

Conventional radiograph V/S CT for evaluation of sagittal fracture of mandibular condyle: A Case report

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Condylar fractures of mandible are not very easy to diagnose radiographically. If fracture is vertical, it would be much more difficult to diagnose. Since treatment depends on type of fracture, CT scan is advised rather than conventional radiographs to diagnose condylar fractures. The cases reporting to the hospital during the period of July 2019 to April 2020 were enrolled, of which 2 cases have been reported here. It was observed that there are chances of missing the diagnosis of the condylar fracture if only the conventional radiographs are used. CT along with conventional radiographs should be considered for better treatment and management of the patients with maxillofacial injuries.

Keywords: *Sagittal fracture; Mandibular condyle; Conventional radiographs; Axial & Coronal CT.*

Introduction

In Maxillofacial injuries the incidence of the mandible fracture is highest, a little lesser than nasal bone fracture, and condyle fracture accounts for approximately 30% and 37% of mandible fracture in dentulous mandible patients and edentulous mandible patients, respectively. The mandibular ramus has high stiffness while the mandibular condyle has low stiffness, this factor may be causing higher incidence of the fractures of the mandibular condyle¹.

Both Clinical and radiographic examinations are both required for the diagnosis of fracture of mandibular condyle. Clinical signs such as jaw deviation, mouth opening limitation, malocclusion, and edema of the preauricular region are suggest fracture of mandibular condyle. The accuracy of physical examination is only 68% of mandibular fractures; therefore, radiographic evaluation is essential to confirm the presence and location of the mandibular fractures².

Fracture of the mandibular condyle is uncommon among mandibular fractures. Diagnosis not only vertical fracture but also other types of fractures of the mandibular condyle is difficult due to its anatomical characteristics fracture area^{3,4}. Classification of condylar fracture is important in choosing the treatment modality i.e., concerning conservative or open reduction. Previously, the sagittal split of condyle could not be identified because of overlapping images on plain radiograph, although sometimes PA view of mandible showed such fractures. However, sagittal splitting fractures of condyle are discovered by the recent advances in evaluating the fractures using a computerized tomography scanning. Computed tomography provides accurate information and is a useful diagnostic tool^[5].

The failure to recognize the presence of a condylar fracture especially in children, may lead to late complications, including facial deformity and temporomandibular joint ankylosis².

In order to interpret the displacement of the fractured fragment on the coronal sections of the CT scan images, the sagittal fracture of condyle was classified into three types for better interpretation of displacement of fractured fragments on the coronal sections of the CT scan images^[5].

Type I (fissure type): The medial part of the condyle split and formed a V-shaped gap between the fragment and the lateral pole of the condyle.

Type II (displacement type): The fractured fragment anteromedially displaced, and the lateral pole of the condyle located within the fossa.

Type III (dislocation type): The fractured fragment anteromedially displaced.

Methodology

All the cases reporting to the BLDEDU Shri BM Patil Medical College, Hospital and Research center with Maxillofacial injuries from July 2019 to April 2020 were enrolled, of these 2 cases have been reported here.

Two patients with a vertical fracture of the mandibular condyle, which were visualized by computed tomography (CT) through OPG, showed no fracture, and initial diagnosis of traumatic arthritis was made.

Case Reports

Case 1: A 40-year-old female patient reported to the department of dentistry, with the chief complaint of pain during mastication in the left preauricular region. There was a history of fall from bike one week before. There was no pain or swelling present initially, but she developed pain after one week of trauma which subsided by medication. No history of ear bleed was reported. On palpation, head of the condyle was present in the glenoid fossa, with diminished movements on the left side. In the OPG no fracture was visible. The initial diagnosis of traumatic arthritis was made, and the patient has advised a soft diet and moist heat application. Though the intensity of pain reduced after 2 weeks, it persisted, hence the C.T scan was advised. Computed tomography revealed bony changes in the fractured mandibular condyle and its position in the mandibular fossa more precisely than conventional radiographic examinations. In the axial section, there was a sagittal fracture of the left condyle. Intermaxillary fixation was done for two weeks.

Case 2: A 22-year male patient reported to the department of dentistry after a road traffic accident. There was swelling in the left preauricular region with a history of ear bleed. Painful movements of the mandible were observed without any restrictions in mouth opening. Condyle was present in the glenoid fossa, and movements were perceptible bilaterally. The O.P.G revealed no fracture in either condyle, but the C.T. showed a sagittal fracture of the left condylar head and a medial displacement

of the medial fragment. A soft diet and limited mouth opening were advised for two weeks.

Discussion

The diagnosis of fractured mandibular condyle requires radiographic as well as clinical findings . However, conventional radiographs sometimes don't provide adequate information due to the anatomical characteristics of the fracture area^{4,5}. With the introduction of the CTscan, the incidence of sagittal fracture of mandibular condyle appeared to increase and was reported to be 9-29% in the cases of condylar fractures. Anatomically, the medial pole of the condyle extends far beyond the condylar neck and has a higher chance of being split in the sagittal plane, resulting in a sagittal fracture of the mandibular condyle. The sagittal fracture line usually passes through an area between the lateral one-third and the medial one-third of the condyle⁶. With the plain radiograph, of the orbito ramus projection, AP projection and oblique transcranial projections, it is unusual to visualize the structures of the minor internal fragment in detail. Salon et al. noted that displaced supracondylar fracture on the medial aspect of the temporo-mandibular joint showed no evidence of fracture by orthopantomogram and multiple standard films but was clearly defined by CT scanning⁷. This may be due to the overlapping images of the adjacent radiopaque structures condyle such as petrous portion of the temporal bone and the zygomatic bone on the fractured fragment of mandibular condyle. The direction of radiographic projection may be restricted by functional limitations in the mandibular condyle. However, no clear correlation between the manifestation of clinical findings and the extent of fragment displacement as demonstrated radiographically was observed. Therefore, proper radiographic projections in different directions are necessary to diagnose the fracture of the condylar head. However, a split in the sagittal plane of the condyle is not visible with a lateral, oblique, or panoramic radiograph but only with anteroposterior, transorbital projections of the temporomandibular joint. Therefore, the plain radiograph should be supported routinely by views in axial and coronal computerized tomography if a sagittal split fracture of the mandibular condyle is suspected⁷.

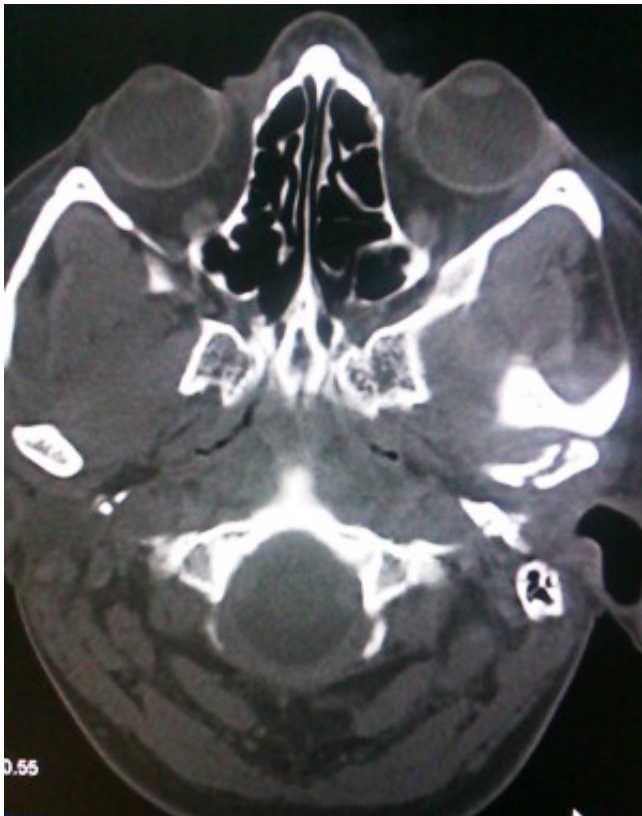


Figure 1. Axial CT showing vertical fracture of left condyle of mandible.



Figure 2. Case 1: Conventional radiograph (OPG)



Figure 3. Case 2: Axial CT showing vertical fracture of left condyle of mandible'



Figure 4. Case 2: 3D CT showing vertical fracture of left condyle of mandible.



Figure 5. Case 2: Conventional radiograph (OPG).

Conclusion

The Computed tomography (CT) reveals bony and soft tissue changes at the same time and allows multi-planar evaluation. However, the routine use of the CT for mandibular fractures is not justified due to the high cost and increased radiation exposure.

The sagittal split of condyle was not identified because of overlapping images on plain radiograph due to its anatomical characteristics of the fracture area. This may be since the shadow of the minor fragment gives overlapping images with other radiopaque structures around the condyle such as the petrous portion of the temporal bone and/ or the zygomatic bone. Therefore the advantages of the CT vs. X-ray in mandibular fractures are several, and partly due to the presence of images in a three-dimensional (3D) plain. The CT scan provides views where superimposed anatomy is avoided, which commonly occurs with X-rays projections. For example, condylar or symphyseal fractures are detailed well in CT, which is commonly obscured in a PA radiograph.

References

1. [Kang-Young Choi](#), [Jung-Dug Yang](#), [Ho-Yun Chung](#), and [Byung-Chae Cho](#) Current Concepts in the Mandibular Condyle Fracture Management Part I: Overview of Condylar Fracture. . 2012 Jul; 39(4): 291-300.

2. Bong-Hae Cho Diagnostic performance of dental students in identifying mandibular condyle fractures by panoramic radiography and the usefulness of reference images *Imaging Science in Dentistry* 2011; 41 : 53-7.
3. Bos RR, Ward Booth RP, de Bont LG. Mandibular condyle fractures: a consensus. *Br J Oral Maxillofac Surg* 1999;37:87-89]
4. Hakubun Yonezu, Takashi Yakushiji, Ken'ichiro Suga, Nobuo Takano, Takeshi Uchiyama and Mamoru Wakoh. Vertical fracture of Mandibular condyle treated with Intra-articular Pumping therapy: A case report. Institutional resources of unique collection and academic activities at Tokyo dental college 2009
5. Yamaoka, K. Furusawa, K. Iguchi, M Tanaka, D Okuda. The assessment of fracture of the mandibular condyle by use of computerized tomography. Incidence of sagittal split fracture. *British Journal of Oral & Maxillofacial Surgery* 1994. 32: 77-75.
6. Duan, Y. Zhang, A clinical investigation on disc displacement in sagittal fracture of the mandibular condyle and its association with TMJ ankylosis development. *Int. J. Oral Maxillofac. Surg.* 2011.
7. Salon J M, Ross R. Computer assisted scanning of supracondylar fractures. *Oral Surg Oral Med Oral Pathol.* 1990.