Implant-Associated Giant Cell Granuloma: A Case Report of 4.8-Year Follow-up and Literature Review.

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INTRODUCTION

Central giant cell granuloma (CGCG) is considered a fibro-osseous benign lesion of the jaws and accounts for 7% of the osseous benign lesion. Several reports suggest there are three theories for its development: 1) reactive origin to a local irritant, 2) developmental anomaly, and 3) neoplastic etiology. CGCG is more commonly found in the mandible and mainly in young females. It can be seen classified as “aggressive” or “non-aggressive” radiologically, clinically, and histologically (Table 1).
CGCG can be seen unilocular or multilocular with wispy-septation, cortical expansion, and perforation in the radiological examination.\textsuperscript{5-7} Its treatment is mostly surgical, but recently some medications, including corticoid, interferon, bisphosphonates, or monoclonal antibody have been used for the treatment.\textsuperscript{7} The aim this case report is to present a case of CGCG associated with inserted implant in a female and its treatment challenge.

**Statement of Clinical Importance**

A well-known etiological factor of CGCG is trauma. And it more likely occurs in female mandible. These patients should be closely followed up after implant placement. Surgeons should be aware to properly diagnose and manage them.

**CASE REPORT**

In 2016, A 39-year-old female presented to our clinic with some dental problems including cavities and missing teeth (Figure 1).

She reported no medication in use. She had lost her second premolars and molars in mandible at the left and right side for more than six years. Her CBCT analysis showed she had vertical and horizontal alveolar ridge deficiency in the mandible posterior areas (Figure 2).

Following a periodontal exam, she was diagnosed with generalized chronic slight periodontitis.\textsuperscript{8} The patient was informed of her treatment options, including filling all cavities, implant placements with bone grafting. Risks and benefits were carefully reviewed with the patient. After full mouth scaling and root planing, all cavities were restored. Then, the patient was scheduled for the implant placement and the wisdom tooth extraction. The following areas utilized to place implant; in positions #24 and 26 (3.3x10 mm, Straumann® BLT Roxolid®, Basel, Switzerland), #35 (3.3x8 mm, Straumann® SP Roxolid®, Basel, Switzerland), #37, 44 and 46 (3.3x10 mm, Straumann® SP Roxolid®, Basel, Switzerland) (Figure 3).

Exposed implant threads were covered with xenogeneic corticocancellous bone substitute (Apatos, Osteobiol, Tecnos, Italy).\textsuperscript{9} The grafted area was covered with resorbable collagen membrane\textsuperscript{‡}. The grafted implants were closed primary, but healing abutments were inserted on the upper implants (Figure 3). The patient was prescribed (started at -1 day) an antibiotic (Augmentin 1 gr: 125 mg of Clavulanic acid + 875 mg of Amoxicillin, twice/day, GlaxosmithKline, Turkey) and asked to use it for a week. Home care instructions were given including mouth rinse with chlorhexidine (0.05%, and twice/day) and clean the healing abutments with a soaked cotton applicator to prevent infection. No clinical complications were observed during the healing time. Post-operative follow-up appointments were scheduled at 1 week, 1 month, and 2 months. After 2 months of the surgery, her implants showed no infection sign and good ISQ values (68-74). Impressions were taken with polyether (Impregum, 3M, USA) by using an open tray technique. Then, implant-supported fixed prostheses (screw-retained) were delivered. Home care instructions were given, including the use of auxiliary hygiene aids for the cleaning of gingival and proximal surfaces. The patient was returned to periodontal maintenance every 3-4 months for continued care and monitoring of her implants and periodontal status. After around 8-month
of loading, the implant placed on #26 area showed some pus formation. Following examination, the crown was removed, and the area was cleaned surgically and left for healing. However, the implant failed in 3 months after the periimplantitis treatment. The implant was removed and left for secondary healing. Then, another implant (3.3x10 mm, Straumann® BL Roxolid®, Basel, Switzerland) was placed after 2-month.

During the regular follow-up (at 8-month of the initial surgery), she reported some discomfort around the implant position of the #35 area. She did not have any pain, had only an intraoral small swelling between implants #35 and 37. Her panoramic x-rays showed a small radiolucency area adjacent to implant #35 (Figure 4).

The lesion was immersed into the 10% formaldehyde solution for a pathological examination. The defect area was repaired with xenogeneic corticocancellous bone substitute (Evolution, Tecnos, Italy). The healing was uneventful, and no post-op complication was seen. Histopathological examination revealed the lesion showed a reactive new bone formation, revascularization, multinucleated giant cells (Figure 6A-C).

The patient was evaluated by her physician to exclude her possible malignant metastases in the jaw.10 Screw retained prosthesis was removed. Then, an excisional biopsy was taken following an envelope flap reflection (Figure 5A). The removed lesion was around 0.4 cm and showed some hard tissue (Figure 5B).

It was diagnosed as a central giant cell granuloma. Intraoral examination demonstrated no peri-implant inflammation, bleeding, or other detectable signs of peri-implant disease at 4.8-year of lesion removal. Soft and hard tissue around implants showed very stably (Figure 7A). Radiologically, it was not observed no crestal bone loss or recurrency of the lesion (Figure 7B).
The overall clinical outcome was evaluated by Visual Analogue Scale (VAS) by questioning whether the patient satisfies peri-implant soft tissues, implant function, implant crown appearance, and post-surgical periods. The VAS scores were measured to the nearest mm by a ruler. Each question was scored on a 100 mm ruler (0: extreme dissatisfaction; 100: extreme satisfaction). She was very satisfied by the treatment aesthetically and functionally after the 5.3-year of initial implant placement.

DISCUSSION

CGCG is first defined by Jaffe in 1953. It is considered as a non-neoplastic lesion, resulting in osteolysis, and seen mostly mandible in females. Its etiological factor remains unknown. Jaffe suggested it was associated with trauma, whilst others have suggested it is instead associated with the inflammatory response or pregnancy. The non-aggressive form usually doesn’t show the cortical bone perforation and its recurrence rate is low. The aggressive form of CGCG is characterized by a high recurrence rate, shows rapid growth, cortical bone perforation, pain, root resorption, and massive anatomical destruction.

Since CGCG shows the low incidence and non-specific radiological features, it can be easily misdiagnosed clinically. The patient's age, sex, histopathology, and response to treatment should be considered for the clinical diagnosis of CGCG. The CGCG differential diagnosis can be made with a tumor such as a bone giant cell tumor (GCT). The pathological character of CGCG consists of multinucleated giant cells clustered around hemorrhagic foci, yet the multinucleated giant cells of GCT seem to be densely packed. The multinucleated giant cells of GCT are larger contain more nuclei than that of CGCG. New bone formation and collagen deposition are seen in CGCG but not in GCT and the age at onset of CGCG has earlier than that of GCT. CGCG and GTC have mostly seen the jaws and the long bone, respectively. Importantly, in contrast to GCT, CGCG metastasis has not been reported.

The primary site in this report was the mandible in a female following an implant insertion, which has not been reported. The patient did not show any clinical symptoms, including pain or facial asymmetry. However, it was seen a cortical bone perforation once a full-thickness flap was reflected. According to the literature, cortical bone perforation might indicate the lesion recurrence whereby it is required a radical excision in addition to curettage due to 13% to 22% the recurrence of GCCG in a short time point after the surgery. In this case, surgical curettage, not resection of a part of the mandible, has been performed in the involved area. This successful management of the lesion could be due to catching it at an early stage. Filling up the lesion with xenogeneic bone substitute could help the surgeons to be able to track the lesion recurrence since xenogeneic bone substitute shows radiopacity and can't resorb for a long time. In our present case, a conservative treatment over a resective treatment was preferred. The result of treatment was successful for a long time.

Conclusion

This report indicated implant-supported fixed restoration (especially in the mandible) in women needs to be followed up closely. Catching CGCG at an early stage could result in a more conservative surgical approach and reduced patient morbidity.

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Conflict Of Interest

This paper was not supported by any grant. Dr. Eskan is employed adjunct faculty at the NSU. Dr. Eskan reports no conflicts of interest related to this study.

Authors’ Contributions

MAE and YEB have made substantial contributions to complete all surgical parts and collecting all parameters from the subjects. MAE has been involved in analyzing, interpreting, and supervising the study.

Patient Privacy

A written patient consent statement was received.
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