

SURGICAL MANAGEMENT OF OSTEOMYELITIS : CASE REPORT

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ABSTRACT

Osteomyelitis is an inflammatory disease of the bone that begins as an infection of the medullary cavity, rapidly involving the Haversian system, and quickly extends to the periosteum of the area. There are many predisposing factors leading to osteomyelitis. When antimicrobial agents or drainage prove unsuccessful, acute osteomyelitis may become chronic. Conventional radiography, bone biopsy, culture, radioisotope bone scan, computed tomography, laser Doppler flowmetry, and magnetic resonance imaging are used for its diagnosis. We present a case of chronic suppurative osteomyelitis associated with a draining extraoral sinus at the right lower border of the mandible, which was successfully treated with sinus tract removal, segmental resection, and stabilization done with 12-hole and 10-hole reconstruction plates and bicortical screws of 10 mm under general anesthesia with nasal intubation.

INTRODUCTION

Osteomyelitis is an inflammation of bone cortex and marrow that develops in the jaw usually after a chronic infection. Osteomyelitis of the jaw is now defined by the presence of exposed bone in the mouth, which fails to heal after appropriate intervention. The primary cause of osteomyelitis is usually microbiologic and results from various predisposing factors like odontogenic infection, post-extraction complications, trauma, radiation exposure of jaw (osteoradionecrosis), untreated fracture, inadequate removal of necrotic bone, early termination of antibiotic therapy, inappropriate selection of antibiotics, and diagnostic failure.

There are many medications linked to osteomyelitis such as steroids, chemotherapeutic agents, bisphosphonates, and other toxic therapeutic agents. Local conditions that adversely affect the blood supply or lead to tissue necrosis can also predispose the host to a bone infection or localized osteomyelitis. Osteomyelitis has a range of clinical manifestations depending on the virulence of the host resistance, infecting organism, and the periosteum reacting to inflammation. Diagnosis of osteomyelitis can be done on the basis of patient history, clinical examination, and surgical and radiographic findings.

Histopathologic examination can be consistent with the diagnosis and microbiologic tests can be helpful. There are different surgical approaches for the treatment of osteomyelitis such as sequestrectomy, saucerization, decortication, trephination, surgical resection, and reconstruction followed by medicinal regime and hyperbaric oxygen (Marx protocol).

CASE REPORT

A 35-year-old man reported to the Department of Oral and Maxillofacial Surgery, MM



College of Dental Sciences, Mullana, with an extraorally draining sinus in the right antero-inferior border of the mandible and a foul odor from the oral cavity for 3 months. The patient also complained of paresthesia of the right lower lip for the previous 1.5 months.

The patient reported having pain in the right lower back tooth region of the mandible 4.5 months previously and took medication for the same from the local practitioner. As the condition did not improve, the patient came to our department for definitive treatment (Fig. 1, 2, 3). Preoperative routine investigations were performed. Radiographic investigations disclosed radiolucent areas extending from right mandibular first premolar region to third molar region along with a pathological fracture on the right body region of the mandible along with displacement of the inferior alveolar nerve canal (Fig. 4, 5).

Based on clinical and radiographic presentation, a diagnosis of chronic osteomyelitis was made. Preoperative Erich's Arch Bar was placed under local anesthesia. The treatment plan

consisted of surgical resection and stabilization with two reconstruction plates with two bicortical screws of 10 mm on both sides of the defect under general anesthesia with nasal intubation.

The lesion was approached extraorally using a submandibular incision involving the sinus tract opening (Fig. 6). Incision extended to the angle of mandible and pathology was exposed by blunt dissection preserving the vital structures (Fig. 7). Segmental resection was done extending from right parasymphiseal region to right angle region (Fig. 8) and stabilization was done with 12-hole and 10-hole reconstruction plates and bicortical screws to maintain the continuity and function of the mandible that had been hindered after segmental resection (Fig. 9).

The entire sinus tract was excised and three-layer suturing was done for wound closure (Fig. 10). Resected tissue was sent for histopathologic examination (Fig. 11). Postoperative care included intravenous antibiotics (ceftriaxone 1 g twice a day, metronidazole 100 mL three times a day, and gentamycin 80 mg thrice daily based on culture sensitivity reports) for 5 days, followed by oral dosage up to 2 weeks with analgesics.

DISCUSSION

Chronic osteomyelitis is a bone disease characterized by inflammatory processes, including necrosis of mineralized and marrow tissues, suppuration, resorption, sclerosis, and hyperplasia. Probable cause of disease in the presented case was odontogenic infection in relation to right lower posterior teeth.

Clinical findings in chronic mandibular osteomyelitis include local pain, fever, swelling, purulent discharge, intraoral and skin fistula, unhealed soft tissue in the oral cavity, neuropathy in the involved area, pathologic fracture, and trismus. The patient presented to the department with a complaint of dull aching pain, mobile teeth, paresthesia in right lower lip region, and an extraorally draining sinus in the right inferior border of the mandible with foul odor.

Radiologic examination revealed radiolucent areas extending between the right mandibular



first premolar and third molar. It also showed the presence of radiopaque involucrum and radiolucent sequestra in the right mandibular body region, and a pathological fracture in the right body region of the mandible along with shifting of the inferior alveolar nerve canal toward the inferior border of the mandible, which might have resulted in compression of the inferior alveolar nerve, suggestive of osteomyelitis. The presence of sequestra and formation of periosteal new bone are the distinguishing features of osteomyelitis.



Computed tomography (CT scan) gives a more definitive picture of tissue calcification. CT findings included sclerosis and defect in the trabecular bone. A diagnosis of osteomyelitis is based on the presence of painful sequestra and suppurative areas in the tooth-bearing jaw bone that are unresponsive to conservative therapy. Tissue specimens should be cultured for the presence of microorganisms. Once soft tissue and bone specimens have been obtained, they must be sent to the microbiology laboratory immediately to identify microorganisms.

Histologically, an increased number of osteoblasts, thickened bony trabeculae, and fibrous marrow replacement are found. Pathologic bone remodeling and the presence of chronic

inflammatory cells are often cited as indicators of osteomyelitis. Pathogenic organisms usually implicated in chronic mandibular osteomyelitis are normal oral flora, *Staphylococcus aureus*, and aerobic gram-negative bacilli. The histological examination of the specimen confirmed the clinical and radiographic diagnosis. The histopathology report revealed fibrocellular connective tissue, the stroma with necrotic bony trabeculae with empty lacunae, dense fibrous tissue with inflammatory cells, including lymphocytes and plasma cells, confirming the clinical and radiographic diagnosis.



Treatment of chronic mandibular osteomyelitis along with pathological fracture involves segmental resection of the mandible. Additionally, 12-hole and 10-hole reconstruction plates were applied with bicortical screws on both sides of the defect to strengthen the weakened mandible in the operated area, and prolonged antimicrobial therapy was done. In addition, appropriate fluid therapy, nutrient intake, antibiotic-containing acrylic beads, microvascular grafts, and sufficient rest may be useful.

Van Merkesteyn and Bakker reported that a combined antibiotic and surgical approach is the



treatment of choice in chronic suppurative osteomyelitis. Bamberger reported that at least 4 weeks of antibiotic therapy are required after surgery, whereas Marx stated that there was a need for at least 2 weeks of antibiotic therapy after surgery. According to Bernier S. et al., surgical therapy consists of sequestrectomy or decortication with saucerization of the affected bone, as well as removal of necrotic tissues, broken teeth, and roots. Montonen et al. described possible causes of failure, which include insufficiently radical surgery and the retention of devitalized teeth in the decorticated area. However, in the more refractory forms and in patients in whom decortication and antibiotic therapy have failed,

hyperbaric oxygen treatment in combination with antibiotics and surgery is indicated to produce microvascular neoangiogenesis to increase reperfusion.

CONCLUSION

The present case shows that surgical resection and reconstruction could be a definitive method of treating chronic suppurative osteomyelitis of the mandible along with pathological fracture, with favorable clinical/radiologic results and postoperative function. Stabilization of bone with reconstruction plates and bicortical screws helps in reestablishing the facial form and function and improves prognosis.

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