

Surgical and endoscopic approach on patients with maxillary sinusitis and medication-related osteonecrosis of the jaw: Case series

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Direct relationship has been established between conditions such as maxillary odontogenic infections and degenerative changes in the antral mucosa, leading to sinusitis. This retrospective study aims to describe the treatment outcomes of patients diagnosed with Mronj with concomitant maxillary sinusitis treated by oral surgical approach in conjunction with Functional Endoscopic Sinus Surgery (FESS). Mronj Patients with inflammatory condition of maxilla at Ewha Womans University Seoul Hospital from March 2019 to 2022 were included in this study. Computed tomography scans and panoramic radiographs were used as diagnostic tools. Primarily, all patients underwent sequestrectomy, when Eight patients were diagnosed with concomitant maxillary sinusitis and underwent functional endoscopic sinus surgery by ENT department. Post-operative follow up presented, in all patients, resolution of maxillary sinusitis and consequently, inflammatory condition of maxilla. Sequestrectomy for treatment of MRONJ in conjunction with functional endoscopic surgery when the maxillary sinus is involved is an effective way of treating MRONJ in the maxillary posterior area. (THE JOURNAL OF KOREAN ACADEMY OF OSSEOINTEGRATION 2022;14(1):12-17)

Key words: Mronj, Sinusitis, FESS

INTRODUCTION

Medication - related osteonecrosis of the jaw (Mronj) can be diagnosed from exposed bone or bone probed through an intra-oral or extraoral fistula in the maxillofacial region that has persisted for more than 8 weeks, and no history of radiation therapy to the jaws or obvious metastatic disease to the jaws. American Association of Oral and Maxillofacial Surgery (AAOMS) defines Medication - related osteonecrosis of the jaw (Mronj) as ischemic necrosis of the jaw caused by current or previous treatment with antiresorptive or antiangiogenic agents.

Success rate of surgical treatment of Medication - related osteonecrosis of the jaw (Mronj) is relatively high (over 93%)¹. By analyzing the outcomes of treatment of the 116 study subjects, 89 (75.0%) terminated treatment within 6 months of surgery, and 20 (17.0%) terminated treatment after 6 months or more. Treatment failure was observed in seven patients (6.0%)².

Direct relationship has been established between conditions such as maxillary odontogenic infections and degenerative changes in the antral mucosa, leading to sinusitis. Medication-re-

lated osteonecrosis of the jaw (Mronj), a side-effect of long-term use of bisphosphonates and anti-angiogenic drug has been reported to be one of the predisposing factors for sinusitis due to its features of bone exposure and secondary infections, causing a disruption in the schneiderian membrane as it advances. This case series aims to describe the treatment outcomes of patients diagnosed with Mronj with concomitant maxillary sinusitis treated by oral surgical approach in conjunction with Functional Endoscopic Sinus Surgery (FESS).

CASE I

First case patient is an 79-year-old woman who came for examination of a nonhealing chronic wound. The patient suffered from osteonecrosis in the right maxilla after extraction of on #17. She was diagnosed as Mronj before being admitted to Department of Oral and Maxillofacial Surgery, Ewha Womans Seoul Hospital. Patient suffered from high blood pressure and osteoporosis for 5 years.

Pre-operative imaging of computed tomography scans show

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sinus radiopacity indicative of inflamed sinus, periapical radiolucency, osteolysis, and oro-antral communication (Figure 1). CBCT scans were reviewed in order to evaluate the involvement of the maxillary sinus and its opacifications. As a clinical sign of sinusitis, presence of a nasal obstruction, rhinorrhea, and/or foul odor and taste, headache, postnasal drip, and maxillary tenderness were examined. FESS was decided on the basis of the severity of sinusitis, the patency of the ostiomeatal unit, and the condition of the maxillary sinus floor.

Surgical treatment included extraction of tooth, sequestrectomy of effected site and functional endoscopic sinus surgery (FESS). Surgical treatment held at OMS deptament included removing

the sequestrum at the maxilla and saucerization of adjacent cortical bones to achieve blood circulation. When destruction of cortical bone and infected maxillary sinus confirmed, inflammatory Soft tissue and necrotic bone were resected and sent for biopsy. Saucerization & Decortification was done with Piezoelectric surgery instument. Saline and Antibiotics (Bactacin) irrigation were done. Then curettage of granulation tissues were done in conjunction with recombinant human bone morphogenic protein (rh-BMP-2) using collagen sponges as carriers. Finally, buccal fat pad harvesting and peddiced flap graft was done to closure oroantral defect. Biopsy results confirmed Mronj diagnosis (Figure 2 and 3).

Patients diagnosed maxillary sinusitis along with Mronj went

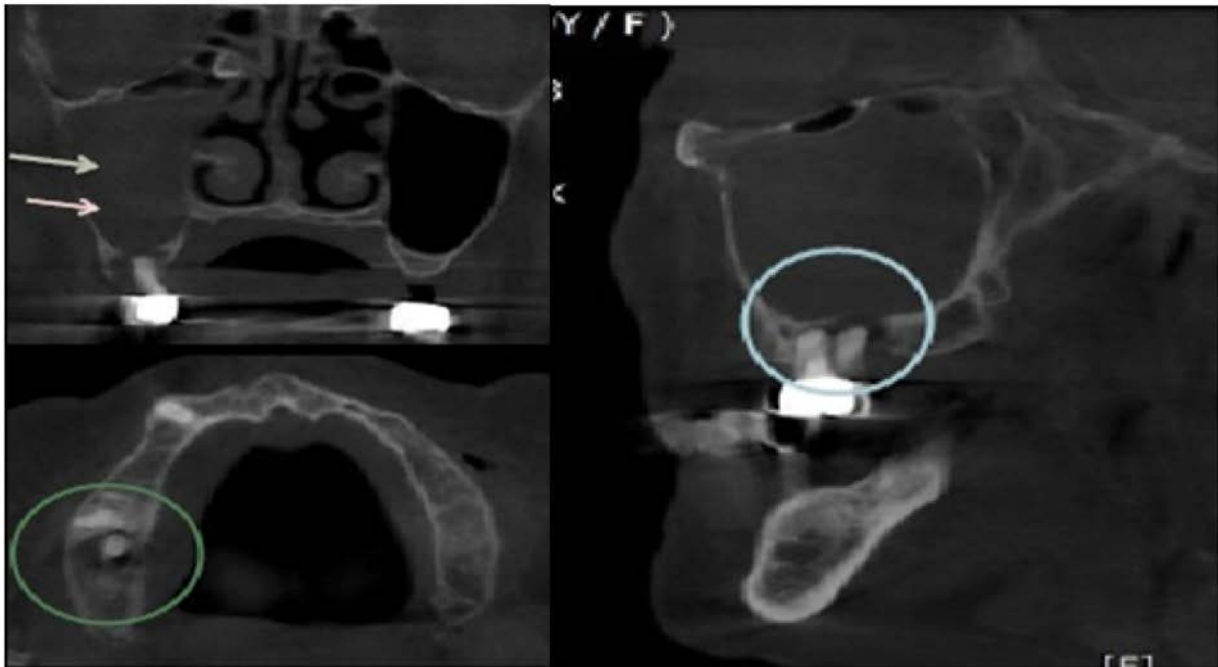


Figure 1. Pre-operative imaging of computed tomography scan showing sinus radiopacity indicative of inflamed sinus – Case I.

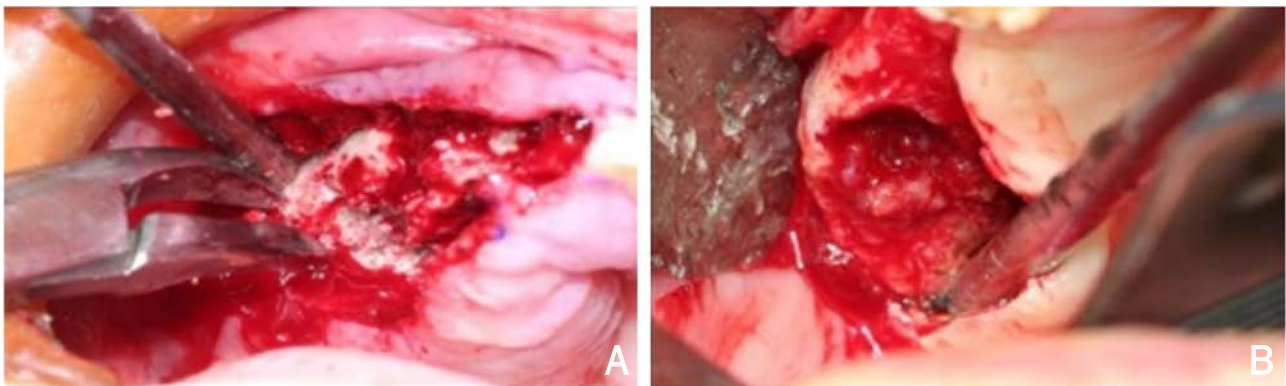


Figure 2. Sequestrectomy of necrotic bone (A) and formation of oro-antral fistula (B) – Case I.

through functional endoscopic sinus surgery (FESS) by the ENT department. Surgical procedures are as followed. Incision to the uncinate process was done using a fontanelle knife and was removed using a cutting forceps. The remnant tissue removed using a debrider. Natural ostium of maxillary sinus was checked using an ostium seeker, then the mucopus in the maxillary sinus was removed by curved suction, and saline irrigation was performed. Removed bulla with curette, debrider, and anterior ethmoidectomy was performed. Aggar nasi cell removal and frontal sinus irrigation were performed. Septal cartilage free from the crest and bony part. Deviated cartilage & bony portion was removed using a d-knife, scissor, vallenger cutting forceps and septal forceps. The deviated and hypertrophied crest was corrected using a gouge and mallet.



Figure 3. Post-operative photo of surgical site - one week (A) and two months (B).

Post-operative radiographs showed Mronj resolution and obliteration of oro-antral fistula. Clinical photos showed good tissue healing (Figure 4).

CASE II

The second patient, 70-year-old man with osteoporosis, was admitted to Department of Oral and Maxillofacial Surgery, Ewha Womans Seoul Hospital for persistent pain at right maxilla. The patient was referred to our department for evaluation and treatment of the upper jaw.

From clinical evaluation, exposed necrotic bone was seen in right maxilla. There was no oroantral fistula, but panoramic radiography and computed tomography scans showed a diffuse sclerosis

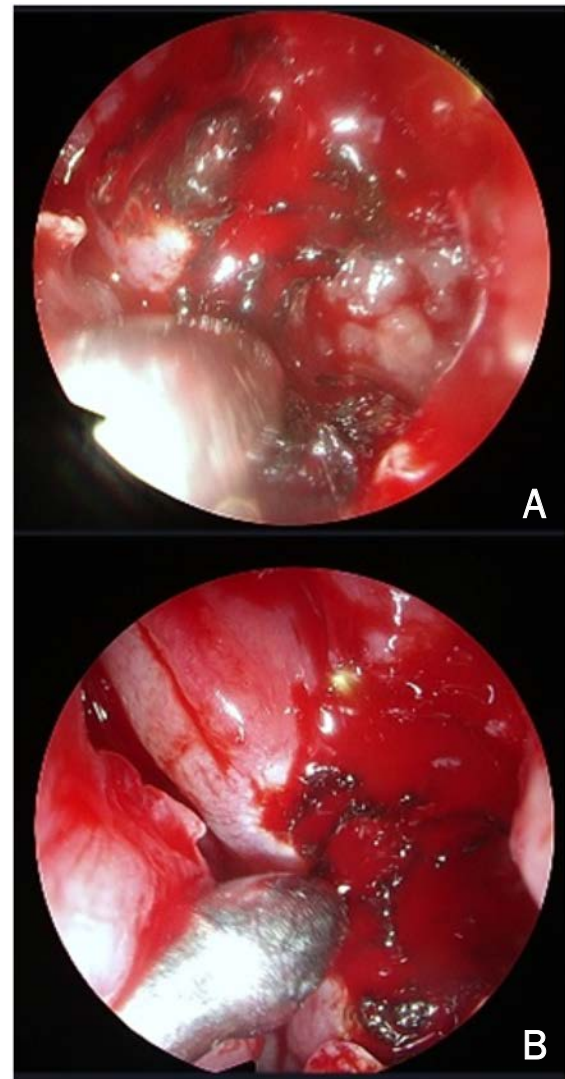


Figure 4. Sinusitis formation site during FESS - case I (A) and case II (B).

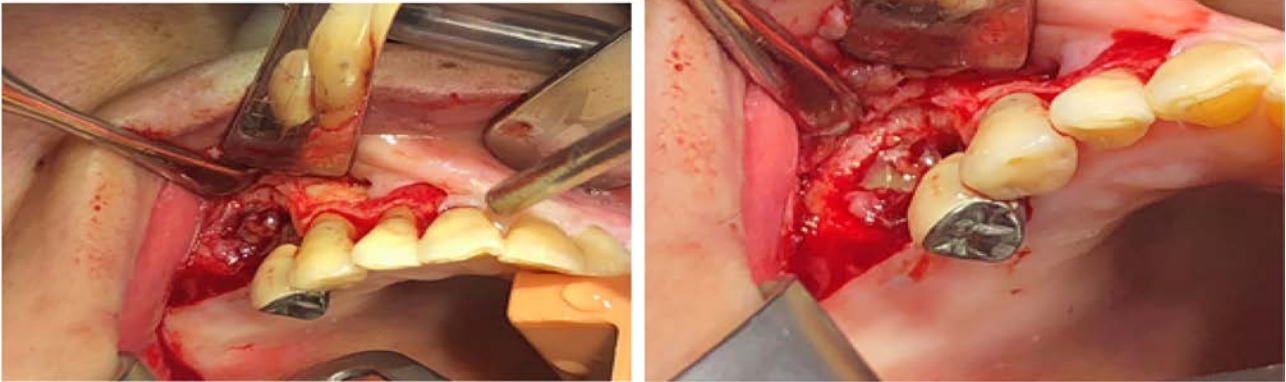


Figure 5. Exposed necrotic bone on right maxilla – Case II.

of maxillary bone and radiopacity indicative of inflamed sinus.

Patient was diagnosed with Mronj and hospitalized in August 2020. Sequestrectomy of necrotic bone was performed under general anesthesia and bone formation-inducing protein with platelet-rich fibrin were transplanted into the affected bone. Functional endoscopic sinus surgery (FESS) took place after OMS surgery (Figure 5).

Antibiotic adjuvant therapy was performed for 2 weeks. Patient suffered large pain on the surgical region for five days. Symptoms improved after 10 days, and the patient was discharged after stitch out. Continuous follow-up was conducted and normal healing state was maintained (Figure 6).

DISCUSSION

Post-operative follow up of case patients were at 7 days after release, and one, three months after then. Healing state of the bone were evaluated based on computed tomography scans and panoramic radiographs examination. Post-operative follow up presented, in both patients, resolution of maxillary sinusitis and consequently, inflammatory condition of maxilla.

MRONJ not only affects function and esthetics but also causes serious side-effects such as pain, infection, sensory disturbances, pathological fractures and odontogenic maxillary sinusitis. It is primarily an adverse side effect of denosumab or bisphosphonates, or possibly anti - angiogenic cancer treatment. In general, the incidence of Mronj increases as the duration of drug administration increases³.

The symptoms of chronic sinusitis are identical to those seen in an acute form of the disease, but are usually milder⁴. Patients with acute sinusitis often have purulent nasal discharge, facial pain, and congestion, whereas those with chronic sinusitis have

mucoid or mucopurulent nasal discharge⁵. In addition, chronic cough, bronchitis, tiredness, malaise and headache may be manifestations of chronic sinusitis. About 40% of chronic maxillary sinusitis seems to have a dental origin⁶.

In Min and Kang's study⁷, Use of rhBMP on bone defect sites after sequestrectomy increases the rate of new bone formation. Therefore, use of rhBMP on bone defect sites after sequestrectomy could be a successful strategy in treatment of Mronj patients. Cicciù et al.⁸ investigated the clinical effects of rhBMP in Mronj patients undergoing sequestrectomy and reported successful healing of the necrotic region. In their study, the experimental group identified an increase in radiographic index 6 months after surgery (Wilcoxon signed rank test, $P < 0.05$). In addition, there was a statistically significant difference in the radiographic index increase between experimental and control groups (Mann-Whitney U-test, $P < 0.05$), which may be the result rhBMP facilitating bone healing. This result suggests that rhBMP contributes to new bone formation.

Marcianò et al.⁹ emphasized that surgical treatment of Mronj is a reliable approach to the disease, and they confirm that appropriate soft tissue management procedures represent an additional guarantee against wound dehiscence, favoring the release of endogenous growth factors and leading to the successful healing of Mronj disease.

Following oral surgical procedure, MRONJ patients with chronic sinusitis were co-managed by the ENT Department and were subjected to further evaluation and eventually, FESS, if indicated. This approach attributes its success (83% resolution) to its less invasive nature and its re-establishment of natural drainage via the ostium. In conjunction with oral surgical treatment, it removes all the sources of possible focus of infection, hence, it pro-

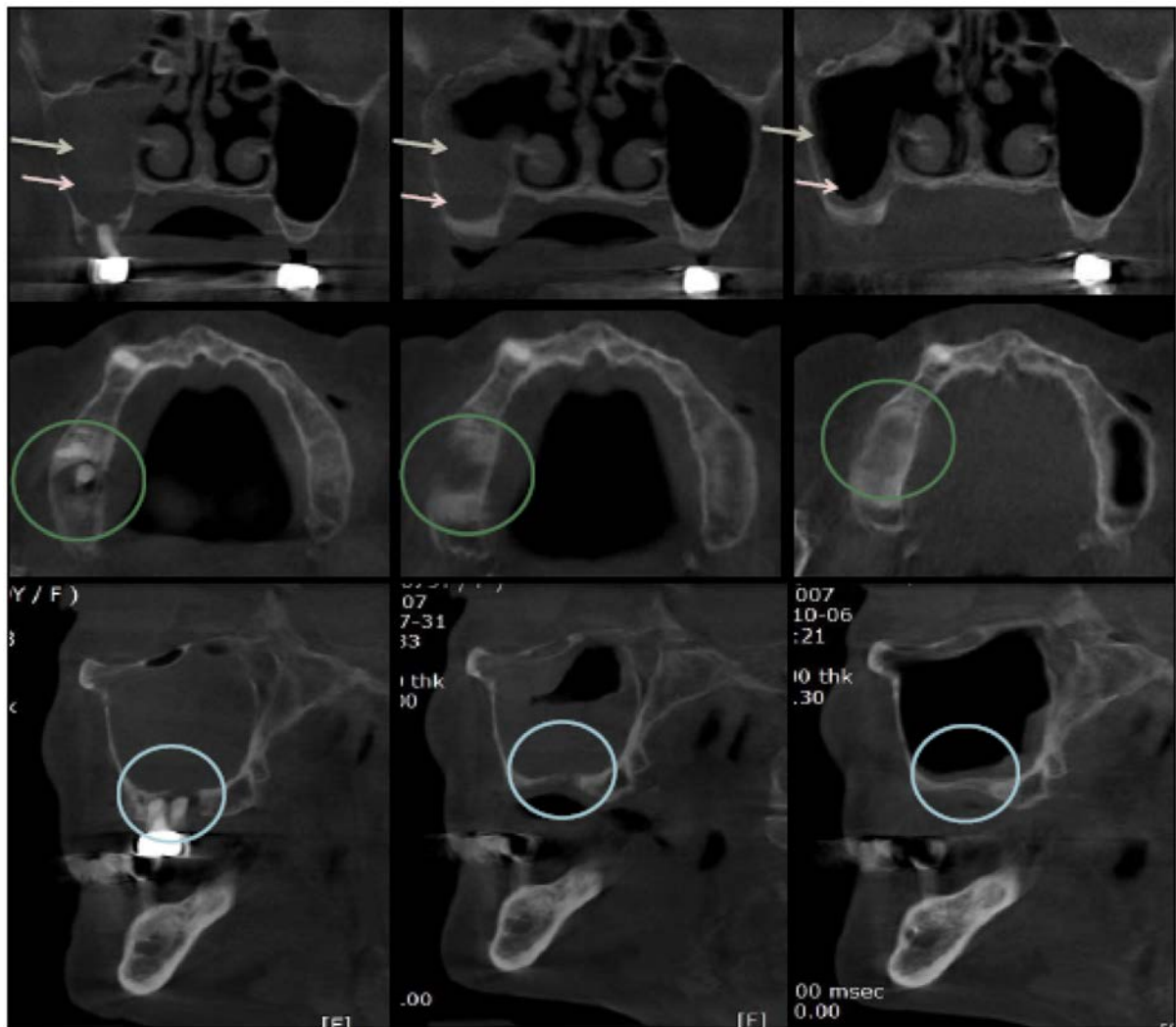


Figure 6. Pre-operative, post-operative 1 week, post-operative 2 months CBCT.

vided promising treatment outcomes.

CONCLUSION

This study was conveyed to determine the effectiveness of surgical treatment on Mronj patients with sinusitis. Maxillary sinusitis and oro-antral fistula are commonly associated with advanced maxillary MRONJ cases. Oral surgical treatment protocols in conjunction with FESS approach when chronic sinusitis is detected, presents promising treatment outcomes. It is important to detect and understand their association for treatment planning and management. Further investigation with larger pool is needed to provide treatment protocols on advanced MRONJ cases with the involvement of the maxillary sinus. However from the study, we could suggest that aggressive surgical intervention

of sequestrectomy and FESS combined can properly enable reconstruction of settled oral environment on Mronj patients with maxillary sinusitis.

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