

CLINICAL AND RADIOGRAPHIC PRESENTATION OF CENTRAL GIANT CELL GRANULOMAS OF JAWS

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ABSTRACT

OBJECTIVE: To determine the demographic, clinical and radiographic features of the central giant cell granulomas (CGCG) of jaws.

METHODS: This observational study was conducted at Outpatient Department of Oral and Dental Hospital, Khyber College of Dentistry Peshawar and private clinics at Peshawar, Nowshera, Mardan and Kohat, from June 2006 to May 2018. Sixty-eight cases of CGCG of jaws, excluding known patients of syndromes and hyperparathyroidism, confirmed by biopsy were included in this study by convenience sampling.

RESULTS: Age ranged from 4-50 years with mean of 22.35 ± 11.68 years. Most of the patients were from 21-30 years ($n=28/68$; 41%). CGCG were slightly more frequent in females ($n=36/68$; 53%) as compared to males ($n=32/68$; 47%). Anterior part of mandible was the most common site involved ($n=32/68$; 47.1%). There was cortical expansion in 53 out of 68 cases. Tooth mobility was found in more than half of cases ($n=36.68$; 52.9%). Only four cases of lip numbness, while no case of spontaneous bleeding (three cases of bleeding on touch were seen). Among all the radiolucencies, majority of CGCG ($n=40/68$; 58.8%) had well define borders while 41.2% of CGCG had diffuse borders. Majority of CGCG were unilocular. Tooth resorption was seen in about one-third patients ($n=24/68$; 35.3%).

CONCLUSION: The clinical and radiographic features of some CGCG show benign features like non-mobile teeth, only buccal cortical expansion, unilocular radiolucency, no tooth resorption and well define borders. However, some show aggressive features like tooth mobility, bicortical expansion, multilocular radiolucency, root resorption and ill-defined borders.

KEY WORDS: Giant Cells (MeSH); Granuloma (MeSH); Granuloma, Giant Cell (MeSH); Jaw (MeSH); Clinical and radiographic features (Non-MeSH); Maxilla (MeSH); Mandible (MeSH).

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INTRODUCTION

Giant cell granuloma is common in the jaw bones as compared to the rest of the skeleton.¹ The giant cell granuloma of jaws is one of the most interesting subjects of the oral surgery not only for its elective development in the jaws but also for its atypical clinical and radiographic features.² Giant cell lesions consist of a non-encapsulated

mass of tissue composed of delicate reticular and fibrillar connective tissue stroma containing large number of ovoid or spindle shaped young connective tissue cells and multinucleated giant cells.³ In past, the term giant cell granuloma has been confusing, a peripheral soft tissue lesion peripheral giant cell granuloma and a central bony lesion central giant cell granuloma are now well recognized.^{1,3,4}

Nature of central giant cell granulomas (CGCG) is not yet clear. None of the theories is so far confirmed.^{1,3-5}

Central giant cell granuloma is commonly seen lesion in the jaws. During the last few years, it has been the center of an active debate and research among the clinical scientists in the field of oral and maxillofacial surgery and pathology. Still the literature does not reach a consensus on the designation of the most correct term for these lesions.⁶ Various terms used for this lesion are; central giant cell granuloma,⁷ central giant cell reparative granuloma,⁸ giant cell lesion,⁹ benign giant cell tumour.¹⁰ The lesion shows more aggressive nature and cause destruction rather than repair that is why the term "reparative" is out of use now a days.^{1,3}

The central giant cell granuloma (CGCG) clinically presents as painful or painless expansion of the bone. Cortical bone perforation is also seen sometimes. Unnoticed radiolucent lesions sometimes turn out to be giant cell granuloma. Radiographically there may be tooth displacement, root resorption and the lesion may be unilocular or multilocular with well defined or diffused borders.^{1,11}

True granulomas rarely cause bone expansion, cortical perforation or displacement of anatomic structures as may be seen in CGCG. The clinical and radiographic behavior of CGCG can vary from benign to rather aggressive.¹²

As no local study of this type is available on the subject in this area, the purpose of the study was to give a clear picture of the clinical and radiological features of central giant cell granulomas of the jaws in patients presenting in our areas.

TABLE I: AGE DISTRIBUTION OF CENTRAL GIANT CELL GRANULOMA (n=68)

Age Group (years)	No of Patients	Percentage
1-10	16	23.5
11-20	16	23.5
21-30	28	41
31-40	4	6
41-50	4	6
Total	68	100

TABLE II: CLINICAL FEATURES OF CENTRAL GIANT CELL GRANULOMAS OF JAWS (n=68)

Clinical Features		Frequency	Percentage
Site	Anterior mandible	32	47.1
	Posterior mandible	16	23.5
	Anterior maxilla	16	23.5
	Posterior maxilla	4	5.9
Type of Cortical Expansion	Buccal cortical expansion only	40	58.8
	Bicortical expansion	13	19.1
	Lingual cortical expansion only	0	0
	None	15	22.1
Tooth Mobility	Yes	36	52.9
	No	32	47.1

TABLE III: RADIOGRAPHIC FEATURES OF CENTRAL GIANT CELL GRANULOMAS

Radiographic Features		Frequency	Percentage
Type of Locularity Seen	Unilocular	44	64.7
	Multilocular	24	35.3
	No radiolucency	0	0
Teeth Resorption	No tooth resorption	44	64.7
	Root resorption	24	35.3
	Cervical area resorption	0	0
Border Definition	Well define	40	58.8
	Ill define	28	41.2

METHODS

This observational study was carried out at Outpatient Department of Oral and Dental Hospital, Khyber College of Dentistry Peshawar and private clinics at Peshawar, Nowshera, Mardan and Kohat, from June 2006 to May 2018. A total number of 68 patients having central giant cell granuloma (CGCG) were included in this study by convenience sampling technique (according to the posting of principal author).

All the lesions of the jaws confirmed by histopathological report as giant cell granuloma were included and known

patients of cherubism, any other syndromes, hyperparathyroidism and those who had giant cell granulomas elsewhere in the body were excluded from the study. Patients presented to Out Patient Department (OPD) of Oral and Dental Hospital, Khyber College of Dentistry and private clinics, having swelling of jaw, mass in oral cavity arising from dentoalveolar areas or radiographic radiolucency were considered as patients with suspicious lesions. Relevant history was followed by clinical examination and appropriate radiographs (peri-apical view, occlusal view of the jaws, ortho-pantomogram, postero-anterior view of face, lateral view of the face) one or more were

advised and images were analyzed. When the consultant on duty and the trainee considered giant cell granuloma in differential diagnosis, the proforma was provisionally filled till the confirmation by histopathological report, in otherwise cases the proformas were discarded. The confirmed cases were then re-examined. Verbal and written consent, regarding use of information in research work, was taken from all patients or guardians in case of minors.

The variables of the study were studied as following;

Age and gender was taken as told by patients or guardian in cases of minors.

Site of the lesion: The distal surface of 2nd premolar/2nd deciduous molar or in cases where it was missing its approximate area in all four quadrants of the jaws were considered as landmark. Lesions anterior to it were classified as anterior and posterior as posterior. In those cases where the lesion was crossing the landmark, an imaginary center of the lesion or epicenter was considered as guide.

Cortical expansion: Cortical bone over the lesion was compared with the rest of the jaw clinically and whenever required augmented by the radiographs to confirm any expansion of the cortical bone.

Numbness of the lip: The patients were asked about any numbness in the lip or areas related to nerve passing near by the lesion. Categorical answer of Yes or No was considered.

Bleeding from the lesion: Patients were asked whether there is spontaneous bleeding from the lesion or on normal touching of food, toothbrush or no bleeding.

Tooth mobility: Teeth related to lesion were assessed clinically for mobility by comparing with the rest of teeth.

Border definition: When the radiolucency of lesion was clearly separable from the rest of normal bone and drawing of a line on a radiograph for more than 80% border was possible, those borders were called well defined. On the other hand when the separation

between normal and abnormal was not distinct, those borders were called diffuse (By well-defined border we do not mean cyst-like corticated border outline in all cases. Anyhow, whenever we came across corticated border it was certainly included in well-defined border class).

Locularity: When more than one well-demarcated radiolucencies were noted within a lesion it was included in multilocular lesions. While the lesion with a single well demarcated radiolucency was included in unilocular lesions.

Tooth resorption: The radiographic appearance of teeth with in lesion was compared with the rest of the teeth on the same radiograph and radiographically apparent resorption in the root and cervical area were noted.

The collected data was entered and processed by using SPSS version 20. Descriptive statistics, like range, mean & standard deviation was calculated for age of patients. Frequencies and percentages were calculated for the rest of variables like gender, site of lesion, cortical expansion, numbness of lip, bleeding from lesion, tooth mobility, border definition, locularity and site of teeth resorption. Data was presented in the form of tables wherever required.

RESULTS

Age ranged from 4 years to 50 years with mean of 22.35 ± 11.68 years (Table I). CGCG were predominantly found in females as compared to males. There were 32 (47%) male patients and 36 (53%) female patients. Anterior part of mandible was the most common site involved (Table II). There was cortical expansion in 53 out of 68 cases. There was tooth mobility in more than half of cases of CGCG. Only four cases of lip numbness were seen. There was no case of spontaneous bleeding however three cases of bleeding on touch.

As per criteria set for this study all the radiolucencies majority of CGCG i.e. 40 out of 68 (58.8%) had well define borders while 41.2% of CGCG had diffuse borders. Majority of CGCG were unilocular as evident from Table III.

DISCUSSION

In the present study the mean age for CGCG was 22.35 ± 11.68 years. It correlates with the figure of 23 years presented by Whitaker and Waldron.⁹ The mean ages of 31.33 years and 30.8 years have also been reported.^{11,13} Our results show occurrence of CGCG at much younger age. In young children the craniofacial skeleton is actively developing, including osteogenesis, exfoliation and eruption of teeth. These processes cease in adulthood and may therefore predispose to CGCG formation in young individuals; however the mechanism is not known.¹⁴ As far as the age distribution of CGCGs is concerned the finding of different authors are not consistent, as each of them has limited number of patients in their studies. These lesions can be found at any age and thus there seems no absolutely age related phenomenon involved in its occurrence.

There is slight female predominance found in cases of CGCG which is in accordance with other studies.^{14,15} Female predominance can be explained by the recent suggestions of the association between hormonal secretion and appearance of CGCG in females.¹⁵ Cohen and Hertzanu reported 84% of the CGCG were seen in mandible.¹⁶ Whitaker and Waldron,⁹ and Kaffe, et al¹⁷ reported 72% which correlates to this study that is 70% while de-range J, et al¹³ reported 67.4%.

This lesion occurs in the anterior parts of the jaws. We find 71% lesions anterior to 1st molar. Starropoulos F found 81% and the rest also agree.¹² The involvement of anterior region of jaws is related to the shedding process of deciduous teeth by some authors but as these can occur in posterior area as well.

Cortical expansion, involvement of nerve, bleeding from lesion and tooth mobility when seen in combination with radiographic features and length of history can give the idea about the aggressiveness of the lesion. In this study, there was cortical expansion in 53 out of 68 cases (78%). In 59% cases, there was buccal cortical expansion only, while in 19% cases there was

bicortical expansion. In international studies the (swelling) cortical expansion was found in 38% cases by Horner,¹⁸ 34% by Whitaker⁹ and 50% by Starropoulos.¹² In our study the difference may be due to late presentation of patients to maxillofacial surgeons and difference in operational definition i.e. we considered small changes.

Four patients have shown nerve involvement i.e. 5.9% which is comparable to 5% and 2% involvement reported by Kaffe I and Starropoulos but much different from the study of Bodner and Barzir who reported 30%.^{12,14,17}

Bleeding from lesion is not a common feature in CGCG but when it presents itself in the oral cavity through the socket of extracted tooth or perforated cortical bone then there are chances of bleeding from it. There were three cases of bleeding on touch, comprising 4.4% whereas no case of spontaneous bleeding. Tooth mobility was found in 53% cases of CGCG, which shows the involvement of periodontium to the extent that tooth loses its support. The large sizes, short history, cortical expansion, cortical perforation, bleeding from lesion and teeth mobility are consistent with the aggression of the lesion.

We found 59.1% cases with well-defined borders. Horner found 69%,¹⁸ Kaffe 56%,¹⁷ Bordner 60%,¹⁴ Whitaker 19%,⁹ Cohen 56%¹⁶ and Starropoulos 50%.¹² In slow growing lesions the periphery becomes corticated while the rapidly growing lesions shows ill-defined margins for example slow growing radicular cyst has well corticated margins while a malignant lesion have ill-defined margins. The development of new bone forming bony septa within the lesion or the bone spared from the destruction of a lesion in a large radiolucent lesion give the appearance of multilocularity in some cases. The assessment of loculation is an important step in the assessment of radiolucent lesions of the jaws. In this study 64.7% CGCG were unilocular while others found it 85%, 44%, 39%, 50% and 55%.^{9,12,14,16,18}

In this study tooth resorption was seen in 35.3% of cases of CGCG and all were in the roots. Other reported it as 12%, 12%, 20%, 43%, 21%, and 37%.^{12,14,16-}

¹⁸ Diffused borders and teeth resorptions are considered as aggressive features.¹⁹⁻²¹ In our study the non-aggressive features were more common than the aggressive ones, which correlate international studies, but there is great variation in reported literature that might be because of different interpretation of variables, socioeconomic condition of patient who present at late stages in poor countries and referral bias at larger centers. Since most of the studies are carried out on cluster of patients hence the results show variations. However, the results of our study raise the question of proper nomenclature.

CONCLUSION

The clinical and radiographic features of some CGCG show benign features like non-mobile teeth, only buccal cortical expansion, unilocular radiolucency, no tooth resorption and well define borders.

However, some show aggressive features like tooth mobility, bicortical expansion, multilocular radiolucency, root resorption and ill-defined borders.

LIMITATIONS OF STUDY

This study seems cases seen by principal author if only case of Khyber College of Dentistry Out patients Department for twelve years were collected that may give much large sample size. There were no detail correlations seen between histological picture and clinical picture.

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AUTHORS' CONTRIBUTIONS

Following authors have made substantial contributions to the manuscript as under:

UN: Conception and study design, acquisition of data, drafting the manuscript, critical review, final approval of the version to be published

BM, TM & NN: Acquisition, analysis and interpretation of data, drafting the manuscript, final approval of the version to be published

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

Authors declared no conflict of interest

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