CASE REPORT

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A potential endodontic misdiagnosis: periapical central giant cell granuloma

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ABSTRACT

Objectives: The purpose of this case study was to report a periapical central giant cell granuloma post-endodontic treatment

Case Report: A 32-year-old female patient presented to the Dental Radiology Unit of Dental Hospital Universitas Padjadjaran with a CBCT referral letter, diagnosed clinically with periapical abscess of tooth 22 post-endodontic treatment. The patient had a history of coming to the emergency room with a fair general condition and complained of pain and swelling of the left upper lip. The CBCT result demonstrated a large radiolucent lesion at the periapical of tooth 22 with a well-defined border that extended to the apical area of tooth 21. There was a cortical destruction on the palatal and labial alveolar bone. Density analysis revealed an average density of 145.2 Grayscale.

Conclusion: Lesions might be analysed using both qualitative and quantitative methods with CBCT 3D. These methods lead to the suspicion of periapical central giant cell granuloma in this case's lesion.

Keywords: *Periapical central giant cell granuloma, endodontic lesion, CBCT 3D*
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INTRODUCTION

Diagnosing periapical radiolucent lesions is challenging in clinical practice. Various cystic and neoplastic conditions can resemble endodontic problems, potentially leading to misdiagnosis and inappropriate treatment. These lesions often have similar clinical and radiographic characteristics, especially when located at the root apex and associated with pulp necrosis or prior endodontic treatment.[1]

Central Giant Cell Granuloma (CGCG) has synonyms giant cell granuloma, giant cell lesion and giant cell tumor.[2] Jaffe first described the lesion in 1953 as a giant-cell reparative granuloma of the jaw bones. It was proposed that the lesion is not a true neoplasm, but rather a localized reparative reaction.[3] In the 2017 edition, the WHO defined the CGCG as a localised benign but sometimes aggressive osteolytic lesion of the jaws, characterised by osteoclast-type giant cells in a vascular stroma.[4]

CGCG are classified as benign, non-odontogenic lesions of the jaws, which can manifest as either multilocular or unilocular radiolucent appearances. These uncommon pseudo-tumours of the maxilla constitute approximately 7% of all benign maxillary tumors, and they predominantly affect female patients, with two-thirds of cases occurring in individuals before the age of 20 years. The underlying etiology of this lesion remains a subject of debate, with three hypotheses proposed to explain its origins. The first hypothesis suggests the lesion arises as a reactive response to a local irritant. The second hypothesis posits that CGCG represents a developmental abnormality, while the third hypothesis implies the lesion has a neoplastic basis.[5,6]

Clinical development comes in two types: nonaggressive and aggressive. The criteria for aggressive lesions were outlined by CGrayscaleong et al. and included pain, paresthesia, root resorption, rapid tumor progression, cortical bone penetration, and a high prevalence of relapses following surgery. CGCG is categorized by other writers based on their radiographic and clinical traits. Younger people are primarily affected by the aggressive variants.[6] Radiologic feature is usually

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classified as a circumscribed, non-cortical, multilocular and radiolucent lesion. However, it may occasionally present as a well-circumscribed, radiolucent and cortical perforation that may be found near the tooth apex, causing root resorption.[1,7,8]

The present report illustrates a case of CGCG associated with necrotic pulps with previous root canal treatment; attention has been focused on Cone Beam Computed Tomography (CBCT).

CASE REPORT

A 32-year-old female patient presented to the Dental Radiology Unit of Dental Hospital Universitas Padjadjaran with a CBCT referral letter, diagnosed clinically with periapical abscess of tooth 22 post-endodontic treatment. The patient had a history of coming to the emergency room with a fair general condition and complained of pain and swelling of the left upper lip. Before treatment, the mucosal tissue in the area of tooth 22 appeared normal (Figure 1).

a

b

Figure 1. a) Normal mucosal before treatment; b) Patient profile photos

On general physical examination, no abnormality was observed. The facial regional examination revealed asymmetry in the upper left lip. Intraoral examination revealed a swelling mass on the labial fold region apex 22.

CBCT examination results present lesion images from coronal, sagittal, axial and 3D views (Figure 2). The coronal view shows a radiolucent lesion with well–defined borders, irregular shape, and apical tooth 22, which extends to tooth 21. The area is ± 101.922mm2 with a lesion core density of -358.4 Grayscale and 128.9 Grayscale, which is close to the density of soft tissue outside the lesion, which is 135.5 Grayscale. There was cortical bone destruction at the inferior border of the nasal cavum (red arrow), adjacent to the apical of tooth 22 and the middle of the root of tooth 21. In the measurement of the lesion profile, high values were obtained in normal tissue and the edge of the lesion, then the value decreased at the core of the lesion, and the value increased again at the border of the lesion and normal tissue (Figure 3).

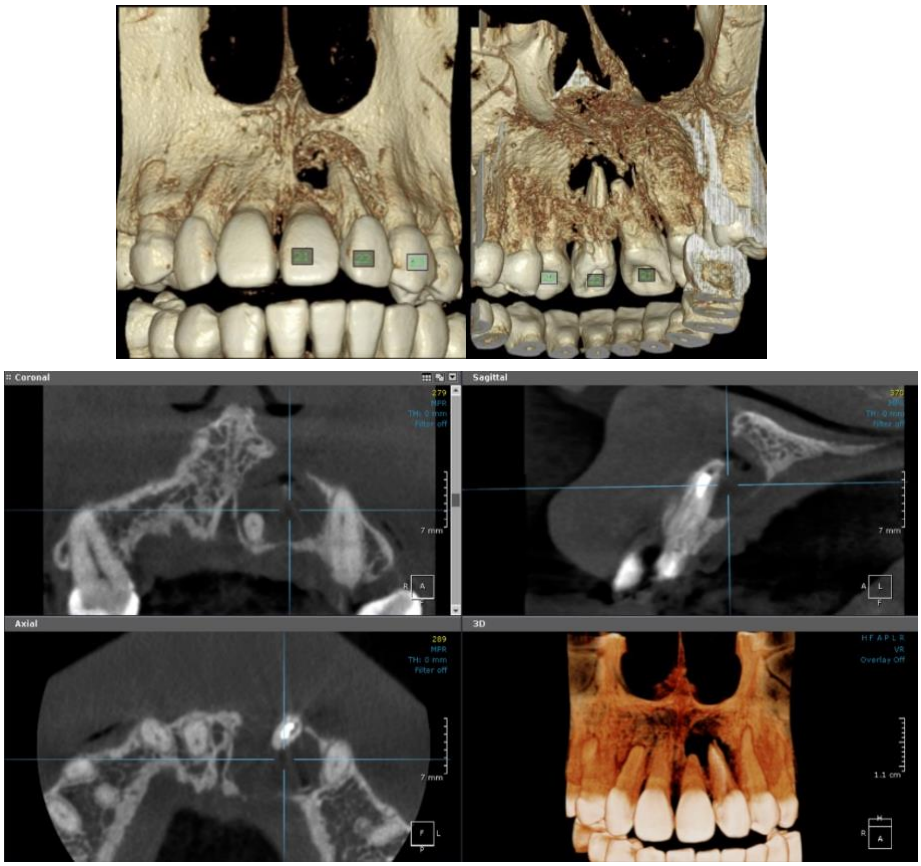

Figure 2. MPR View presenting coronal, sagittal, axial and 3D view of the lesion

Figure 3. Coronal View and Coronal Sliced View

In the sagittal view, the distance between the lesion and the sinistra nasal cavum is 3.36 mm. There is cortical bone destruction on the labial and palatal sides (red arrows) (Figure 4). In the axial view, $^1/_2$ of the root of tooth 22 is inside the lesion, and the rounded root tip appears to be related to root resorption (blue arrow) (Figure 5).

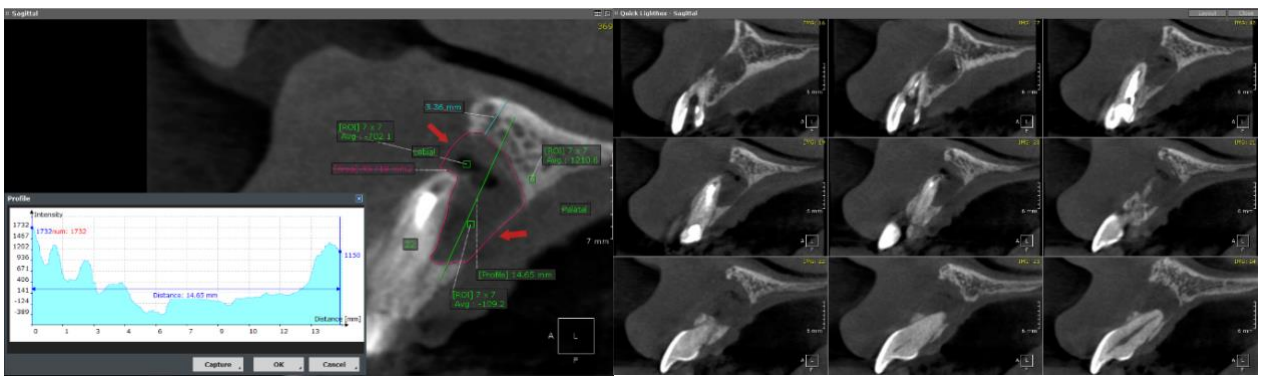

Figure 4. Sagittal View and Sagittal Sliced View

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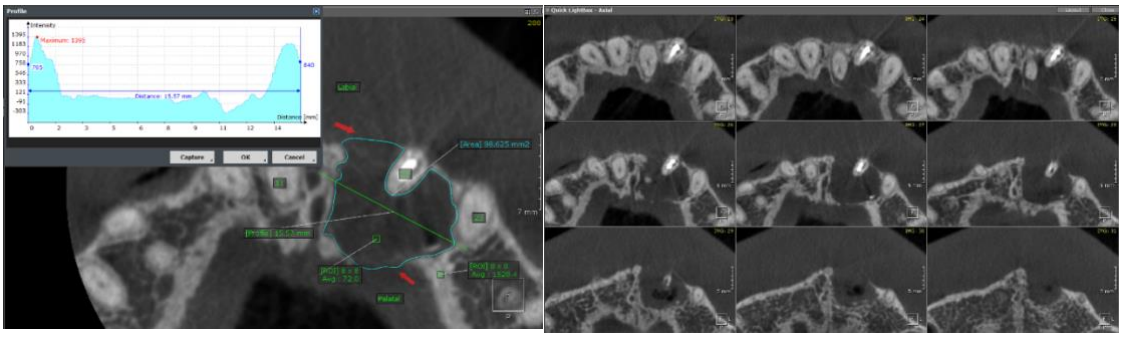

Figure 5. Axial View and Axial Sliced View

The treatment performed in the case was non-surgical retreatment of tooth 22, and observation was made for 3-6 months. A month after retreatment, the patient was instructed to take a periapical examination to see the progress of the lesion. There was a radiopaque appearance along the root resembling a root canal filling material exceeding the apical foramen, and there was a well-defined radiolucent lesion surrounding the radiopaque pattern. A month later, the patient was asked to take another periapical photo examination of tooth 22, and the radiolucent lesion appeared to be smaller than it was a month ago, and the radiopaque image resembling a root canal filling material was fading (Figure 6).

Figure 6. Periapical radiograph a month after retreatment (left); periapical radiograph 2 months after retreatment (right)

CBCT examination was conducted after a period of 6 months of root canal treatment related to the lesion. The examination results showed that the lesion had shrunk from an area of 101,922 mm2 to 83,750 mm2. There was an increase in the density of the lesion as indicated by the increased ROI measurement results, and there was a presence of new bone formation around the lesion (Figure 7).

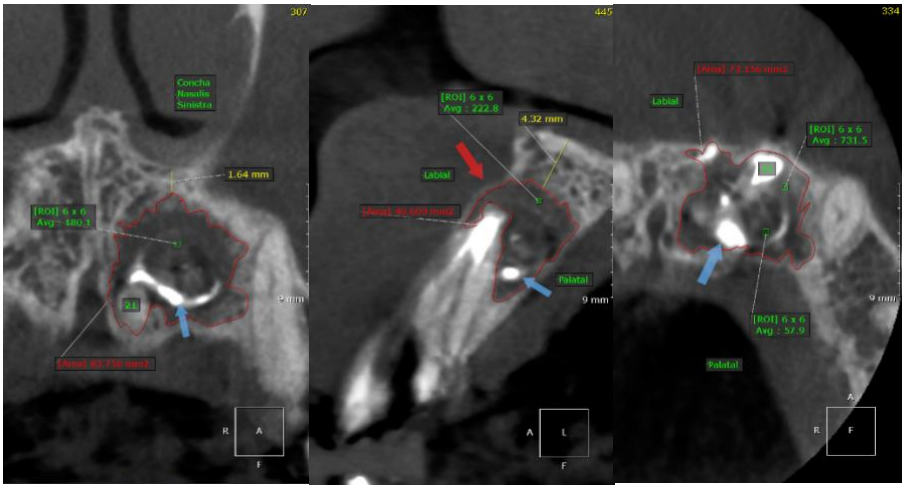

Figure 7. CBCT examination after 6 months post-root canal treatment, related to the lesion

DISCUSSION

Central Giant Cell Granuloma (CGCG) is a benign, localized osteolytic lesion of the jaws that can infrequently become aggressive with an unclear etiology. At first, it was believed to be the bone's ability to repair itself after being injured, inflamed, or hemorrhages inside the body. Nevertheless, CGCG is best regarded as a benign neoplasm because the lesion does occasionally exhibit aggressive activity and is composed of cells that resemble osteoclasts and are comparable to the giant cell tumor of long bone.[5,9]

This case has unusual features. The CGCG occurred in a 32-year-old woman, which, according to theory, can occur under the age of 30, but other theories reveal that CGCG can occur in the second and third decades of life. This is in line with previous theory, where the gender ratio is 2:1, which means that CGCG cases are predominant in women far more frequently than in men. The patient complained of pain and swelling, which is characteristic of an aggressive type of CGCG. The CBCT examination revealed cortical bone destruction, and the lesion measured more than 5 cm. The lesion's size and aggressiveness were anterior-posterior and mesiodistal, and it was rapidly expanding. Some literature explains that there are parameters to differentiate aggressive lesions in the case of CGCG, including discomfort, aberrant sensations, root resorption, rapid expansion, cortical bone penetration, and a high chance of recurrence after surgery. The aggressive form is less prevalent, grows quickly, and recurs frequently.[9-14]

The CBCT radiograph showed a radiolucent, well-defined, irregularly shaped lesion on the apical part of tooth 22 that appeared to cause root resorption and cortical bone destruction on the labial and palatal sides. This appearance is in accordance with the theory that CGCG appearance on radiographs was diverse, including unilocular lesions and broader lesions that have a tendency to be multilocular, which appeared totally radiolucent, to ones that had more mixed-density within, with the majority of the lesions appearing radiolucent. The majority of lesions in earlier research had well-defined borders. Larger lesions were more likely to have both tooth displacement and resorption, which were frequently accompanied by irregular boundaries. In some literature, it is mentioned that in other cases, there are also wispy septa in the internal structure.[2,4,5,7,9,10,15]

The density calculation of the lesion was 128.9 Grayscale, which is similar to the density of the soft tissue around the lesion of 135.5 Grayscale. This indicates that the soft tissue density result is supported by the literature, as it includes the soft tissue density range of +40 - +400 Grayscale, and is still below the bone density of +700 - +1000 Grayscale. The density results are in line with the literature, which states that CGCG is a lesion consisting of soft tissue containing multinucleated giant cells and vasculature.[2,4,9,16]

Periapical lesions, as in these cases, can lead to misdiagnosis in terms of radiographs, and examining these cases can suggest several differential diagnoses, such as granulomas or periapical cysts. Further examination, such as histopathology, needs to be done to make the correct diagnosis. In this case, it was not performed; the operator performed non-surgical retreatment and was evaluated around 3-6 months regarding the lesion.[2,5,7]

CONCLUSION

Lesions might be analysed using both qualitative and quantitative methods with CBCT 3D. These methods lead to the suspicion of periapical central giant cell granuloma in this case's lesion.

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FOOTNOTES

All authors have no conflict of interest to declare for this article.

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