

Brodie's Abscess in a Pit Bull Terrier Dog

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Abstract : A 3-year-old Pit bull terrier dog had left hindlimb lameness for 3-weeks. On plain radiographs, geographic osteolysis with well-defined edges and marginal sclerosis was identified in medial aspect of left proximal tibial metaphysis. Surgical debridement and curettage was performed. Coagulase negative *Staphylococcus spp.* grew on a culture specimen obtained during surgery, and Brodie's abscess was diagnosed.

Key words : abscess, geographic osteolysis, marginal sclerosis, *Staphylococcus spp.*

Introduction

Brodie's abscess is a form of subacute or chronic pyogenic osteomyelitis that is defined by a particular constellation of clinical, radiologic, and pathologic features (1), and initially described by Sir Benjamin Collins Brodie in 1832 (1,7,8,10,11). In human being, Brodie's abscess is one of the clinical presentations of hematogenous osteomyelitis (4,7), usually affected in tibial metaphysis (1,7,8,10). Although pathogens may gain access to bone by direct inoculation, extension from an adjacent soft-tissue infection, or hematogenous spread, development of Brodie's abscess by hematogenous spread has not been described in veterinary literature. Development by direct inoculation, and development with inaccurate history have been described (2,6).

Case

A 3-year-old, intact female Pit bull terrier was referred to the Gyeongsang National University Veterinary Teaching Hospital due to left hindlimb lameness for the duration of 3-weeks. The dog was bitten by another dog 3-week ago, and the lameness on the left hindlimb has shown since then. Antibiotic therapy that was performed by local veterinarian did not lead to improvement. The dog's rectal temperature was 38.2°C, and activity was normal. The stifle was swollen and painful. The results of laboratory tests, including hematocrit concentration, leukocyte count, and serum biochemistry, were within normal limits.

Plain radiographs revealed geographic, osteolytic lesion with 7 mm sized, well-defined sclerotic edges in medial aspect of left proximal tibial metaphysis, and osteolytic lesion was surrounded by sclerosed margin (Fig 1). In addition, medial dis-

placement of left patella and joint effusion were identified. On ultrasonographic examination, cortical disruption was clearly identified. A large, echoic wedge-shaped area was



Fig 1. Craniocaudal (A) and lateral (B) radiographs of the left stifle joint show a geographic focal lucency surrounded by sclerotic margin in medial aspect of proximal tibial metaphysis. Craniocaudal (C) and lateral (D) radiographs at 37 days follow-up show partial filling up of the lesion.

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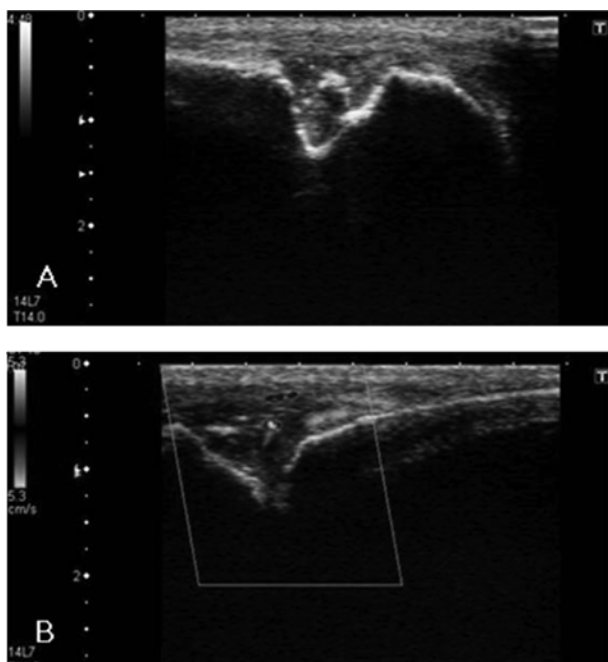


Fig 2. A, Echoic wedge-shaped area with hyperechoic focus is present in the medial aspect of a tibia imaged in a transverse plane. B, color Doppler imaging show absence of blood flow, except for superficial blood flow in a longitudinal plane.

revealed adjacent to the medial aspect of a tibia imaged in a transverse plane, and the hyperechoic focus with distal shadowing was revealed within the echoic region. There were subtle blood vessel signals corresponded to superficial vessels in color Doppler imaging (Fig 2). Chronic osteomyelitis caused by biting wound seemed to be the most probable diagnosis, and surgery was planned for confirmation and treatment. Under general anesthesia, the patient underwent curettage of lesion, along with excision. A cavity filled with gelatinous material was found in the tibial lesion. Bacteriologic culture of gelatinous material and antimicrobial susceptibility testing were performed. Coagulase negative staphylococci grew on a culture specimen which was obtained during the surgery. Based on history, clinical signs, radiographic findings and culture result, Brodie's abscess was diagnosed. Antimicrobial sensitivity test showed that many antibiotics, including ampicillin, cefadroxil, cephadrin, cefuroxime, vancomycin, were sensitive to cultured specimen. The dog underwent a proper surgery and given a 6-week course of cefadroxil. Clinical sign of the dog was improved postoperatively. In addition, filling up of the lesion with normal bone was identified on follow-up radiographs at 37 days after surgery (Fig 1).

Discussion

Staphylococcus species is the most common causal microorganism, and the specific microorganism isolated in Brodie's abscess is *Staphylococcus aureus* in most cases (1,2,3,5,7,10, 11). In this case coagulase negative staphylococci was iso-

lated from the lesion, and this microorganism is usually related to osteomyelitis that is associated with an infected prosthesis (9). Culture may be negative in approximately 25% of the cases although this does not completely exclude the possible presence of infection (1,7). Brodie's abscess represents localized infection because of low virulence or good immune response (3,5). In this case, we presumed that initial aggressive administration of antimicrobial drugs, but inadequate or inappropriate antimicrobial drugs, by local veterinarian as well as good body condition of the dog was one of the factors forming Brodie's abscess. Usually, there is no systemic illness (4), laboratory tests are within normal limits (1,4,7,8). In this case, these characteristics were similar to other reports.

Radiographically, Brodie's abscess appears as a medullary-based (86%) lytic lesions (100%), with a geographic pattern of destruction (100%), well defined edges (90%), marginal sclerosis (86%), and no bone enlargement (95%). Usually there is no periosteal reaction (71%), cortical break (95%), or visible matrix (90%) (8). In particular, the typical radiographic findings which are associated with Brodie's abscess are described as geographic osteolysis with well-defined edges and marginal sclerosis in previous report (8). In this case, typical radiographic findings of Brodie's abscess were also identified. The possibility of malignant bone tumor in this patient was low because aggressive features were absent on the plain radiographs. Although radiography helps in diagnosis of Brodie's abscess, due to variety of radiographic features of Brodie's abscess, a relatively specific features of other imaging techniques such as MRI, scintigraphy, or ultrasound may help differentiate between some of the differential diagnosis of similar radiographic features (4,5,11). In this case, we did not perform MRI examination due to owner's rejection. Therefore, we performed ultrasonographic examination to evaluate bony lesion. The chronic osteomyelitis were clearly visualized by the ultrasonographic examination as described previous report (9). The ultrasonographic findings in this case were cortical disruption, hyperechoic foci representing sequestra compatible with chronic osteomyelitis in dogs. Treatment included aggressive surgical debridement and curettage, along with long-term administration of appropriate antimicrobial drugs (1,6,7,10), and grafting of bone deficits is necessary for bone defect greater than 3 cm in diameter (10). A sterile abscess is unnecessary to treat with antibiotics (1). In this case, the dog was treated with appropriate antibiotics based on bacterial culture and sensitivity testing.

References

1. Bagatur AE, Zorer G. Brodie's abscess of the cuboid bone: a case report. *Clin Orthop Relat Res* 2003; 408: 292-294.
2. Berzon JL. Brodie's abscess: a case report in a dog. *J Am Anim Hosp Assoc* 1979; 15: 749-752.
3. Bohndorf K. Infection of the appendicular skeleton. *Eur Radiol* 2004; 14: E53-E63.
4. Davies AM, Grimer R. The penumbra sign in subacute osteomyelitis. *Eur Radiol* 2005; 15: 1268-1270.

5. Khan SHM, Bloem JL. Radiologic-pathologic correlations of bone infection. In: Gourtsyiannis NC, Ros PR (eds): Radiologic-pathologic correlations from head to toe understanding the manifestation of disease. 1st ed. pp. 654-656, Berlin Heidelberg, Springer, 2005.
6. Knecht CD, Slusher R, Cawley AJ. Treatment of Brodie's abscess by means of bone autograft. J Am Vet Med Assoc 1971; 158: 492-493.
7. Kurup HV, Uglow M. Bilateral asymmetrical Brodie's abscess. Eur J Orthop Surg Traumatol 2005; 15: 145-147.
8. Lopes TD, Reinus WR, Wilson AJ. Quantitative analysis of the plain radiographic appearance of Brodie's abscess. Invest Radiol 1997; 32: 51-58.
9. Samii VF, Long CD. Musculoskeletal system. In: Nyland TG, Mattoon JS (eds). Small animal diagnostic ultrasound. 2nd ed. pp. 270-272, Philadelphia, WB Saunders, 2002.
10. Stephens MM, MacAuley P. Brodie's abscess. A long term review. Clin Orthop Relat Res 1988; 234: 211-216.
11. Yoshikawa M, Sugawara Y, Kikuchi T, Nakata S, Mochizuki T, Ikezoe J, Sakayama K. Two cases of pediatric bone disease (eosinophilic granuloma and Brodie's abscess) showing similar scintigraphic and radiographic findings. Clin Nucl Med 2000; 25: 986-990.

핏불테리어 견에서 발생한 브로디씨 농양

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요 약 : 3년령의 핏불테리어 견이 3주간의 좌측후지 파행을 주증상으로 내원하였다. 일반방사선검사상에서 경계명확한 골용해소견과 경계부위의 경화소견이 좌측 근위경골골간단의 내측면에서 관찰되었다. 수술적 소파술이 실시되었으며, *Staphylococcus spp.*가 수술중에 채취한 샘플의 배양결과 확인되었다. 이상의 검사결과를 바탕으로 브로디씨 농양으로 진단하였다.

주요어 : 농양, 골용해, 골경화, *Staphylococcus spp.*