Kathmandu University Medical Journal (2005), Vol. 3, No. 4, Issue 12, 415-417

Case Note

Anatomical variation of maxillary sinus mimicking a periapical cyst: A case report

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Abstract
Maxillary sinus can pose diagnostic dilemma radiographically because of its anatomical variation which can mimic a periapical pathosis. This case report deals with one such diagnostic problem, where a maxillary sinus was interpreted in an intraoral periapical radiograph as a periapical cyst. With the advances in imaging techniques, the use of an Ultrasound imaging together with application of Colour Power Doppler helped in revealing the contents of the radiolucent area and come up with an accurate diagnosis. Thus a thorough knowledge about the normal anatomy and its variations and proper diagnostic aids are essential in the diagnosis of periapical pathology.

There have been many reports of conditions that may mimic periapical inflammatory lesion such as carcinoma[1], odontogenic cyst[2] and periapical cemental dysplasia[3] etc. Film processing errors has also been reported to mimic the appearance of periapical infection[4], while normal anatomies such as the mental foramen or incisive foramina are familiar as radiolucencies that may overlie teeth and cause diagnostic confusion. This case report describes an anatomical variation of maxillary sinus manifesting as well defined periapical radiolucency in relation to the roots of upper left first molar, premolars and canine, which was suggestive of periapical cyst.

Radiographs are an important part of root canal therapy especially for detection, treatment and follow up of periapical bone lesion. However, routine radiographic procedures do not demonstrate reliably the presence of every lesion[5]**.** Furthermore, inter and intra observer variability can influence the diagnosis[6] . Echography is a real time Ultrasound imaging technique that is of great use in numerous diagnostic fields of medicine. It is based on the phenomenon of the reflection of ultrasound waves at the interfaces between tissues that have different acoustic properties as described below. *Hypoechoic* or *Transonic* is a given area with low echo intensity. *Anechoic* is an area where there is no reflection of echoes , that is area filled with fluids. *Hyperechoic* is an area that shows high echo intensity[7]. The application of Colour Power Doppler to the ultrasound offers an opportunity to evaluate and determine the presence of blood flow within the ultrasound image of the examined tissue. Power Doppler will give a colour coded representation of the intensity of Doppler signal and its modification with time[8]. Cotti et al.[9] suggested an echographic image describing a cyst and a granuloma. For cystic lesion, a transonic or hypoechoic well-contoured cavity surrounded by reinforced bone walls filled with fluids and with no evidence of internal vascularization on application of Colour Power Doppler was observed. Whereas for granuloma, a poorly defined hypoechoic or Hyperechoic area exhibiting a vascular supply on application of Colour Power Doppler was observed.

Case Report
A 19 year old female patient attended the Department of Conservative Dentistry and Endodontics, Manipal College of Dental Sciences, Mangalore, complaining of cavity in upper left canine with food getting stuck in that area. On clinical examination, caries was seen in distal aspect of left upper canine with no history of pain or trauma. On routine radiographic examination, a large well defined radiolucency was seen involving the root apices of upper left maxillary first molar, premolars and extending till the root apex of canine (shown in Fig. 1). On performance of vitality tests, all the teeth appeared to be vital.

Ultrasound with Colour Power Doppler examination revealed a hyperechoic area with irregular border and dirty shadowing within the lesion that was suggestive of a cavity filled with air (shown in Fig 2). After this an orthopentemogram was taken which revealed the maxillary sinus with its border extending to involve the root of canine, which is one of the anatomical variations of maxillary sinus (shown on Fig. 3).

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Fig. 1: Radiograph showing large well defined periapical radiolucency in relation to maxillary first molar, premolars extending to involve the root of canine which was suggestive of a periapical cyst.

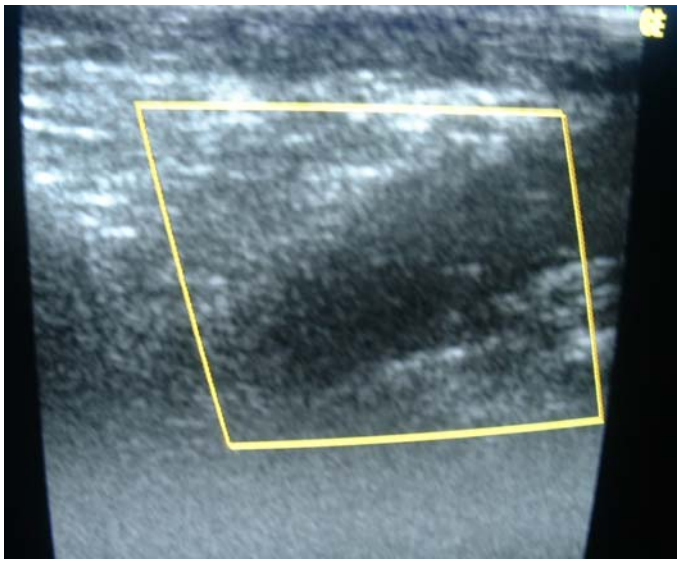

Fig. 2: Ultrasound and Colour Power Doppler indicating the same lesion as hyperechoic area with dirty shadowing suggestive of cavity filled with air.

Fig. 3: Orthopentemogram showing the maxillary sinus extending from maxillary first molar till the root of canine.

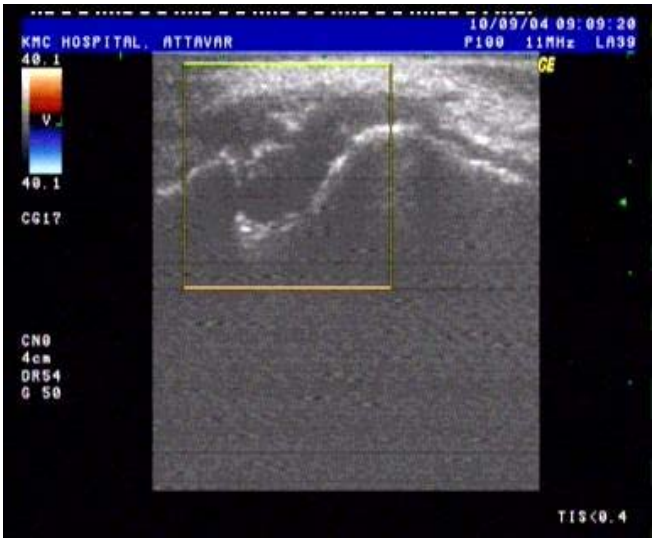

Fig. 4: Ultrasound and Colour Doppler showing Hypoechoic area with well defined border and no internal vascularity suggestive of Periapical Cyst

Discussion

Maxillary sinus is the largest of all paranasal sinuses occupying the body of maxilla. It is pyramidal in shape, with base formed by lateral wall of nose, apex projecting into the zygomatic process. Superiorly, roof is formed by orbital plate and inferiorly is bordered by alveolar process of maxilla. According to the literature, maxillary sinus is related to molars and may extend till premolars. There has been a case reported where maxillary sinus has extended from lateral incisors to third molars[10].

In the present case, the radiographic examination of the lesion was suggestive of a cyst, because of its well defined border and the size of the lesion that was more than 10mm. For a cyst, according to Cotti et al [9], Ultrasound examination shows a hypoechoic area with irregular border and no internal vascularization on Colour Power Doppler examination (shown in Fig. 4). However, in the present case, ultrasound examination showed a hyperechoic area with a dirty shadowing that is not typical of a cyst. This result made us go back to radiographic examination. Orthopentemogram was taken which revealed the outline of the maxillary sinus extending till the root of canine. Then combining the results from clinical examination, radiographic examinations, results from vitality tests and ultrasound examination, the final diagnosis was made which prevented the patient from undergoing inappropriate treatment. Therefore, a thorough knowledge about the anatomy and its variations, proper diagnostic aids and good interpretation skills are essential to come up with an accurate diagnosis.

When periapical radiolucency is seen in the radiograph, it can be a separate pathologic process or it could be just an anatomical variation. Collection of data by clinical and radiographic examinations helps us to get a working diagnosis. If this data supports the diagnosis of radiolucent lesion associated with a non-vital tooth, then only endodontic therapy should be initiated. If it does not, then further diagnostic data should be collected from various clinical tests, advance imaging techniques, biopsy, consultation with appropriate specialist etc.

Conclusion

This case report emphasis the need for careful consideration of the causes of periapical radiolucency before making a final diagnosis and discusses how an anatomical variation may cause "diagnostic confusion". The radiographic feature of this presented case may have led to patient receiving inappropriate dental treatment had further clinical examinations and ultrasound and orthopentemogram not been done.

"The Endodontist cannot content himself with sufficient knowledge to deal with apical infection only, for he encounters a great number of diseases ; it is necessary for him to be reasonably well informed on the radiographic appearances of normal anatomy, abnormalities and diseases that occur in the jaw "

Dr. H. M. Worth

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