Prolonged cellulitis due to plant thorn

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SUMMARY: Cengiz AB, Kanra G, Çelik T, Cömert B, Devrim İ, Özen M, Kara A. Prolonged cellulitis due to plant thorn. Turk J Pediatr 2005; 47: 393-396.

We report the case of a five-year-old healthy boy who was admitted with abscess and soft tissue infection between the left wrist and the distal end of the forearm. Postero-anterior X-ray examination of the forearm showed a transverse line on the radius; however, further comparative radiographic examinations of the forearm were not compatible with fracture. *Enterobacter cloacae* was identified in the pus culture and initial intravenous empiric treatment with sulbactam-ampicillin was continued. Although the microorganism was susceptible to the empiric antimicrobial agent, at the eighth day of the treatment, inflammatory drainage was still present so further evaluations were performed. Ultrasonography of the forearm and wrist revealed only collection; magnetic resonance imaging showed a foreign body on the anterior distal section of the left forearm. The patient underwent operation and a 22 mm wooden foreign body was removed. Detailed history after removing a tree branch particle revealed that the boy had recently fallen from a tree causing an abrasion over the left wrist. The postoperative course was uneventful and clinical response was excellent in two days. In view of this case report, we would like to emphasize the importance of medical history and imaging studies in cases of cellulitis that do not respond to appropriate antimicrobial therapy. Another point to be kept in mind is that *Enterobacter cloacae*, which is very rarely reported as a causative agent for cellulitis, could be the etiological agent in cases after plant thorn injuries.

Key words: plant thorn cellulitis, Enterobacter cloacae, ampicillin-sulbactam.

Soft tissue infections are generally associated with previous trauma or infection in the superficial area[1]. Because of the association with previous trauma, most cellulitis occurs on the extremities. A wide variety of organisms may cause cellulitis, but the most common organisms implicated are coagulase positive staphylococci, group A beta hemolytic streptococci, and *Haemophilus influenzae* in areas where H. influenzae vaccine is not routinely administered. Cases of cellulitis due to *Enterobacter cloacae* (*E. cloacae*) have been reported quite rarely[2,3].

Diagnosis of soft tissue infections generally is clinical; laboratory examination including radiography is usually for determination of extension or detection of complications.

We report a case of cellulitis-abscess in which *E. cloacae* was isolated and unresponsive to appropriate antimicrobial therapy. A foreign body was later shown by magnetic resonance imaging.

Case Report

A five-year-old boy was admitted to hospital with localized swelling and erythema between the distal end of the left forearm and the wrist. The parents had observed swelling and erythema, followed by yellow purulent fluid drainage within the last two days with increased body temperature.

When the patient was admitted, he was in good condition. His temperature was 36.5°C, pulse and respiratory rate were 90 beats and 26 breaths per minute, respectively, and blood pressure 100/70 mmHg. A 2x2 cm area of the volar surface of his left wrist was swollen and tender and erythema was present. The movement of his left wrist was restricted. Initial laboratory findings revealed hemoglobin: 12.5 g/dl, leukocytes: 11,500/mm^3 with 64% polymorphonuclear leukocytes on blood film, platelet count: 600,000/mm^3, erythrocyte sedimentation rate: 24 mm/h, and C-reactive-

protein: 0.6 mg/dl (normal, 0-0.8). Urinalysis was within normal limits. Radiographs of the hand and forearm showed neither fracture nor periosteal reaction (Fig. 1). The abscess on the wrist was drained in the outpatient clinic. Gram smear of abscess specimen demonstrated Gram-positive cocci.

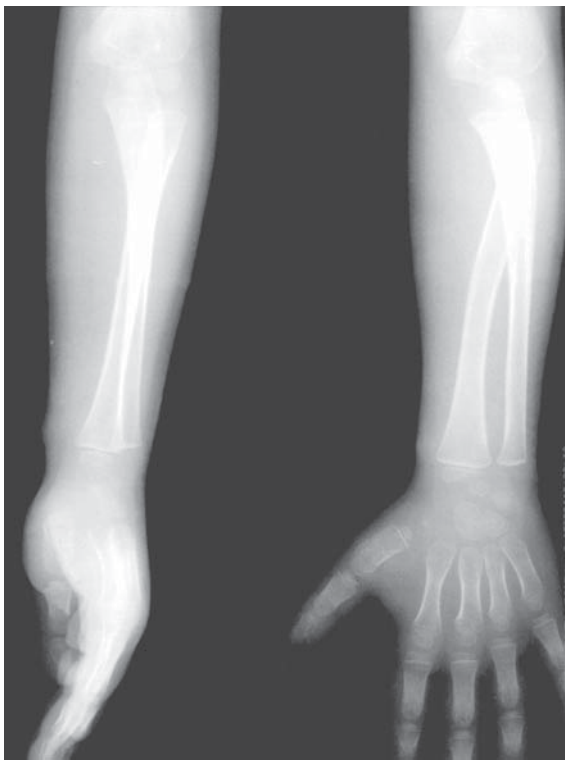

Fig. 1. Conventional postero-anterior and lateral X-ray of the patient's forearm.

The patient was hospitalized with the diagnosis of soft tissue infection. He was initially treated with sulbactam-ampicillin (100 mg/kg daily) intravenously. On the second day of his hospitalization, culture of the pus revealed *E. cloacae* sensitive to ampicillin and sulbactam-ampicillin, and only resistant to cephalothin and cefazolin. No bacterial growth was detected on blood culture. On the seventh day of therapy the patient was still febrile and there were still drainage and collection. Because of unresponsive clinical course over a one-week period, ultrasound examination was performed and showed fluid accumulation; magnetic resonance imaging was performed to rule out abscess formation and possible osteomyelitis. A foreign body (21-22 mm in length) was demonstrated on the anterior distal part of the left forearm just below the subcutaneous tissue at the level of the anterior distal part of the radius (Fig. 2).

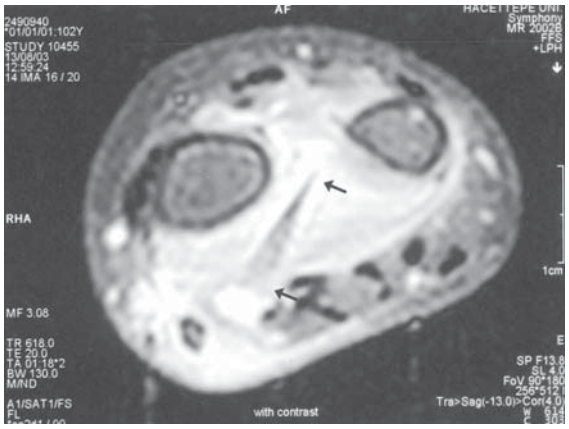

Fig. 2. A foreign body (between the black arrows) is seen on the anterior distal section of the radius on the T2 scans of magnetic resonance imaging.

Based on these findings, his medical history was detailed and his family reported that he had fallen from a tree two weeks prior to admission, suffering only a small abrasion over his left wrist at the time. Because of foreign body and the detection of abscess on the wrist, on the ninth day of hospitalization, the patient underwent an abscess drainage in the operation room under general anesthesia. A tree branch particle (22 mm in length) was taken out of the abscess (Fig. 3). The pus culture taken during the operation revealed no bacteria. His treatment was completed in two weeks using

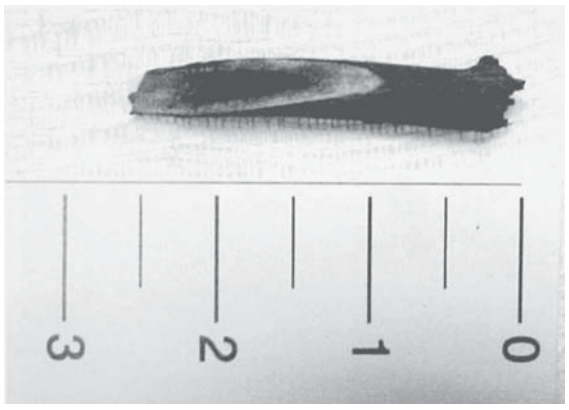

Fig. 3. Segment of tree branch (22 mm) removed from the forearm of the patient.

the same antibiotic. The postoperative course, including one-month follow-up examination, was uneventful.

Discussion

Since many children spend a significant portion of their leisure time outdoors, they are highly susceptible to hazards relating to plant-associated accidents. Septic arthritis, periostitis, osteomyelitis, and deep soft tissue infections may develop after plant thorn and wood sliver injuries[4-7]. Thorns of especially the palm, yucca, hawthorn, bougainvillea, sentry plant, blackthorn, cactus, and rose may lead to arthritis, especially among children[5].

Kratz et al.[5] reviewed reports published between 1953 and 2002 about arthritis and synovitis developed by plant thorn injury and reported that *Pantoea agglomerans* (formerly named *Enterobacter agglomerans*) was the most common isolated organism. However, they did not report any arthritis or synovitis case due to *E. cloacae*.

Enterobacter cloacae is a member of the genus Enterobacter[3]. This Gram-negative bacterium can be found in human and animal feces and in plants. Like other Enterobacter species, *E. cloacae* is an opportunistic pathogen. *E. cloacae* accounts for most hospital-acquired infections with this genus[3]. Neutropenic patients with malignancies, and patients with burns, wounds, respiratory and urinary tract infections, invasive procedures, and indwelling catheters are the groups at highest risk for *E. cloacae* bacteremia and sepsis[3,8].

The literature also contains no report of periostitis or osteomyelitis cases due to *E. cloacae*. Soft tissue infections due to *E. cloacae* have been reported quite rarely. Among the literature published in English which we have reviewed, only McCown[7] reported that *E. cloacae* was isolated from the culture of the wound in a seven-year-old child who had fallen near the edge of a pond.

In conventional radiographic examinations, non-opaque foreign bodies are generally not readily recognized in the soft tissues. In the literature, it is reported that such plant materials could not be detected using X-ray examination[5,6]. Radiographs have been reported to reveal a wooden foreign body in only 15% of patients[9]. Kratz et al.[5] reported that foreign bodies could not be identified in X-ray examination of arthritis and synovitis developing after tree thorn injuries. They recommended the use of ultrasound or magnetic resonance imaging examination in order to identify and locate the suspected foreign bodies, even if they could not be detected by conventional X-ray radiography[5].

Since it is necessary to remove the foreign body and drain the abscess for the cure, identification of the foreign body is of vital importance. As can be seen, laboratory examination has limited success for identification of foreign bodies. In our case, in whom soft tissue infection and abscess developed following a fall from a tree, there was no embedded plant material history. Nevertheless, it must be strongly considered in cases that do not respond to treatment.

Additionally, the pus culture in our case revealed *E. cloacae*, which does not exist in the skin flora of a child, and therefore implicates a plant pathogen as the causative agent. In view of the nature of the trauma in our case, it is not surprising that a plant pathogen was isolated. Therefore, especially in children who are not old enough to provide a good history, if wounds have potentially been contaminated by bacteria from plant or soil, prospective examination should be accompanied by the imaging technique in unresponsive cases. We also emphasize that despite advances in imaging techniques, the detection of retained wooden foreign bodies remains a difficult and challenging task. The basic component of the medical evaluation, patient history, is essential in even the modern technical era.

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