Original Research Article

Correlating multi-detected computed tomography findings with conventional radiography, operative and histopathological examination in mandibular swellings

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Abstract

Introduction: Mandibular swelling are common entity in dental and general surgery practice requiring prompt intervention, imaging techniques such as plain radiography and especially multi-detector computed tomography (MDCT) which offer the potential to improve the outcome buy increasing the accuracy of diagnosis.

Materials and methods: In the present study, 30 patients with clinically diagnosed mandibular swelling were evaluated with conventional radiography; MDCT and HPE wherever performed to establish the value of MDCT and to evaluate the role of MDCT in establishing the diagnosis.

Results: In the present study, majority of the cases were in the age group of 21-30 years with an male: female ratio of 1:1.5. Most commonly found lesions were odontogenic lesions (27 out of 30 cases) accounting about 90% of all the mandibular swellings. Among the odontogenic lesions ameloblastomas was the most common diagnosis followed by odontogenic keratocyst constituting 48%and 29% respectively in the present study, unilocular ameloblastoma were more common than multiocular ameloblastomas i.e. 7 out 13 cases (53.85%) among non-odontogenic lesions, central ossifying fibroma was the common diagnosis i.e. 2 out of 3 cases (67%) in the present study, being lesions were common than malignant i.e. 28 out of 30 cases (93.3%) and 2 out of 30 cases (06.66%) were malignant.

Conclusions: MDCT provided excellent visualization and delineation of mandibular anatomy when compared to plain radiography. MDCT images ideal for pre-operative evaluation as they provide thin sections (<l mm) multiplanar reconstruction in the coronal, sagittal, panoramic and para-axial planes. In addition information regarding the appearance, location, course of anatomic structure in the jaws. Value rendering technique provides near real 3 dimensional appearance of the lesion for the dental surgeon to plan accordingly.

Key words

Multi-detector computed tomography, Mandibular swelling, Ameloblastomas.

Introduction

Mandibular swellings are commonly seen in clinical practice. Many mandibular swelling are asymptomatic especially in their early stages and are discovered incidentally at routine dental radiography. Patients with mandibular swelling present with swelling pain, tooth displacement and mobility. Few lesions may present with bleeding or with signs and symptoms of secondary infection radicular cyst is the most common cyst of the jaw. Benign lesions are more common than malignant lesions. Malignant tumors that involve mandible are squamous cell carcinomas of oral cavity, osteosarcomas and metastatic tumors.

Mandibular swelling may be either intraoral or outside resulting in facial asymmetry. Majority of the mandibular lesions occur in the posterior aspect of mandible or angle as this region has more vascularity. Mandibular lesions may be very in size from 2-3 cm to very large size. Mandibular lesions appear as round, oval, scalloped or regular and shape of a lesion may help in diagnosis. Plain radiography is the initial modality commonly used in the diagnosis of mandibular swellings. Orthopantomography (OPG) is also routinely used due to its wide availability especially in dental practice. Multi-detected computed tomography (MDCT) has an important role in the evaluation of mandibular swelling. It can delineate the extent of the lesion, involvement of margins, displacement of adjacent structures and mandibular canal. It can also depict in dental architecture of the lesions. Contrast enhancement when used wherever required will further add in the diagnosis of these swellings. Due to multi-planar reconstructions it also helps in planning appropriate treatment and follow up. MRI as a limited role in the routine evalution of mandibular swellings. However it can clearly delineate the soft tissue involvement of the lesions [1].

Many of these lesions have a cyst like radiographic appearance, but it is often difficult to distinguish cystic appearing lesion from one another on imaging. Imaging helps to narrow differential diagnosis [3, 4] though appropriate diagnosis can be arrived at with the help of MDCT, histopathology is required to confirm the diagnosis. Here aim to correlate MDCT findings with conventional radiography and to correlate MDCT findings with operative and histopathological examination in evaluation of mandibular swellings.

Materials and methods

All patients presenting with mandibular swelling to the department of ENT are directed for evaluation. Plain radiographs have been obtained for all cases. All the cases were studied using Siemens Somatomemotion (6 Slice MDCT). MDCT with dental reformation method were obtained. 3 D reconstructions were performed for all cases. Findings of MDCT were compared with that of plain radiograph. Findings of MDCT were correlated with operative and histopathological examination and/ FNAC wherever performed.

Results

The study included 30 cases of mandibular swelling, who were subjected to plain

radiography, MDCT and histopathological examination.

In the present study, majority of the cases were in the age group of 21-30 years with male: female ratio of 1:1.5. Most commonly found lesions were odontogenic lesions (27 out of 30 cases) accounting about 90% of all the mandibular swellings (**Table – 1**).

Table - 1: Age and gender distribution (N=30).

Age intervals in years	**Number of patients (percentage)**
11-20	1(3%)
21-30	27(90%)
31-40	1(3%)
41-50	1(3%)
51-60	0
61-70	0
Sex distribution	
Males	18(60%)
Females	12 (40%)

On plain radiography and MDCT ameloblastoma was the commonest diagnosis in 11 and 13 cases respectively.

25 out of 30 cases were subjected to HPE and the commonest diagnosis was ameloblastoma (10 cases accounting 40%). Correlation plain radiography and MDCT was done for all 30 cases, there was good correlation except 2 cases of ameloblastoma.

Correlation between MDCT and HPE was done for 25 cases in which one case each of OKC and ameloblastoma did not correlate.

Out of 30 cases of mandibular swelling 27-30 cases were odontogenic and non-odontogenic lesion respectively. Among odontogenic lesion ameloblastoma was the commonest diagnosis (**Table – 2**).

Table - 2: Diagnosis by various methods (n=30).

Diagnosis	**Plain radiography N (percentage)**	**4 MDCT diagnosis N (percentage)**	**HPE diagnosis N (percentage)**
Ameloblastoma	11(36.66%)	13(43.33%)	10(40%)
Odontogenic Keratocyst	08(26.66%)	08(26.66%)	06(24%)
Dentiular	04(13.33%)	04(13.33%)	04(16%)
Radicular Cyst	02(06.66%)	02(06.66%)	02(8%)
Central Ossifying Fibbroma	02(06.66%)	02(06.66%)	02(8%)
Osteosarcoma	01(03.33%)	01(03.33%)	01(4%)
Non Specific Finding	2(06.66%)		

Discussion

Mandibular swellings are common in clinical practice. Benign lesions are more common than malignant lesions. In the present study majority of the cases were in the age group of 21-30 years with an male: female ratio of 1:1.5. Most commonly found lesions were odontogenic lesions (27 out of 30 cases) accounting about 90% of all the mandibular swellings. Among the odontogenic lesions ameloblastomas was the most common diagnosis followed by odontogenic keratocyst constituting 48% and 29% respectively in the present study, unilocular ameloblastoma were more common than multiocular ameloblastomas i.e. 7 out 13 cases (53.85%) among non-odontogenic lesions, central ossifying fibroma was the common diagnosis i.e. 2 out of 3 cases (67%) in the present study, being lesions were common than malignant i.e. 28 out of 30 cases (93.3%) and 2 out of 30 cases (6.66%) were malignant (**Photo – 1, 2**).

M Mamabolo, et al. [2], in their study of 743 cases of odontogenic tumors found 324 cases of ameloblastoma and 171 cases of odontogenic

keratocyst accounting 43.6% and 29% respectively. Difference of percentage was due to the short duration of the study, small sample size and urban population in the present study when compared to 26 years of duration, large sample size and the rural African population in their study. In the present study, average age of patients diagnosed with ameloblastoma was 25 years.

Figure - 1: Unicytic ameloblatoma. PA view of the mandible how well defined unilocular radiolucent lesion involving the ymphyeal and paraymphyeal region and CT axial, panaromic and VRT images show well defined unilocular radiolucent lesion with small area of cortical break.

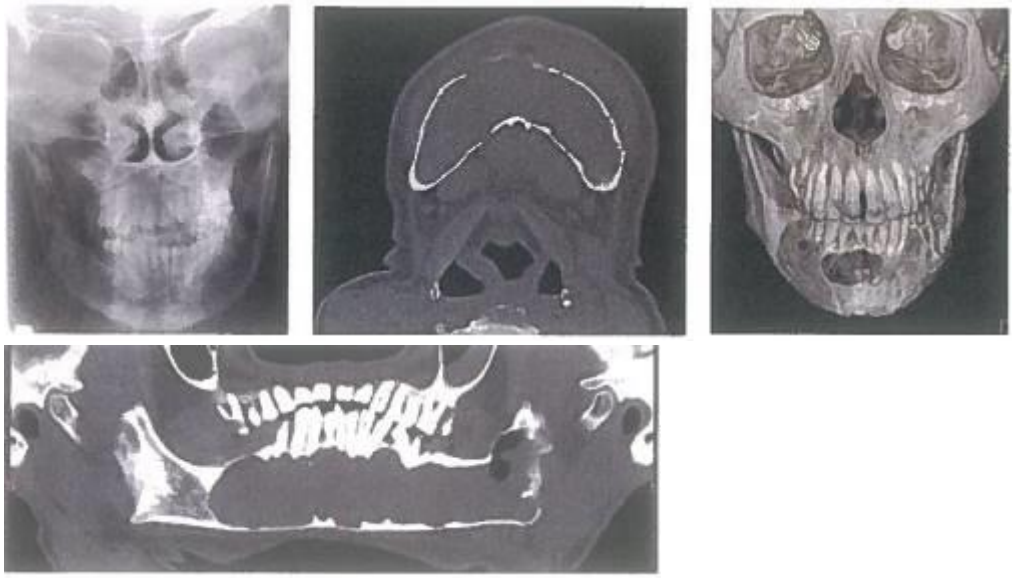
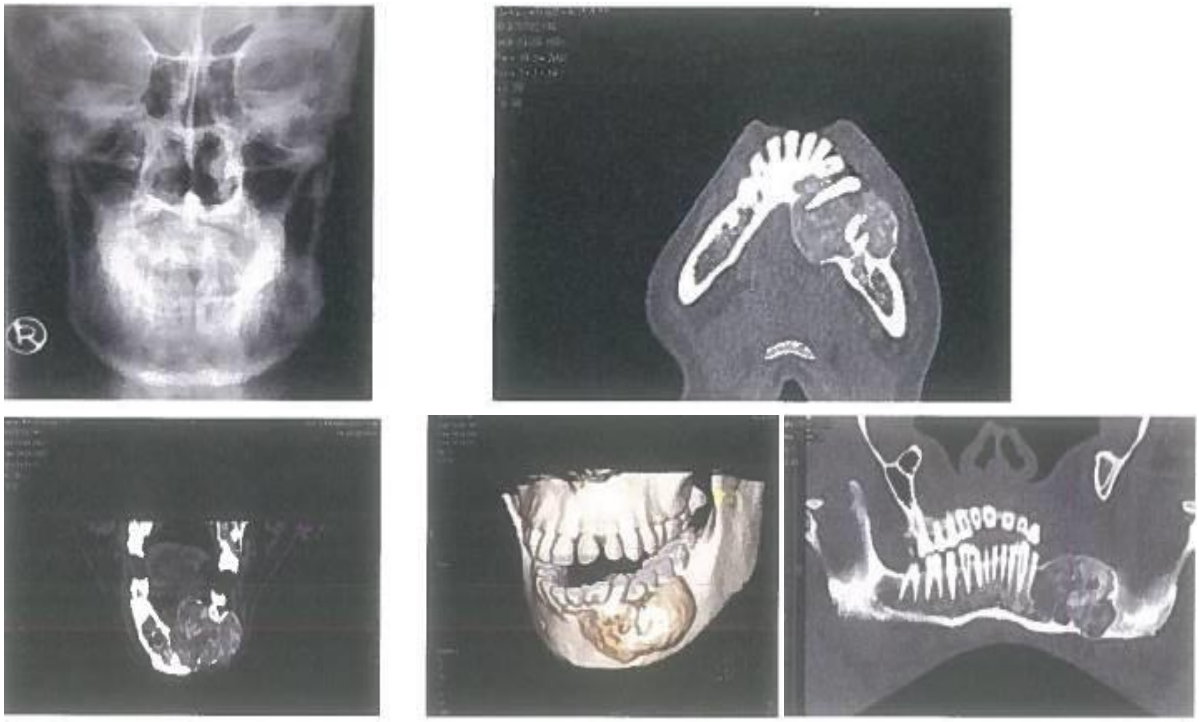


Figure - 2: Ossifyng fibroma. PA view of the mandible shows lytic lesion in ramus on left side. CT axial, panaromic and VRT image shows well circumscribed mixed radio opaque radiolucent lesion with internal calcifications.



The most common odontogenic tumor in the first 2 decades of life in our study was ameloblastoma (43% of our sample), with frequencies comparable to reports from Egypt [3], Nigeria [4], Brazil [5], China [6] and Sri Lanka [7]. Data from Mexico [8], California [9] and Argentina [10] indicate odontoma to be the most frequently diagnosed odontogenic tumor. This may be the result of differences in dental awareness between the latter regions and Africa as most odontomas are asymptomatic and diagnosed on routine dental radiographs, whereas all patients with ameloblastomas ultimately present for surgical management. However, caution is expressed when comparing studies like these with those based on the new 2005 classification owing to the inclusion of several new entities in the latter. Extension into the mandibular ramus, a uni- or multilocular appearance without calcifications and gross expansion were the hallmarks of all ameloblastomas in our study. The lack of clinical evidence of bony expansion (particularly when located in the body of the mandible) or multiple lesions may place keratocystic odontogenic tumour higher on the list of differential diagnosis than ameloblastoma.

Philipsen, Reichat PA, et al. [11], reviewed available literature on ameloblastoma of jaw including publications and reviewed biological profile of 3677 cases of ameloblastoma, and their study found that the average of the patients diagnosed with ameloblastoma was 36 years (**Table – 3**). authors say that in developing countries ameloblastoma occurs in young patients which is present study finding in the present, study females were more commonly affected than the males 8 out of 13(61.43%) in the study, males and females were equally affected (50%). Radiographically in the present study, 06(46.15%) cases of ameloblastoma appeared as multilocular radiolucent lesion. Radiographically in their study, 1833 (50%) of cases of ameloblastomas appeared from multicystic ameloblastomas be differentiated from multicystic ameloblastomas as unicystic ameloblastomas show lower recurrence states compared to non unicystic ameloblastoma, in the present study, both unicystic and multicystic ameloblastomas were common in females with M: F ratio 1:1.5. Philipsen HP, et al. [11] in their study reviewed 193 cases of unicystic ameloblastoma and found that M: F ratio 1.5:1 difference of percentage is due to our short duration of study and urban population.

Table - 3: Comparison of the present study with other study.

	Present study (n=30)%	**Philipsen, Reichart, et al. [11] (n=3677)**
Mean age	25 years	36 years
Sex distribution		
Males	18(60%)	1838(49.98%)
Females	12 (40%)	1838(49.98%)
Appearance of the lesion (ameloblastoma)		
Multilocular lesion	06(46.15)%	1838(50)%

In developing countries ameloblastoma occurs in young population difference of percentage if due to our small sample size and short duration of the study. Present study proved MDCT was superior to plain radiography. MDCT found to more valuable in pre-operative diagnosis in knowing the extent of the lesion and post-operatively in locating resection defect. MDCT described important features of the lesion as lack of image superimposition with presentation of soft tissue detail MDCT had high degree of accuracy (extent of the lesion, nerve involvement, surgical planning) with help of 3D intervention.

Conclusion

All cases of being and malignant lesions have been excellently correlated with HPE and thereby proving MDCT as a valuable imaging

tool to differentiate being from malignant lesion in present study. MDCT plays a major role in arriving at a diagnosis of mandibular swellings precise location (body, angle and ramus, condyle, symphyseal and parasymphyseal) extension (lingual, buccal) internal architecture, effect on adjacent structures. Relationship of a lesion to mandibular canal and vascularity by 4 contrast can be predicted. Multi-planar 3d reconstruction facilities provided in MDCT can help the dental surgeon in planning his approach for treatment. Though MDCT provide adequate in arriving at an appropriate diagnosis, however histopathological examination ifs mandatory in accurate diagnosis of mandibular swellings.

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