

## BRODIE'S ABSCESS – A CASE REPORT

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### Abstract

Brodie abscess is a form of subacute osteomyelitis; but because the diagnostic delay ranges from a few weeks to up to several years, the distinction between subacute and chronic osteomyelitis is not clear. The term 'Brodie's abscess' was applied to localized bone abscess that developed without prior systemic illness. Due to its location in the bone, Brodie's abscess can mimic benign and malignant diseases.

We report here a case of a 14 years old boy, that was admitted in the department of pediatric surgery of the "Louis Turcanu" Timisoara Hospital for a distal radius and ulna epiphyseal take-off in his left forearm. The patient presented a bone tumor in the distal part of his left forearm accompanied by pain more severe at night, laesa functio and feeling of tension within the bone.

Differential diagnosis was made mainly between osteosarcoma, bone tuberculosis and acute monoarthritic rheumatoid arthritis. Due to its location in the distal third of the ulna and its MRI aspect, Brodie's abscess mimicked the aspect of a malignant disease.

The prognosis is excellent, and healing usually takes place without complications. After effective surgical evacuation, the bone lesion can disappear within a couple of months. The patient can be completely asymptomatic, pain-free and with no tenderness on palpitation.

**Key words:** Brodie abscess, subacute osteomyelitis, osteosarcoma, osseous tuberculosis.

### Introduction

In general practice, serious infections in children have an incidence of 12.3 cases per 1000 patients per year, or 1 serious infection per 100 children per year. Of these, osteomyelitis affects 0.2 to 1.6 children per 1000 annually and is more common in boys than in girls (ratio, 2.5:1).<sup>[1,2]</sup> Osteomyelitis has historically been categorized as acute, sub-acute, and chronic.<sup>[3,4]</sup> Brodie abscess is a form of sub-acute osteomyelitis; but because the diagnostic delay ranges from a few weeks to up to several years, the distinction between sub-acute and chronic osteomyelitis is not clear.<sup>[5,6,7,8]</sup>

Brodie abscess (subacute osteomyelitis) is an infectious disease localized in metaphyseal bone, with rapid expansion in the medullary cavity, in 95% of cases caused by *Staphylococcus aureus* with low virulence in a body with high immunity. The immune system fight against

etiopathogenic agents quartered on bone, cause inflammatory lesions, cortical abscess with periosteal reaction with bone sequestration and limitation of abscess.

Brodie first described a localized abscess of the tibia in an amputated limb that did not produce systemic signs and developed without prior febrile illness. Subsequently, the term 'Brodie's abscess' was applied to localized bone abscess that developed without prior systemic illness<sup>[9]</sup>. Due to its location in the bone, Brodie's abscess can mimic benign and malignant diseases.

A recent study from a university hospital found that all 23 patients with a final diagnosis of subacute osteomyelitis were first referred to an orthopaedic oncology clinic<sup>[10]</sup>. Due to the diagnostic challenges of the condition, imaging modalities have been used to help confirm its diagnosis. This ranged from radiography of the affected area to magnetic resonance (MR) imaging. While osteomyelitis in its different forms may be rare in developed countries, it remains a relatively common problem in developing countries.<sup>[11]</sup>

Although the chronic variety of osteomyelitis is common, the sub-acute type (particularly Brodie's abscess) is rare, except in East Africa, where it is reportedly a common occurrence<sup>[12]</sup>. This may explain the paucity of reports on this variant. The disease has been described to follow an indolent course due to the interplay of host resistance combined with low virulence of the infecting organisms<sup>[13]</sup>.

The treatment of Brodie's abscess varies. There are reports of successful treatment with antibiotics combined with cast immobilization in children,<sup>[14]</sup> curettage with postoperative antibiotics,<sup>[15,16]</sup> and recently, the use of antibiotic-impregnated beads. The curettage of abscess cavity with cancellous bone grafting has been reserved mainly for those with large cavity diameters > 3 cm.

### Case presentation

Patient U.D, male, age 14 y.o., from urban area, was admitted in the Department of Pediatric Surgery of the "Louis Turcanu" Timisoara Hospital in October 2011 for a distal radius and ulna epiphyseal take-off in his left forearm which receives specialized treatment. In 21 March 2012 the patient is admitted presenting a bone tumor in the distal part of his left forearm accompanied by pain most severe at night, functional impotence and feeling of tension within the bone.

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Clinical Exam:

*Inspection:* left forearm deformation and localized edema

*Palpation:* reveals 2/3 cm size tumor of the ulna which imprints an abnormal position of the left forearm and the deformation of the radio-carpal joint without loss of motility, soft and elastic sensitive to touch. The superjacent skin presents edema.

General examination revealed no pathological evidence including no documented fever.

*Laboratory examination* revealed a minor anemia, a inflammatory syndrome and increased alkaline – phosphatase. Arm X-ray shows a round osteolytic area with

a 2/3 cm diameter located in the distal 1/3 of the left ulna. We continue the investigations with a MRI, bone marrow puncture in the right and left iliac spine and bone content sampling for histo-pathological examination.

The MRI scan revealed in the distal third of the ulna, on a length of about 9 cm, a tumor in hyper / hyposignal T1, T2 hypersignal, intramedullary, with central necrosis and osteolysis, with aggressive periosteal reaction and extension in the interosseous membrane and muscular parts (deep flexor of fingers and square pronator); the formation is adjacent to the interosseous vessels. Peritumoral edema. The tumor doesn't reach the radioulnar joint (Fig.1).



Fig.1 MRI scan of left forearm revealing a tumor of about 9 cm, in hyper / hyposignal T1, T2 hypersignal, intramedullary, with central necrosis and osteolysis.

The result of the bone marrow puncture in the right and left iliac spine indicated: increased reticulo-histio-monocytic reactivity, macrophages present and active, isolated atypical cells especially in the right iliac crest, cells that can not be classified between local bone marrow cells, otherwise normal cellularity.

The result of the bone marrow puncture in the right and left iliac spine and the MRI result suggests a bone tumor, possibly osteosarcoma. Pending the histopathology results the patient is released on the 31 of March, after 10 days of treatment with the following medication: Sulperazon iv, 2x 1,5 g/day; Perfalgan 3x60 ml/day; Ketonal i.v. 3x40 ml/day.

The results of the histopathology exam are received on the 5th of April:

- Soft tissue examination: Macroscopic examination of the parts showed 2 irregular fragments of 1,6/0,8/0,6 cm and 1/0,4/0,3 cm, whitish-gray color and increased consistency. Microscopic diagnosis of the soft tissue indicated a span of the acute inflammatory infiltrate (polymorphonuclear, macrophages, adult lymphocytes, eosinophils) with necrosis, thrombosis and bleeding picture consistent with that of a phlegmon.
- Marrow examination: Macroscopic examination of the parts showed a fragment of 0,8/0,7/0,3 cm, brown

colored and elastic consistency. Microscopic diagnosis of the bone marrow indicated irregular fibrocolagen fragments with span of acute inflammatory infiltrate that consists mainly from: plasmocyte, eosinophilic cells, lymphoblasts, lymphocytes, polymorphonuclear cells with large areas of hemorrhage.

The patient returns presenting a fistula of the tumor in the distal 1/3 of the left ulna on the 18th of April and admitted for specialized treatment. General examination revealed no pathological evidence. Laboratory examination revealed a minor anemia. Arm X-ray shows a round osteolytic area which suggests a tuberculous etiology. To exclude a tuberculous etiology we indicate: lung X-ray, intradermal reaction with 2 units of PPD, microscopic examination of sputum and cultures to isolate the etiological agent of tuberculosis, Koch bacillus. We intervened with a surgical procedure and performed: excisional debridement, bone cyst removal, histopathology sample, bacterial culture and sensitivity. The Phthisiology exam showed no specific changes of tuberculosis (lung X-ray, intradermal reaction with 2 units of PPD, microscopic examination of sputum and cultures to isolate the etiological agent of tuberculosis-negative).

The patient is released on the 25th of April after treatment with the following medication: Clindamycinum i.v

4x150 mg/day; Perfalgan 3x60 ml/day; Ketone i.v 3x40 ml/day. The wound from his left forearm is healing properly, causing a favorable evolution.

*Diagnosis:*

Clinical and paraclinical exams state that the bone tumor is a Brodie abscess based on:

- higher frequency in men between 13 and 34 years of age
- insidious onset without fever
- recurring attacks of pain more severe at night
- feeling of tension within the bone
- left forearm deformation and localized edema
- deformation of the radio-carpal joint without loss of motility
- Arm X-ray- round osteolytic area with a 2/3 cm diameter, local thickening of the bone
- MRI scan- a tumor in hyper / hiposignal T1, T2 hypersignal, centromedular, with central necrosis and osteolysis, with aggressive periosteal reaction
- Histopathology exam: Soft tissue examination-phlegmon. Marrow examination indicated irregular fibrocollagenous tissue fragments with span of acute inflammatory infiltrate

*Differential diagnosis:* was made mainly between osteosarcoma, bone tuberculosis and monoarthritic rheumatoid arthritis considering clinical features that are for and against the suspected diagnosis.

*Treatment*

1. Surgical – excisional debridement, bone cyst removal
2. Diet – normocaloric, normoproteic, normoglucidic, normolipidic
3. Etiological – Clindamycinum capsules of 150 mg, oral 4x150mg/day, 6weeks
4. Symptomatic – Ibuprofenum tablets of 200mg, oral 2x200mg/day, at need

*Evolution:* Patients with Brodie’s abscess respond well to surgical curettage of the abscess, and antibiotic therapy for 6 weeks, leading to a favorable evolution. The outcome

is rated as satisfactory if there was no recurrence at a minimum follow-up of two years and in cases of complete obliteration of abscess cavities with development of normal trabeculae bone pattern. Without treatment Brodie’s abscess can lead to life-threatening complications.

*Complications:*

- Septicemia: disseminated abscesses, infective carditis
- Septic bacterial arthritis
- Pathological fractures
- Alteration in growth rate
- Squamous cell carcinoma
- Amyloidosis

*Prognosis:* The prognosis is excellent, and healing usually takes place without complications. After effective surgical evacuation, the bone lesion can disappear within a couple of months. The patient can be completely asymptomatic, pain-free and no tenderness on palpation.

*Particularity of this case:* Due to its location in the distal third of the ulna and its MRI aspect Brodie’s abscess mimicked the aspect of malignant disease, osteosarcoma. Due to the diagnostic challenges of the condition the positive diagnosis of Brodie’s abscess was delayed.

**Discussions and Conclusions**

In this case, the infection became apparent in 5 months after a distal radius and ulna epiphyseal take-off. The difficulty in this case in classifying it as subacute or chronic comes from the description of these terms. Chronic osteomyelitis often progresses from an uncontrolled acute septic infection, which does not seem to be the case with this child because the symptoms were never acute. Subacute osteomyelitis, or Brodie abscess, usually reflects a low-grade clinical course of a hypovirulent infection. This description would fit the case.

The age range for osteomyelitis is bimodal, being younger than 2 years and between the ages of 13 and 34 years old. Being 14 years old, this boy fits the general characteristics found in the literature.

This patient was treated with surgically- excisional debridement, bone cyst removal and then with antibiotics Clindamycinum capsules of 150 mg, oral 4x150mg/day, 6weeks.

This case presentation wants to be a review of the case and an alarm sign, presenting the high risk of misdiagnosing a Brodie abscess due to its capacity to mimic benign and malignant diseases. In our case the abscess was initially considered to be an osteosarcoma but histopathology exam and course of the complaint excluded this diagnosis.

For positive diagnosis, investigation and treatment, such cases require a multidisciplinary approach: pediatric surgery and orthopedics, onco-hematology, pneumophthysiology, imaging and laboratory cooperation.

An incorrect or delayed diagnosis can lead to systemic complications affecting ad vitam prognosis of which the most feared are septicemia and squamous cell carcinoma; these contrasting with the excellent prognosis, healing without sequelae or complications if a correct diagnosis and well led treatment is initiated.

Although, sometimes positive diagnosis is one of exclusion, this condition with rare incidence must be considered every time we face tumors that borrow characteristics of osteosarcoma and bone tuberculosis.

**References**

1. Van den Bruel A., Bartholomeusen S., Aertgeerts B., Truyers C., Buntinx F. Serious infections in children: an incidence study in family practice. BMC Fam Pract. 2006;7:23. [PMC free article] [PubMed]
2. Gomis Gavilán M., Barberán López J., Sánchez Artola B. Peculiarities of osteo-articular infections in children. Baillière's Clin Rheumatol. 1999;13(1):77-94.

3. Carek P.J., Dickerson L.M., Sack J.L. Diagnosis and management of osteomyelitis. *Am Fam Physician*. 2001;63(12):2413–2420. [PubMed]
4. Axford J.S. Joint and bone infections. *Medicine*. 2006;34(10):405–412.
5. Bohndorf K. Infection of the appendicular skeleton. *Eur Radiol*. 2004;14(Suppl 3):E53–E63. [PubMed]
6. González-López J.L., Soleto-Martín F.J., Cubillo-Martín A., López-Valverde S., Cervera-Bravo P., Navascués del Río J.A. Subacute osteomyelitis in children. *J Pediatr Orthop*. 2001;10(2 Pt B):101–104.
7. Macnicol M.F. Patterns of musculoskeletal infection in childhood. *J Bone Joint Surg Br*. 2001;83-B:1–2. [PubMed]
8. Shih H.N., Shih L.Y., Wong Y.C. Diagnosis and treatment of subacute osteomyelitis. *J Trauma*. 2005;58(1):83–87. [PubMed]
9. Brodie BC. An account of some cases of chronic abscess of the tibia. *Med Chir Trans* 1832; 17:239-49.
10. Shih HN, Shih LY, Wong YC. Diagnosis and treatment of subacute osteomyelitis. *J Trauma* 2005; 58:83-7.
11. Olawoye AO, Olasinde AA. Chronic osteomyelitis in Owo, Ondo state - a 2-year experience. *Annals Biomed Sci* 2003; 2:30-5.
12. Harris NH, Kirkaldy-Willis WH. Primary subacute pyogenic osteomyelitis. *J Bone Joint Surg Br* 1965; 47:526-32.
13. King DM, Mayo KM. Subacute haematogenous osteomyelitis. *J Bone Joint Surg Br* 1969; 51:458-63.
14. Ross ERS, Cole WG. Treatment of subacute osteomyelitis in childhood. *J Bone Joint Surg Br* 1985; 67:443-8.
15. Hayes CS, Heinrich SD, Craver R, MacEwen GD. Subacute osteomyelitis. *Orthopedics* 1990; 13:363-6.
16. Stephens MM, MacAuley P. Brodie's abscess. A long-term review. *Clin Orthop Relat Res* 1988; 234:211-16.

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