

Lisa R. Amir, PhD
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Clinical Reports in Dentistry

DENTISTRY AND ORAL SCIENCES

NOVA

Clinical Reports in Dentistry

Lisa R. Amir, PhD (Editor)

Faculty of Dentistry Universitas Indonesia, DKI Jakarta, Indonesia

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The book presents extensive case reports covering various clinical dentistry disciplines. In Oral Medicine, cases of various oral lesions and their risk factors were reported, as well as the precautions of radiotherapy for oral condition. In Oral Surgery, various surgical techniques were discussed related to orbital cavity reconstruction, mandibular defect reconstruction, arthroplasty, management of tumors in maxillofacial region, management of Schneiderian membrane perforation and lateral sinus lifting procedures in severe bone loss case.

The use of CBCT on implant planning and identification of ameloblastoma tumor margin were reported. In Prosthodontics, treatment of removable partial denture and orbital defect reconstruction were discussed. In Conservative Dentistry, endodontics treatment and retreatment in rare cases were discussed, including management of fracture instruments and iatrogenic pulp exposure and replantation of avulsed teeth. In Pediatric Dentistry, various techniques related to intrusive luxation, treatment of lip sucking and approach for children in special need toward dental anxiety were addressed.

In Orthodontics, a case of management malocclusion of a difficult case was reported. In Forensic Dentistry, the importance of forensic odontology in burnt victim age estimation and post mortem reconstruction methods were reported. In Periodontology, cases of trauma from occlusion and the aesthetic of crown lengthening were reported. This large collection of case reports, discussing various treatments of clinical problems, identification of oral diseases that are frequently encountered in daily practice will surely give valuable information for general practitioners and dental specialists in order to achieve the highest standard in clinical dentistry.

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**COMPARISON OF IMAGING CHARACTERISTICS AND MARGIN OF AN
AMELOBLASTOMA BETWEEN CONE BEAM COMPUTED TOMOGRAPHY
AND COMPUTED TOMOGRAPHY: A CASE REPORT**

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ABSTRACT

Introduction: Ameloblastomas are rare, benign, odontogenic tumors that mainly affect the mandible. They are slow-growing tumors with an affinity for bone, and they have a high recurrence rate if not adequately removed. Tumor removal needs attention with regard to the assessment of the correct free tumor margin. Computed tomography (CT), as the gold standard, allows good assessment and contrast enhancement is helpful. Advancements in imaging technology have resulted in the development of cone beam computed tomography (CBCT) as an alternative imaging approach. We present a patient with an ameloblastoma, who underwent both CT and CBCT. We compared the imaging characteristics and tumor margin between these imaging approaches in this patient.

Case Report: The patient was a 34-year-old woman with swelling in the right lower jaw. She underwent both CT and CBCT. The lesion was identified as an ameloblastoma. We found that both approaches provided good image quality with regard to anatomy,» however, there was a slight difference in measurement results.

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Conclusion: Our findings suggest that CBCT provides good image quality for surgical guidance with regard to measuring ameloblastomas and determining the free tumor margin and that CBCT results are as good as CT results in the assessment of ameloblastomas.

Keywords: CBCT, MSCT-Scan, ameloblastoma

INTRODUCTION

In 2005, the World Health Organization described ameloblastomas as benign, locally invasive, polymorphic neoplasms that include proliferating odontogenic epithelium (usually with a follicular or plexiform pattern) and are present in a fibrous stroma [1]. They are slow-growing tumors with an affinity for bone but not soft tissue, and they can recur (recurrence rate up to 60%-80%) if not adequately removed [2]. They are often asymptomatic and are frequently incidentally detected during routine panoramic radiography. A painless swelling of the jaw is the usual clinical presentation. Ameloblastomas arising within the jaw bones are subclassified as "solid" (formerly "multilocular"), "unicystic" and "desmoplastic" types [1].

It is important to determine whether the lesion is unicystic or solid, as a unicystic ameloblastoma responds well to conservative surgery, enucleation and adjuvant treatment (usually Carnoy's solution), whereas a solid ameloblastoma requires resection to minimize recurrence [3]. Additionally, it is important to understand the tumor margin, which divides the free tumor margin in an ameloblastoma, as this will help obtain better results with minimum risk of recurrence [4]. As ameloblastomas are difficult to recognize in the early stages, they are often relatively large at diagnosis and can fill the ramus or body of the mandible. The radiological appearance of an ameloblastoma can be unilocular, multilobular, or multilocular [5].

Radiological imaging technology has advanced through the use of computed tomography (CT) or helical CT, and this is considered as the gold standard radiological examination especially for the oral and maxillofacial regions [4]. Advancements in radiology have resulted in the development of cone beam computed tomography (CBCT), which allows exposure to be specifically limited to only the oral and maxillofacial regions, and the wide use of CBCT in dentistry has improved imaging when compared with conventional radiography [6]. CBCT can provide submillimeter spatial resolution for images of the craniofacial complex with scanning times comparable with those of panoramic radiography, and the radiation dose is generally lower with CBCT than with fan-beam or helical CT [7]. CBCT is becoming an increasingly frequent imaging option for oral and maxillofacial regions,

and it needs to be compared with CT, as it does not involve the use of contrast and has limited Field of View scan for assessing lesions in the

Comparison of Imaging Characteristics .

maxillofacial region [8]. Here, we present a case of a patient with an ameloblastoma, who underwent both CT and CBCT. We compared the imaging characteristics and tumor margin between these two imaging approaches in this patient.



Figure 1. Patient profile.

2. CASE REPORT

A 34-year-old female patient with swelling in the right lower jaw was referred to the Oral and Maxillofacial Surgery Division at Cipco Mangunkusumo Hospital in January 2018 (Figure 1). She had swelling in the right lower jaw 3 years previously, and there was no pain, trismus, or dysphagia. Examination revealed a diffuse and bulging intra-oral mucosa that was prominent in the buccal region, and the swelling was intra-oral and extra-oral. There was no purulence or fluid discharge, and aspiration with a syringe revealed a reddish" dark fluid.

About 1 year previously, she underwent biopsy at Fatmawati Hospital, and histopathological findings revealed an ameloblastoma. Initially, surgery was postponed as she had early signs of lung tuberculosis (TB). She then decided to seek further treatment for the ameloblastoma at Cipto Mangunkusumo Hospital, and she was treated with TB medication 3 months prior to surgery. Patient is planned to have surgical resection with reconstruction using Titanium Plate 2.4, based on oralpanthomography, a segmental resection is prepared to out take tumor which involve half of anterior symphysis up to angular mandibula since inferior border of

mandible is very thin and fragile for pathologic fracture. Surgical planning is needed to decide tumor margin and free tumor margin.

To have surgical free tumor margin, patient is usually measured 1 cm from outline of tumor margin, this measurement is based on CT Scan or CBCT data. However, measuring tumor volume cannot be accurately done s

have good outcomes, surgical simulation is done by producing 3D Model from CT Scan or CBCT data. An imaging examination is prepared.

She underwent CT with contrast enhancement for better imaging as orthopantomography could not appropriately differentiate the tumor margin (Figure 2). A 128-slice CT scan using contrast (iopamidol) was performed 5 days prior to surgery. However, she lost her original CD of the CT scan data and decided to undergo CBC! without contrast. Both data sets were assessed using InVesalius ver. 3.1 (CTI, Campinas, São Paulo, Brazil), and multi-slice data were measured using the measurement function caliper in mm. The point of measurement was confirmed with a 3D feature that enables ballpoint markers that are equivalent to point marks in multi-slice data (axial!coronal/sagittal view). Point markers are measured with the same points in the same positions between CT and CBCT data (Figure 3)



Figure 2. Lesion on orthopantomograph (OPG). The lesion is expanding from region 41 to 48, the "bubble soap" appearance is identified from cervical of alveolar bone to inferior border of ramus mandibula. Foramen mentalis cannot be identified on this OPG.



Figure 3. Comparison of measurements between computed tomography (left side) and cone beam computed tomography (right side) data using InVesalius.

Comparison of Imaging Characteristics

Table 1. Comparison of measurements between computed tomography and cone beam computed tomography data

Variables	CT	CBCT	Differences
Tumor length (mm)	50.58	49.90	0.68
Tumor height (mm)	31.74	31.25	0.49
Tumor thickness (mm)	37.40	37.30	0.10
Symphysis height (mm)	30.12	30.03	0.09
Symphysis thickness (mm)	10.42	10.12	0.30
Angular angulation (degree)	115.67	114.53	
Mentalis nerve preservation	None	None	None

Based on the measurement results, all CBCT values were lower than the corresponding CT values (Table 1). In the tumor region and normal bone region, there were value discrepancies. In the tumor region, the highest discrepancy was for the tumor length (difference of 0.68 mm), and the lowest discrepancy was for the tumor thickness (difference of 0.10 mm). On the other hand, in the normal bone region, the thickness of the mandible had a difference of 0.30 mm between CBCT and CT. Additionally, angulation was lower with CBCT than with CT, and the difference was 1.14°.

However, the same result was obtained for the involvement of the mentalis nerve between CBCT and CT. The mentalis nerve was evaluated to assess whether the result differs between soft tissue measurement and bone measurement, which in CT Scan will produce high contrast of radiopaque appearance for bone.

In regard to size dimension, there were differences in tumor length, height, thickness, volume, and angulation between CT and CBCT, although those were very small. The dimension differences are associated with different fields of view between the radiographic approaches. CBCT can only assess the oral and maxillofacial regions from condyle to condyle and from menton to supraorbital bone. On the other hand, CT can assess almost the entire body and can focus on a specific area.

3. DISCUSSION

An ameloblastoma is relatively common among young patients, and it is frequently located in the mandible [1]. In regard to preservation of the mandible, the tumor is usually associated with important anatomical structures, such as inferior alveolar nerve,

CONFLICT OF INTEREST

All authors disclose any financial interest and personal relationship to organisations and companies that are mentioned in the article. The patient has given their consent to use photograph for publication

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