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Microbiological Research and Multidisciplinary Management Play a Crucial Role

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Abstract

The diagnosis of primary chronic osteomyelitis of the jaw was made in a 15-year-old girl with a history of recurrent severe orofacial swelling based on clinical symptoms, histological analysis, and imaging modalities. The results of the initial microbiological samples were inconclusive. She used NSAIDs and several empirical antibiotic treatments for three years without achieving full remission. The ultimate diagnosis of bacterial chronic osteomyelitis of the jaw could only be made by MALDI-TOF (Matrix-Assisted Laser Desorption/Ionization-Time of Flight) analysis after further numerous microbiological bone samples with suitable methods. To reduce treatment failure, it must be managed using a multidisciplinary strategy comprising oral and maxillofacial surgeons, infectiologists, and microbiologists. The entire radiographic resolution of the CBCT (Cone Beam Computed Tomography) and the normalisation of laboratory values were obtained with antibiotic therapy without surgery for six months. A follow-up of two years revealed no relapses. In particular, in rare and clinically perplexing types of this infection, modern microbiological research and sample procedures are essential for the appropriate diagnosis and management of osteomyelitis of the jaw.

Keywords: Osteomyelitis • Jaw • Microbiology • MALDI-TOF analysis • Child

Introduction

Despite recent advancements in diagnosis, surgical management, and antimicrobial therapy, jawbone infections still pose a number of difficulties for dentists and oro-maxillofacial surgeons. A cortical and cancellous bone inflammation known as osteomyelitis is primarily brought on by bacteria or fungus. Jawbone infections typically develop as a result of an untreated dental issue either through straightforward contiguous spread (such as pulpal and periodontal infections) or from direct inoculation following trauma or surgery (e.g., tooth extractions, oral mucosal wounds and maxillofacial fractures). Less frequently, the cause of acute osteomyelitis in babies and children may be determined to be hematogenous dissemination from bacteremia or a distant infected site [1,2].

The Zurich classification system is currently the most used one, despite the fact that there have been various categories of osteomyelitis of the jaw (OJ) presented. First is OJ defined in terms of length (acute or chronic), clinical characteristics, and imaging. The histology, assumed aetiology, and pathophysiology of the disease are used to subclassify the disease. True infections in various stages of the same disease are acute and secondary chronic OJ. Numerous physiological and underlying bone diseases impact local vascularity and bone homeostasis, which facilitates bone infections in the jaw. Risk factors include diabetes mellitus, orofacial radiation therapy, and bisphosphonate therapy. The bacteria discovered in cases with necrotic bone exposure to the oral cavity are thought to be contaminants originating from the oral microbiota.

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Subjective Heading

In June 2019, a 15-year-old Kosovo-born woman with recurrent, excruciating orofacial swelling was sent by her doctor to the Reims University Hospital's oral surgery division. The young kid had jaw osteomyelitis that had been present for three years. The diagnosis of primary chronic osteomyelitis had been supported by imaging tests, including a CT scan and bone biopsy. In fact, histological study, which excluded malignant pathology, revealed generalised symptoms of chronic bone inflammation, and microbiological testing was unable to identify the development of any particular bacteria. Short-term antibiotics (amoxicillin and co-amoxiclav) and non-steroidal anti-inflammatory medicines (NSAIDs; ibuprofen®) had been used to treat recurrent inflammatory episodes between July 2016 and June 2019 with a partial remission of symptoms. Other than that, the medical background was ordinary Clinical. Examination revealed trismus, facial asymmetry, and an enlarged left mandible. Extraoral palpation revealed a solid, agonising enlargement in the lower mandibular angle and right forehead. There had been no reports of a fever, localised lymph nodes, arthritis, or skin abnormalities. An intraoral examination showed that teeth 16 and 36 were missing. There were no carious lesions found in the teeth. There were no indications of infection or periodontitis in the mouth. Diffuse radiopacities were visible in the left mandibular ramus on the initial panoramic radiograph [3-5].

The afflicted mandibular areas, particularly the right mandibular angle, which corresponds radiologically to the most representative medullary area described in the preoperative cone beam computed tomography, underwent histological biopsies once more under local anaesthetic (CBCT). The bone trephine and clamps were used in these biopsies, which were carried out one after the other and then preserved in sterile, dry containers. The location was heavily irrigated with sterile NaCl solution right after collecting all of the samples, and then the vestibular mucoperiosteal flap was closed. Childhood malignant tumours (osteosarcoma) and bone illnesses (such as fibrous dysplasia, ossifying fibroma, Paget disease, and histiocytosis) were ruled out by histopathology, which also revealed non-specific bone inflammation. six fresh microbiological bone samples (n = 6) were taken using an intraoral technique and a stringent regimen to prevent oral contamination. Aerobic and anaerobic bacterial cultures, fungal and mycobacterial cultures, and biopsy samples were all examined. From four of the six samples, Actinomyces oris, Streptococcus gordonii, and Streptococcus vestibularis were identified. In order to improve bacteriological analysis/diagnosis and treatment decision-

making, medical data were referred to Champagne-Ardenne CRIOAC (Centre de Référence des Infections Ostéoarticulaires Complexes) [6,7].

These results led to the definitive diagnosis of persistent bacterial osteomyelitis. Levofloxacin (500 mg, once daily) and cotrimoxazole (trimethoprim/sulfamethoxazole, TMP/SMX) (400 mg/80 mg, twice daily) were used to start a 6-month course of oral antibiotic treatment. Renal function monitoring and routine blood testing both produced normal results. The patient was symptom-free after three months. At CBCT/CT scans taken at 6 months revealed a normal bone structure. There had been no clinical or radiological relapse at two years after the end of the antibiotic treatment.

Discussion

The osteomyelitis of the jaw (OJ) clinical case described in this study exemplifies the necessity of a correct diagnosis for appropriate and efficient management. The precise aetiology of OJ is difficult to determine in the absence of suggestive indications of infection, and effective treatment is frequently postponed. Primary chronic osteomyelitis (PCO), according to the Zurich classification, is a diverse category of uncommon chronic non-bacterial osteomyelitis for which etiologies are yet unknown. Although there isn't any proof that the presence of bacteria causes the condition, some scientists do propose an infectious origin. Samples are frequently contaminated by saliva or commensal oral bacteria, and microbial cultures frequently fail to identify specific disease microorganisms. Most isolated bacteria come from the Streptococcus, Peptostreptococcus, Actinomyces, and Cutibacterium (formerly Propionibacterium) are the four genera mentioned. Even if these results are in favour of a non-infectious condition, histological characteristics and the prevalence of micro-abscesses in the majority of cases point to an infectious cause of PCO [8-10].

Conclusion

When diagnosing chronic osteomyelitis of the jaw, the discovery of the pathogen responsible for the condition should come first. MALDI-TOF is a useful tool for pathogen detection, and culture time is essential. It is often advised to manage the condition with a multidisciplinary team composed of oral and maxillofacial surgeons, microbiologists, and internists skilled in infectiology.

Acknowledgement

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Conflict of Interest

None.

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