Unusual Case of Occult *Brucella* Osteomyelitis in the Skull Detected by Bone Scintigraphy

Myung-Hee Sohn · Seok Tae Lim · Young Jin Jeong ·
Dong Wook Kim · Hwan-Jeong Jeong · Chang-Seob Lee

Received: 18 January 2010 / Revised: 17 February 2010 / Accepted: 17 February 2010 / Published online: 21 April 2010
© Korean Society of Nuclear Medicine 2010

Abstract Brucellosis is a worldwide infectious disease of animals that can be transmitted to humans. Osteoarticular involvement is the most common complication of brucellosis. A 47-year-old man, who was a stockbreeder, complained of myalgia with fever and chills for 2 weeks. The serology titers and blood cultures for brucellosis were positive. Bone scintigraphy demonstrated a focally increased uptake in the left supraorbital area. Plain radiographs showed an osteolytic lesion, and an MRI revealed signal abnormalities in the corresponding site. We present an unusual case of occult *Brucella* osteomyelitis in the frontal bone of the skull detected by bone scintigraphy.

Keywords Brucellosis · Osteomyelitis · Tc-99m MDP · Bone scintigraphy

Brucellosis is a worldwide infectious disease of animals that can be transmitted to humans. The disease usually spreads to humans by direct contact with infected animals,

Fig. 1 A 47-year-old man had a 2-week history of myalgia with fever and chills. He was a stockbreeder. The physical examination was unremarkable. The serology titers for brucellosis were elevated. A blood culture grew *Brucella* spp. The erythrocyte sedimentation rate (23 mm/h), serum C-reactive protein (18.9 mg/L), and alanine aminotransferase (50 IU/L) were elevated. The other laboratory results were normal. Tc-99 m MDP bone scintigraphy was performed for the evaluation of osteoarticular complications of brucellosis and demonstrated a focally increased tracer uptake in the left supraorbital area (arrows). Plain radiographs and a magnetic resonance image (MRI) were performed to evaluate the areas showing abnormal uptake

M.-H. Sohn (✉) · S. T. Lim · Y. J. Jeong · D. W. Kim ·
H.-J. Jeong
Department of Nuclear Medicine,
Chonbuk National University Medical School,
San 2-20 Geumam-dong, Deokjin-gu,
Jeonju, Jeonbuk 561-180, Korea
e-mail: mhsohn@jbnu.ac.kr

C.-S. Lee
Department of Internal Medicine,
Chonbuk National University Medical School,
Jeonju, Jeonbuk, Korea

M.-H. Sohn · S. T. Lim · D. W. Kim · H.-J. Jeong · C.-S. Lee
Research Institute of Clinical Medicine,
Chonbuk National University Medical School,
Jeonju, Jeonbuk, Korea

Fig. 2 Plain radiograph of the skull showed a radiolucent osteolytic lesion in the left supraorbital area

by ingestion of unpasteurized milk or milk products, through cuts and abrasions, or by inhalation of aerosols. It can affect individuals of all ages. Its clinical features are not disease-specific and may be mild, self-limiting, or severe. Hematogenous dissemination is followed by localization of bacteria within the reticuloendothelial system, such as the liver, spleen, and bone marrow. Once localized, *Brucella* spp. induce a granulomatous reaction [1]. Although brucellosis often results in complications in various parts of the body, osteoarticular involvement is the most common complication and includes arthritis, sacroiliitis, spondylitis, and osteomyelitis. Most reports of *Brucella* osteomyelitis have involved the spine [2–6] or the long bones [2, 3].

Other rare sites, such as the calcaneus [7, 8], middle phalanges of the fingers [9], sternum [10], carpal bones [11], tarsal bone, ribs, clavicle, and pelvic bone [12] also have been described. Involvement of the skull is considered to be extremely rare. It was reported that a 14-year-old boy with an erythematous, non-tender mass over the left mid-forehead area had *Brucella* osteomyelitis of the left frontal bone with an epidural abscess [13]. However, our patient had no symptoms and only osteomyelitis in the frontal bone.

Bone scintigraphy has been reported to be a highly sensitive method for the detection of osteoarticular brucellosis and should be routinely used in screening for asymptomatic occult lesion in patients with brucellosis [2–5]. We present an unusual case of occult *Brucella* osteomyelitis in the frontal bone of the skull detected by bone scintigraphy (Figs. 1, 2, 3).

References

1. Corbel MJ, Beeching NJ (2007) Brucellosis. In: Fauci AS, Braunwald E, Kasper DL, Hauser SL, Longo DL, Jameson JL, Loscalzo J (eds) Harrison's principles of internal medicine, 17th ed. McGraw-Hill, New York, pp 973–976
2. al-Shahed MS, Sharif HS, Haddad MC, Aabed MY, Sammak BM, Mutairi MA (1994) Imaging features of musculoskeletal brucellosis. Radiographics 14:333–348
3. Bahar RH, Al-Suhaili AR, Mousa AM, Nawaz MK, Kaddah N, Abdel-Dayem HM (1988) Brucellosis: appearance on skeletal imaging. Clin Nucl Med 13:102–106
4. el-Desouki M (1991) Skeletal brucellosis: assessment with bone scintigraphy. Radiology 181:415–418

Fig. 3 MRI of the brain demonstrated an area of **a** low signal intensity in the frontal bone on T1-weighted image (WI), **b** high signal on T2-WI, and **c** marginal enhancement on contrast enhanced T1-WI.

These results were suggestive of a bone abscess (arrows). The patient underwent a craniotomy. The biopsy confirmed a chronic granulomatous infection caused by *Brucella* spp. He received antibiotic therapy

5. Aydin M, Fuat Yapar A, Savas L, Reyhan M, Pourbagher A, Turunc TY et al (2005) Scintigraphic findings in osteoarticular brucellosis. Nucl Med Commun 26:639–647
6. Geyik MF, Gür A, Nas K, Cevik R, Saraç J, Dikici B et al (2002) Musculoskeletal involvement of brucellosis in different age groups: a study of 195 cases. Swiss Med Wkly 132:98–105
7. Taşdan Y, Alikashioglu M, Midilli K, Ilter O (1998) Brucellar osteomyelitis of the calcaneus. Pediatr Infect Dis J 17:664–665
8. Baktiroglu L, Zeyrek F, Ozturk A, Yazgan P, Sirmatel O, Isikan E (2005) *Brucella* osteomyelitis of the calcaneus. J Am Podiatr Med Assoc 95:216–217
9. Howard CB, Alkrinawi S, Gadalia A, Mozes M (1993) Bone infection resembling phalangeal microgeodic syndrome in children. A case report. J Hand Surg Br 18:491–493
10. Hyun DY, Palazzi DL (2007) Brucellosis of the sternum and olecranon in an adolescent. Pediatr Infect Dis J 26:92
11. Seal PV, Morris CA (1974) Brucellosis of the carpus. Report of a case. J Bone Joint Surg Br 56:327–330
12. Mousa AR, Muhtaseb SA, Almudallal DS, Khodeir SM, Marafie AA (1987) Osteoarticular complications of brucellosis: a study of 169 cases. Rev Infect Dis 9:531–543
13. Piampiano P, McLeary M, Young LW, Janner D (2000) Brucellosis: unusual presentations in two adolescent boys. Pediatr Radiol 30:355–357