



Severe Bilateral Degenerative Temporomandibular Joint Disease with Erosion into the Middle Cranial Fossa: An Uncommon Etiology

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Abstract

Erosion of the temporomandibular joint into the middle cranial fossa due to severe degenerative joint disease is an extremely rare occurrence. There have been multiple cases of the condyle being displaced into the middle cranial fossa as a result of trauma and pathology. The patient in this case report presented with erosive arthropathy of the bilateral temporomandibular joints with nearly complete loss of the condylar heads which were bilaterally displaced into the middle cranial fossa with dural thickening. Treatment options were complicated by partial edentulism and the potential for intracranial complications. The patient was reconstructed with bilateral TMJ Concepts prostheses using her dentures as a guide for establishing the appropriate vertical dimension.

Keywords: Middle cranial fossa; Joint disease

Introduction

Displacement of a condyle into the middle cranial fossa is a relatively rare occurrence generally having a traumatic or pathologic etiology [1,2]. There have also been cases reported as post-operative complications resulting in an alloplastic prosthesis eroding into the middle cranial fossa with a resulting cerebrospinal fluid leak [3].

Severe degenerative joint disease is characterized by pain, limited opening, deformity of the articular disc, closed lock, crepitus, and degenerative osseous changes in the condyle or fossa. Approximately five percent of patients who suffer from temporomandibular disorders require surgical management [4]. Patients requiring surgical management generally have undergone multiple procedures and some ultimately require reconstruction with a prosthesis to address functional deficits. The patient we are presenting had an unusual presentation, chief complaint, and etiology. She had no prior surgical or non-surgical intervention for her severe bilateral degenerative joint disease and erosion into the middle cranial fossa bilaterally.

Case Report

A 69 year old female with a past medical history significant for renal artery stenosis, COPD, polyarticular osteoarthritis, and acute pancreatitis of which the underlying etiology was unclear presented with the complaint of progressively worsening retrognathia and malocclusion. Her chief complaint was primarily centered around functional status, not pain. She began to notice changes in her occlusion initially and reported difficulty incising and chewing food. The patient had a skeletal class II appearance with a progressively worsening anterior open bite. She was edentulous in the maxilla, partially edentulous in the mandible with retention of the mandibular anterior teeth from 22-28, and had apertognathia. The distance from the maxillary alveolus to mandibular incisors on maximal opening was 30mm. She had mild reproducible pain on palpation of the bilateral temporomandibular joint capsule. Neurologically she was intact.

Diagnostic imaging

The patient underwent computed tomography of the head which demonstrated an erosive arthropathy of bilateral temporomandibular joints with nearly complete loss of the condylar heads, expansion and thickening of the joint capsule, and marked thinning and remodeling of the condylar fossa (Figure 1). There was bone dehiscence superiorly bilaterally in the condylar fossa with dural thickening which was greater on the right. Given these findings we obtained a contrasted stealth MRI for further evaluation of the middle cranial fossa and surgical planning (Figure 2). The MRI findings

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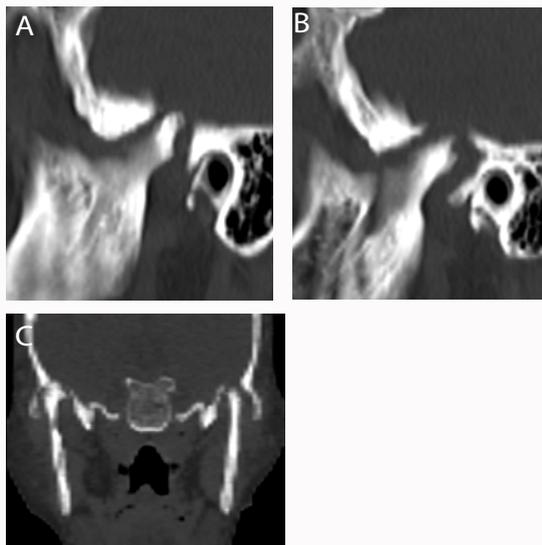


Figure 1: Computed axial tomography of the head. A) Oblique sagittal view of the right condylar head. B) Oblique sagittal view of the left condylar head. C: Coronal view of the bilateral condylar heads.

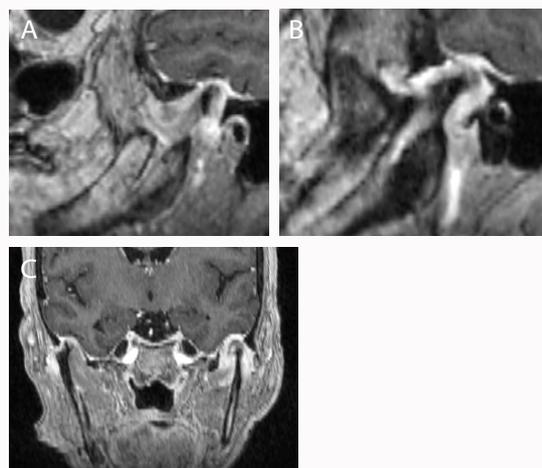


Figure 2: MRI of the brain with intravenous contrast. A) Oblique sagittal view of the right condylar head. B) Oblique sagittal view of the left condylar head. C: Coronal view of the bilateral condylar heads.

were consistent with the prior CT head. The MRI demonstrated bulging of the expanded temporomandibular joint capsule into the middle cranial fossa with dural thickening bilaterally (Figure 1 and 2).

Treatment

There has been multiple treatment algorithms described for displacement of a condyle into the middle cranial fossa with a traumatic etiology which involve closed reduction, open reduction with craniotomy, and condylotomy [5]. Due to the etiology of erosion in our patient there was nearly complete loss of the condylar head. Treatment options were discussed with the patient and she elected to undergo bilateral total joint replacement to restore her acquired skeletal malocclusion and vertical dimension in an effort to improve her function. Treatment planning was complicated by the potential for an intra-operative cerebrospinal fluid leak and intracranial hemorrhage [6]. There have been multiple cases of a condyle displaced into the middle cranial fossa due to other etiologies one of which an alternative surgical approach was used which

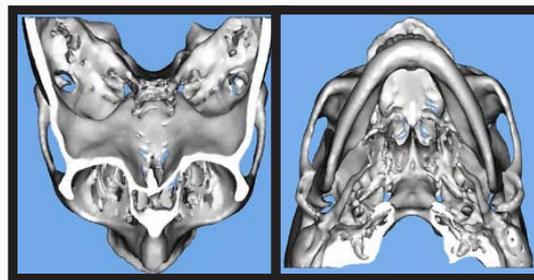


Figure 3: Three dimensional reconstruction of the head CT. A) Superior view demonstrating erosion of the condylar head into the middle cranial fossa. B) Inferior view of the mandible.



Figure 4: Panoramic radiograph, Postoperative panoramic radiograph.

involved leaving the condyle in the middle cranial fossa predisposing the patient to less risk of intracranial hemorrhage [7]. Given the displacement of the remaining condyles into the middle cranial fossa the patient was referred to the neurosurgery department for a pre-operative evaluation. Neurosurgery agreed to be available for intra-operative assistance and consented the patient for a sub temporal craniotomy, fascia latta, fat graft, and lumbar drain placement if indicated. Preoperatively alginate impressions were taken and her existing dentures were duplicated. The casts and duplicated dentures were used to establish the occlusion and vertical dimension. This along with imaging was sent to TMJ Concepts for construction of the bilateral total joint prostheses (Figure 3).

The patient was taken to the operating room and underwent nasotracheal intubation. After positioning and prepping the patient her left joint space was approached from a preauricular incision and the left mandible from a submandibular approach. A 701 fissure bur was used to make an osteotomy and remove the remaining portion of the condylar head. On exploration of the glenoid fossa an extensive amount of granulation tissue was found and removed. There was no cerebrospinal fluid leak observed and the dura remained intact. The mandible was pushed superiorly from the submandibular approach and an osteotomy was made from the sigmoid notch to the posterior aspect of the mandible to accommodate the alloplastic joint. The temporal bone was contoured with a bur to accommodate the fossa component then the fossa component was secured. An identical approach was made to the right joint space and mandible with similar osteotomies and removal of granulation tissue. The fossa component was fitted in a similar fashion as the contralateral side. The duplicated dentures were placed in the mouth along with Karlis screws. The patient was placed into maxillomandibular fixation to establish the proper vertical dimension. Once the occlusion was established the condylar portion bilaterally was temporarily secured with two bicortical screws and the patient was released from maxillomandibular fixation to verify that the occlusion was correct, stable, and repeatable. The condylar portions were then permanently

fixed with bicortical screws. An abdominal fat graft was harvested from the umbilicus region and grafted bilaterally to the condylar region. All surgical sites were then irrigated and closed. The bilateral condylar heads and associated soft tissue were sent as specimens. The diagnosis on the final pathology report was fibro cartilaginous tissue, granulation tissue, and associated cortical bone.

Postoperatively the patient did well and was sent home on the diet of her choice on postoperative day two. She was seen for follow up at two and four week intervals and was recovering appropriately without complication. At four weeks postoperatively she opened to a maximum incisal opening with her previous dentures to a distance of 31mm and was consuming a regular diet. (See figure 4) She was lost to follow up after four weeks.

Conclusion

While temporomandibular disorders are common among the population most are managed conservatively with only five percent requiring surgical intervention [4]. Most patients who undergo surgical management with a bilateral temporomandibular joint replacement with an alloplastic prosthesis have exhausted all other surgical options for severe degenerative joint disease. Bilateral native temporomandibular joint erosion into the middle cranial fossa is an extremely rare occurrence. It is also extremely rare for a patient to present at such an advanced stage in the disease process with minimal symptoms and requiring bilateral total joint replacement as the primary intervention. When the condyle is displaced into the middle cranial fossa the etiology is generally a result of trauma or pathology, other etiologies include advanced aging, malignancy, and condromatosis of the temporomandibular joint.

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