

Comparison Ultrasound, Indirect Digital Panoramic Radiography in Differential Radiolucent Mandible Lesions

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Abstract: Comparing the accuracy of ultrasound and indirect digital panoramic radiography in diagnosis cystic and tumoral radiolucent mandible lesions. Ten patients aged between 12 and 50 years with jaw bone lesion were selected and consented for the study. Panoramic radiography was obtained and scanned to digital form. Measurements and provisional diagnoses of lesions were made. Preoperative ultrasound and color doppler with probe examination 12 MHz were performed. Lesion observed for the size, contents, vascular supply and provisional diagnosis made as to whether the lesion was a cyst or tumor. Surgery was performed and histopathological investigation was made which provided the gold standard diagnosis. All measurements and findings compare and analyzed with spss 0.3 software test. Existing all lesions in panoramic radiography were significant. In areas which cortical bone was inadequate thin, ultrasound imaging was significant. In 8 cases: (6 cysts and 2 tumors) ultrasound results were agreed with histopathological gold standard. But in two cases which cortical bone was not enough thin ultrasound could not diagnose the lesion there was no statistical difference between measurements in two techniques. Ultrasound is an established valuable diagnostic tool for lesions and is noninvasive although panoramic is able to diagnose the existing the lesions but can not provide accurate information on the pathological nature of lesions.

Key words: Ultrasound, digital, panoramic, radiography, gold standard

INTRODUCTION

Two groups of jaws lesions are cysts and tumors. They have different treatment plan. There is necessary before surgery to diagnose the accurate information of pathological nature of lesion (Whites and Pharaoh, 2004; Peterson *et al.*, 2003). Imaging techniques play a very important role in the diagnosis of lesion. Indirect digital panoramic radiography has sensitivity the same as conventional radiography. Ultrasound is recognized as non invasive methods and used in salivary gland disease, cysts in soft tissues, fractures, cystic and solid lesion of jaw, Tmj disease (Whites and Pharaoh, 2004; Peterson *et al.*, 2003; Gundappa *et al.*, 2006; Akinbami *et al.*, 2006; Adeyemo *et al.*, 2006). Advantages of ultrasound are in being noninvasive, without any known deletions biological effect, rapid, painless, inexpensive and easily reproducible. In this study, we want to find an invasive technique which provide more

information for diagnosis lesions and reduce the exposure of x-ray. The aim of this study was to compare ultrasound and indirect digital panoramic radiography in identify radiolucent lesions (Raitz *et al.*, 2006; Bialeke *et al.*, 2004; Cotti *et al.*, 2003).

MATERIALS AND METHODS

Ten patients aged between 12 and 50 years having bone lesions in Mandible were selected from Maxillofacial surgery department of dental school of Isfahan Medical Science University. Ethical approval obtained from all of patients. Clinical examination and history of patients recorded. One general radiologist and one Maxillo Facial radiologist with >10 years history of clinical work study and measured lesions before surgery.

Indirect digital panoramic radiography: Panoramic radiographs were prepared by Maxillofacial radiologist by

plan meca (Helsinki, Finland) 2002 EC praline, 60-70 kvp, 4-9 mA, 2.5 mm Aluminum Filtration. Then plain films scanned and made digital lesions measured in vertical and horizontal dimensions.

Ultrasound examination: Ultrasound examination were done in ultrasound center with Medicon SA9900 with color Doppler function with ultrasonic linear probe operating at a frequency (12 MHZ).

The ultrasound probe was first covered with a layer of ultrasound gel (ultra gel, Medic on, India). The probe positioned outside jaw on the skin. The position of probe was changed several times in order to find the area and dimension of lesion. The image of ultrasound analysis by expert ultrasonographer.

Surgical examination: Surgical examination of all cases were done in surgery department and specimens referred to Histopathology Department and were processed for routine histopathological examination. Finally images results were compare with histopathology results. Data analyzed with SPSS software and t-paired test.

RESULTS AND DISCUSSION

In indirect digital panoramic examination ten lesions diagnosed cyst but in ultrasound examination 6 cyst and two tumor were diagnosed and in two cases ultrasound examination did not diagnose the lesions. About 6 lesions were with anechoic area with smooth contour, well defend without vascularization they were cystic. In two cases hypo echo area and severe vascularity were shown these were solid lesions. Cortex perforation were diagnosed in ultrasound examination. In histopathology examination eight cases were cyst and two cases were tumor (solid lesion).

Comparing results of panoramic and histopathology showed in 80% agreement in diagnosis of cysts but in panoramic did not diagnose solid tumors. In eight cases there were agreement with histopathology and ultrasound examination.

The sensitivity of ultrasound in diagnosing cysts were 75% and a bout solid tumors were 100%. We compare means of sizes measurements with t-pair test. The mean of vertical dimension in panoramic was 32.4+11.9 and in ultrasound 35.1+18.6. It was not significant ($p = 0.53$). The mean of horizontal dimension in panoramic 22.1+6.7 and in it was not significant 22.9+1.05.

It was not significant ($p = 0.86$). In panoramic only two dimension of lesion could be studied. But in ultrasound three dimensions were studied.

CONCLUSION

In this study ultrasound could differentiated cyst and tumors but in panoramic all of lesion seems cyst. Ultrasound is an established valuable diagnostic tool for lesions. Its advantages include being noninvasive, painless (Gundappa *et al.*, 2006; Akinbami *et al.*, 2006; Adeyemo *et al.*, 2006). Ultrasound imaging is a technique that may help make a differential diagnosis between cysts and tumors by revealing the nature of the content of a bony lesion.

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