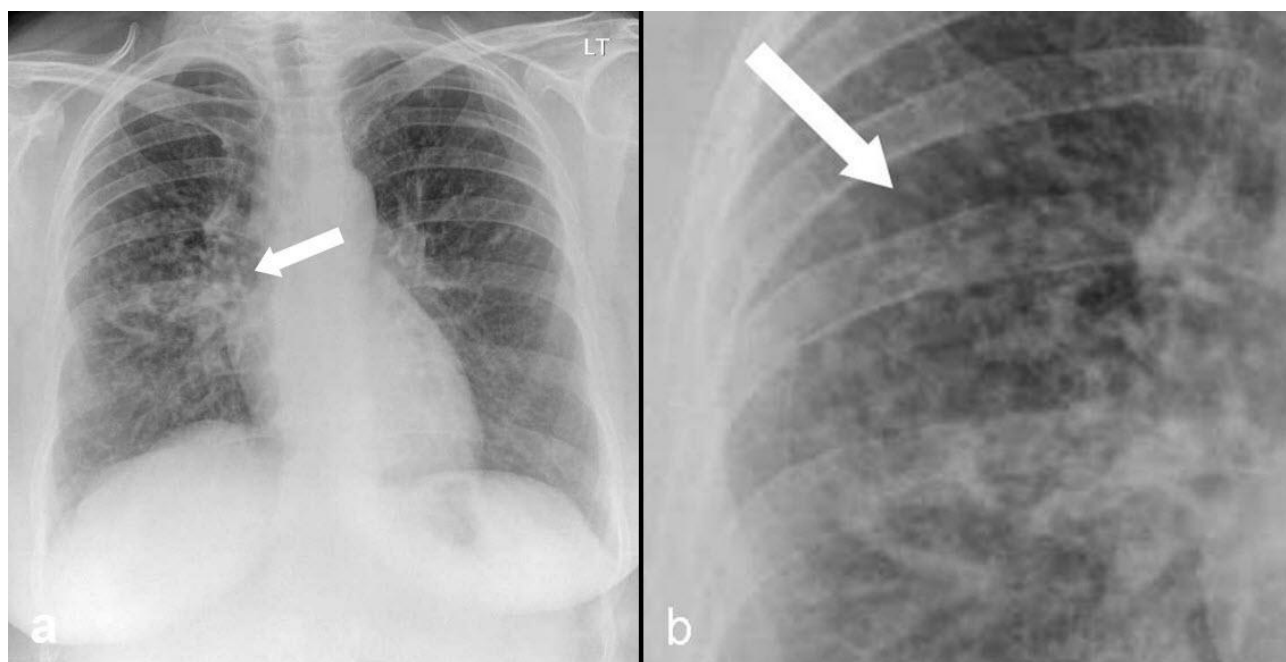


Figure 3: A 59 year old lady with widespread sarcoidosis. A plain chest radiograph in the posterior-anterior view shows multiple small nodules in the right mid zone and bulky right hilum (Figure 3a, white arrow). The nodules are further demonstrated in the magnified view (Figure 3b, white arrow).

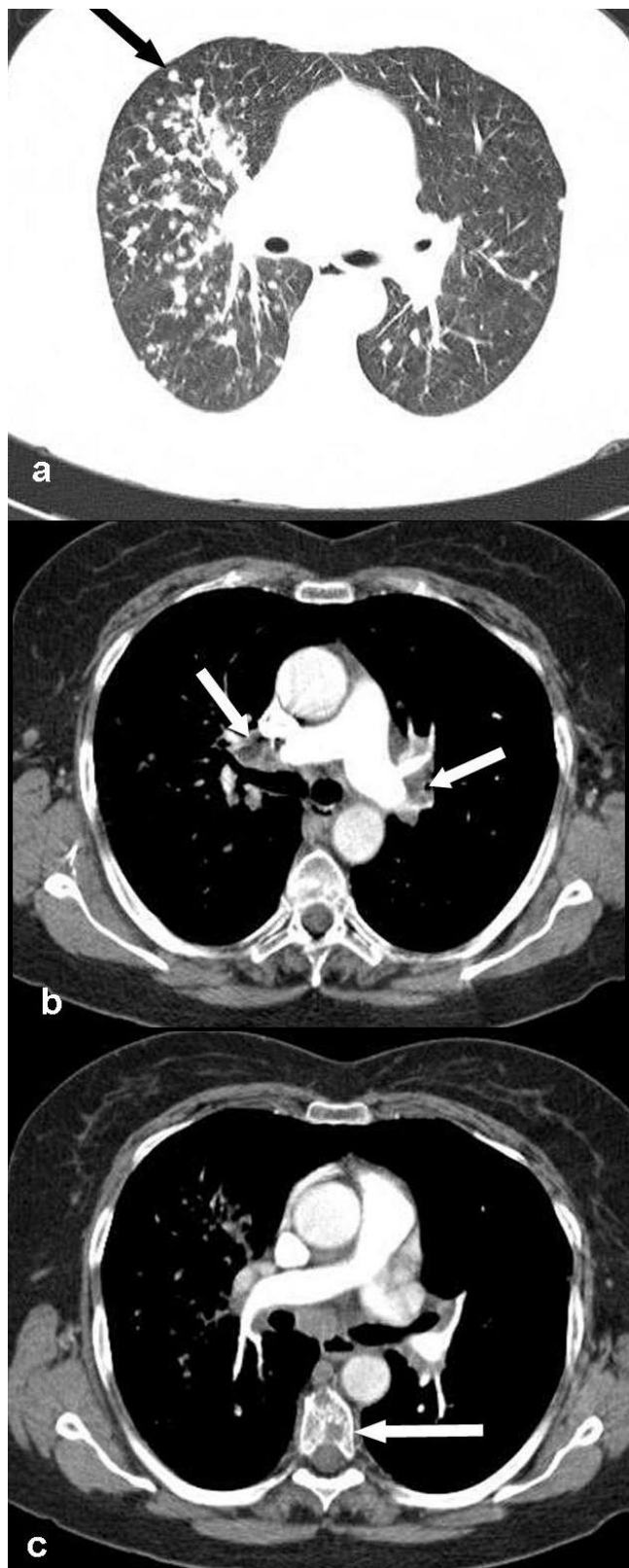


Figure 4: A 59 year old lady with widespread sarcoidosis. Contrast enhanced axial CT of the chest. Numerous small pulmonary nodules are seen in lung windows (Figure 4a, white arrow). Bilateral hilar (Figure 4b, white arrow) and subcarinal lymphadenopathy (Figure 4c) are seen on mediastinal windows. Lytic lesions are present in thoracic vertebrae (Fig4c, white arrow). (Protocol: four slice, Siemens, Volume Zoom; 100mAs, 120kV, 3mm slice thickness. Lung windows (a); W:1000, L:-700. Mediastinal windows (b and c); W:400, L:40. 100mls intravenous Omnipaque).

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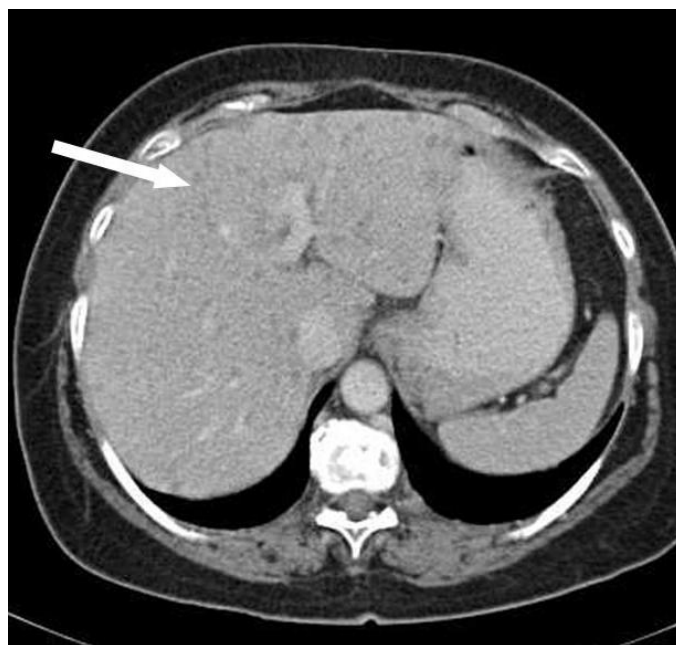


Figure 5: A 59 year old lady with widespread sarcoidosis. Contrast enhanced axial CT of the abdomen in abdominal windows demonstrates multiple low attenuation liver lesions (white arrow). (Protocol: four slice, Siemens, Volume Zoom. 150mAs, 120kV, 5mm slice thickness. W400, L:40. 100mls intravenous Omnipaque).



Figure 6: A 59 year old lady with widespread sarcoidosis. Contrast enhanced axial CT of the abdomen in bone windows demonstrates lytic lesions in the right iliac bone (white arrow). (Protocol: four slice, Siemens, Volume Zoom. 150mAs, 120kV, 5mm slice thickness. W:2400, L:200. 100mls intravenous Omnipaque).

Etiology	Not known. Postulated that it occurs in genetically susceptible people who are exposed to specific environmental agents
Incidence	10.9 per 100 000 in white Americans 35.5 per 100 000 in African-Americans
Gender ratio	Slightly more common in females
Age predilection	Usually occurs in adults under the age of 50 years
Risk factors	Linked to class II major histocompatibility complex region (MHC) of chromosome 6. Also linked to Lofgren’s syndrome
Presentation	Multisystemic disorder. Most common presentation is with pulmonary symptoms e.g. non-productive cough, breathlessness or wheeze. Vertebral involvement is usually symptomatic
Pathological features	Non-caseating epithelioid cell granulomas are the histological hallmark
Treatment	Corticosteroids are the most common treatment
Prognosis	Generally good prognosis. Although mortality from disease 1-6%
Findings on imaging	<u>CXR</u> : Bilateral hilar and right paratracheal lymphadenopathy. Nodular interstitial disease. <u>Hand and feet x-rays</u> : Lace-like cystic areas in short tubular bones. <u>CT</u> : Mediastinal and hilar lymphadenopathy and lung nodules. Hepatic and splenic nodules. Osteolytic lesions. <u>Gallium-67 nuclear medicine scan</u> : Uptake in active areas (can be useful to assess response to treatment).

Table 1: Summary table for sarcoidosis [1, 7-13]

Differential diagnosis	Plain radiographs	Nuclear medicine bone scan	CT	MRI
Sarcoidosis	Lace-like areas of cystic change in the tubular bones of the hands and feet.	Areas of increased uptake.	Osteolytic skeletal lesions.	Low signal areas on T1-weighted images and high signal on T2-weighted images.
Multiple myeloma	Multiple, round, punched-out areas in the skull, vertebral column, ribs and pelvis. Diffuse osteopaenia may be seen before discrete lesions due to diffuse myelomatous involvement. Occasionally diffuse osteosclerosis may be seen.	Typically, no uptake is seen as cytokines released by myelomatous cells suppress osteoblastic activity.	Lytic destructive lesions.	Appearances are variable. Marrow involvement can be nodular or diffuse. In particular, destruction of the intervertebral discs is more likely to occur in multiple myeloma than in metastases.
Metastases	Usually osteolytic and multiple lesions. Initially destroy the medulla and later the cortex.	Increased uptake (hot spots). Occasionally, photopaenic areas may be seen due to a lack of an osteoblastic response (can occur with renal cell carcinoma metastases).	Lytic lesions which usually initially destroy the medulla. In addition, destruction of the spinal pedicles is more likely to occur in metastases than in multiple myeloma.	Osteolytic metastases usually have low signal intensity on T1-weighted images and high signal intensity on T2-weighted or fat-suppressed sequences. Osteoblastic metastases may appear hypointense on all pulse sequences.

Table 2: Differential diagnoses of osseous sarcoidosis [7, 9, 11, 13, 16]

ABBREVIATIONS

CT = computed tomography
 kV = kilovoltage
 L = length
 mAs = milliampere-seconds
 mls = millilitres
 mm = millimetres
 MRI = magnetic resonance imaging
 W = width

KEYWORDS

Sarcoidosis; Vertebral; Cranial

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