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Post-Endodontic Therapy Maxillary Sinusitis: A Case-Report

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Abstract

This report describes a case of maxillary sinusitis of dental origin. A 67 year old male presented to the graduate endodontic clinic complaining of nasal discharge from his left nostril with a history of recent endodontic treatment on his maxillary left second molar. Patient was diagnosed with acute maxillary sinusitis. Etiology and treatment of this condition are discussed along with a review of the maxillary sinusitis of dental origin literature.

Keywords

Maxillary sinusitis, Endodontics, Dentistry, Sinus disease, dental patho-etiology

Introduction

Maxillary sinusitis is the inflammation of the maxillary par-nasal air sinuses. The association between peri-apical and sinus disease is well established in the literature [1-5]. Maxillary sinusitis secondary to odontogenic infection was first described by Berry in 1930 [2] and later termed maxillary sinusitis of dental origin or MSDO by Bauer [1]. An understanding of this dental patho-etiology of sinus inflammation is necessary for proper diagnosis and treatment [6].

A Diagnosis of maxillary sinusitis is reached following clinical and radiographic examination. Conventional radiographs provide a limited two dimensional evaluation of the teeth-maxillary sinus relationship. Cone-beam computed tomography (CBCT) scanning produces a three dimensional image and is significantly more sensitive in detecting the expansion of periapical lesions into maxillary sinuses when compared to periapical radiography [7]. Treatment of sinusitis is usually pharmaceutically driven. Antibiotics, analgesics and decongestants are commonly prescribed [6]. This report describes a case of acute maxillary sinusitis that occurred immediately following endodontic treatment of a maxillary first molar. An emphasis will be placed on the diagnosis, etiology, and management of this surprisingly common sequela of dental infection.

Case Report

A 67-year-old male presented to the Graduate Endodontic Clinic at the Ostrow School of Dentistry of USC. The patient complained of green nasal discharge from his left nostril for the past four days. He denied any headaches, facial or dental pain, or fever. A review of the patient's medical history revealed no systemic disease. The patient reported no known allergies. Patient vital signs were within normal limits at the time he was seen. He had received a root canal procedure on tooth # 15 which was completed one week prior by a second year graduate endodontic resident. A review of the patient's dental chart from the previous dentists revealed the following findings. Tooth # 15 demonstrated sharp lingering pain to cold test. Percussion and palpation sensitivity were present. Biting elicited no pain. No evidence of sinus tract or swelling was noted. However, no data on periodontal condition was present. The pulpal/periapical status of the tooth noted in the chart at the time of endodontic therapy was irreversible pulpitis with symptomatic apical periodontitis. Endodontic treatment was performed in a single visit using a combination of stainless steel hand and NiTi rotary files (K3; Sybron, Orange CA). Tooth was obturated with a thermoplasticized gutta percha technique with AH plus sealer (Dentsply Tulsa, Tulsa, OK). Resin composite build up (Z100; 3M ESPE, St. Paul, MN) was placed at the same visit.

Patient presented to the graduated endodontic clinic one week later. Clinical examination was unremarkable except for tenderness to percussion of the maxillary left posterior teeth and bone overlying the left sinus. Periodontal evaluation was performed at this time and 9 mm probings were found on the distal and distolingual aspects of tooth # 15. The remaining probing depths around the tooth were within normal limits. Evaluation of the postoperative periapical radiographs taken at the time of root canal completion showed slight extrusion of filling material around the apex of the mesiobuccal root of # 15 (maxillary left second molar). Otherwise, the quantity and quality of the fill appeared radiographically adequate (Figure 1). A CBCT scan of the maxillary left posterior area was performed using a medium field-of-view CBCT scanner (Galileos Compact; Sirona Dental systems LLC, Charlotte, NC) (Figure 2). The CBCT scan revealed complete sinus opacity on the left side and advanced vertical bone loss on the distal of tooth # 15 with a periapical radiolucency (Figure 3). Upon examination of the contralateral side, 10 mm probing depths were identified on the distal of tooth # 2 (maxillary right second molar) and the same pattern of distal vertical bone loss and periapical radiolucency was discovered.

Patient was diagnosed with acute sinusitis due to the presence of sinus opacity and frequent nasal discharge. Due to the recent history of endodontic and periodontal involvement, the principle author believed that tooth #15 was the source of the problem. Treatment options for tooth #15 including no treatment, only symptomatic treatment for sinusitis, extraction only or extraction and implant placement were presented and discussed with the patient. At the time, patient decided to go with symptomatic treatment for sinusitis only with no further treatment. He was informed that this line of treatment will only temporarily resolve his problems and not eliminate the infectious etiology. Patient was then prescribed Amoxicillin-Clavulanate potassium (Augmentin; 875mg; q12h, 14 tabs). He was also advised to purchase a nasal irrigation device (Nasaflo NetiPot; Neilmed Pharmaceuticals Inc, Santa Rosa, CA). He was instructed to irrigate with 8 fl. Oz. of warm saline, twice daily till resolution of symptoms. He returned in one week with complete symptom resolution. Patient was instructed to return

in 6 month and 12 months for routine follow-up or immediately should symptoms develop again. No signs or symptoms of sinusitis were detected at the 6 and 12 month follow-visits. However, the patient did report that the symptoms returned after 18 months and he had tooth # 15 extracted by a periodontist.

Discussion

This case report describes a case of acute maxillary sinusitis that manifested shortly following completion of endodontic treatment of tooth # 15. This etiology of this acute sinusitis maybe iatrogenic ; a complication of the recent endodontic treatment, periodontal; pocket defect on the distal of tooth #15 provided a pathway for bacterial ingress to the periapex and sinus floor or a combination of the above where a preexisting undetected sinusitis caused by the periodontal pocket was exacerbated by the endodontic treatment. There is not enough evidence to accurately ascertain the etiology of the sinusitis. According to Arias-Irimia, iatrogenic involvement is the most common cause of MSOD [8]. The clinician must be aware of two important facts when dealing with the maxillary posterior region; firstly symptoms arising from maxillary sinusitis can be mistaken for dental pain and secondly, dental infection can sometimes be the primary cause of maxillary sinusitis [5,9,10]. In fact, studies have shown that dental etiology can be implicated in about 10-15% of maxillary sinusitis cases [11]. In a study by Bomeli et al, a dental source of infection was identified in 17%, 53%, 79% of sinuses that were <1/3, 1/3 to 2/3, >2/3 opacified with fluid respectively [5]. Diagnosis of sinusitis is achieved by radiographic and clinical examination. According to the severity and persistence of symptoms, sinusitis can be classified into acute, sub-acute and chronic. A diagnosis of acute sinusitis was reached based on the patient's clinical presentation and cloudy appearance of the maxillary sinus space on the cone beam tomography.

Traditionally, the maxillary sinus is best visualized by a panoramic radiograph or an occipito-mental projection (Water's view) [12]. However, cone beam computed tomography (CBCT) is rapidly gaining popularity as the modality of choice for sinus imaging [12,13]. A CBCT image showed partial sinus obliteration and close proximity of the sinus floor to the mesio-buccal root of the recently treated maxillary second molar. Mattila showed that the closer the apex to the sinus floor, the greater the sinus involvement [14]. Eberhardt *et al* studies the relationship between the maxillary sinus and maxillary posterior teeth using CT imaging. They reported that the apex of the mesio-buccal root of the maxillary second molar was the closest to the maxillary sinus with an average distance of 1.97 mm, while, the furthest apex from the sinus was that of the buccal root of the maxillary first premolar, which was, on average,7.05 mm away[15]. In a study of 82 CBCT scans of patients suffering from maxillary sinusitis, MSDO was identified in more than 50% of the cases [16]. Involvement of the maxillary sinus floor may occur during routine orthograde endodontic procedures resulting in iatrogenic irritation and inflammation of the sinus mucosa. This inflammation may be caused by over-instrumentation or inadvertent extrusion of irrigating solutions, intra-canal medicaments, sealers or solid obturation materials [6]. In his classic cadaver study, Bauer demonstrated that sinus changes can occur even with the presence of intervening bone. He hypothesized that the blood and lymphatic vessels act as conduits for spread of infection from periapex to sinus[1].

In this case, patency was continuously maintained using a # 15 ISO files 1 mm beyond the predetermined working length. In addition, evidence of filling material extrusion was observed on the radiograph. Both finding could be possible etiologic co-factors in the development or exacerbation of sinusitis.

Traditionally, pharmacological management of sinus infections includes antibiotics, decongestants, and analgesics[6]. MSDOs are poly-microbial infections[9]. *Streptococcus pneumonia* and *Haemophilus influenza* are responsible for about 70% of bacterial sinusitis[17]. Thus, a synthetic penicillin antibiotic (Amoxicillin-clavulanate) was selected owing to its efficacy against *S. pneumonia* and *H. influenza* including b-lactamase producing strains[6]. In addition, reduction of edema around the ostia to improve drainage and promote sinus oxygenation is important. This can be achieved by using topical or systemic decongestants. In this case, the patient dismissed the use of decongestants. Pain can generally be controlled with over-the-counter analgesics; however, a narcotic analgesic may be indicated in case of severe pain. In this instance, nasal irrigation was also incorporated in treatment. Tamooka *et al*, demonstrated that nasal irrigation is effective in improving symptoms in patients with sinus disease[18]. A recent review by Brown and Graham stated that nasal irrigation must be considered as an essential tool for sinus therapy[19]. A Cochrane systematic review by Harvey et al showed that the benefits of saline nasal irrigation outweigh the drawbacks for management of chronic sinusitis[20]. On the other hand, another Cochrane database systematic review by Shaik et al, showed no beneficial use for nasal irrigation, or decongestants in treatment of acute sinusitis in children[21]. Initially, the patient was reluctant to use the nasal irrigation device, but after using it, the patient reported great relief.

An interesting feature of this report is that it describes a case where a second molar was implicated in acute sinusitis of dental origin which is quite rare [8]. In summary, this case report details a case of acute sinus disease following endodontic treatment. It confirmed the importance of periodontal evaluation prior to endodontic treatment. The value of CBCT in evaluating the maxillary sinus was demonstrated. Short-term symptomatic management of sinusitis secondary to dental infection can be successfully accomplishment with a combination of medication and nasal irrigation.

Figures

Figure 1: Pre- and postoperative periapical radiographs of tooth # 15. Conventional endodontic therapy was performed prior to the patient presenting with sinus symptoms.

Figure 2: Axial CBCT slices demonstrating left maxillary sinus opacity; radiographic evidence of intra-sinus fluid accumulation.

Figure 3: Sagittal CBCT slice advanced vertical bone loss on the distal of tooth # 15 with a periapical radiolucency

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