Gorlin-Goltz Syndrome: Case Report and Review

Tahir Ahmad[1], Parveen Akhter Lone[2], Javaid Ahmed Wani[1], Nusrat Rafi[3]

[1]*Department of Oral and Maxillo Facial Surgey, Indra Gandhi Government Dental College, Jammu and Kashmir*
[2]*Professor and Head, Department of Oral and Maxillo Facial Surgey, Indra Gandhi Government Dental College, Jammu and Kashmir*
[3]*SRI Venkateswara University, Uttar Pradesh, India*

ABSTRACT

The Gorlin-Goltz syndrome or (the nevoid basal cell carcinoma syndrome) is a rare autosomal dominant syndrome with multiple organ involvements. The common manifestations include multiple odontogenic keratocysts in the jaws, multiple basal cell nevi on the skin with an early age onset, palmar pits, bifid or splayed ribs, high arched palate, euryopia, areas of hyper-pigmentation in the upper eyelid of left eye and dorsal surface of hands, calcified diaphragma sellae, and calcifications of the falx cerebri. In this case report, we report the only case of Gorlin-Goltz syndrome in the Jammu-Kashmir region in a young 20-year-old female patient.

Keywords: Gorlin-Goltz; Basal Cell; Bifid Ribs; Odontogenic Keratocyst

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Correspondence to: Tahir Ahmad

Address: Department of Oral and Maxillo Facial Surgery, Indra Gandhi Governmental Dental College, Jammu and Kashmir

E-mail: t.a.tahir66@gmail.com

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INTRODUCTION

Gorlin-Goltz syndrome (GGS), also known as nevoid basal cell carcinoma syndrome (NBCCS), is a rare multisystem disease with an autosomal dominant inheritance, high penetrance, and variable expressivity **[1, 2]**. GGS shows a predisposition to neoplasms and other developmental abnormalities. The estimated prevalence varies from 1/57,000 to 1/256,000 among various studies, with a male-to-female ratio of 1:1 **[2]**.

The first report of the syndrome was in 1894 by Jarisch and White in a patient with multiple basal cell carcinomas, scoliosis, and learning disability. Binkley and Johnson in 1951 and Howell and Caro in 1959 suggested a relationship between basal cell epitheliomas and developmental malformations. It was delineated only in 1960 by Robert James Gorlin and William Goltz **[3, 4]** who established the classical triad (multiple basocellular epitheliomas, keratocyst in jaw, and bifid ribs) that characterizes the diagnosis of this syndrome. It is also called as the fifth phakomatosis due to the presence of multiple cutaneous, skeletal, ophthalmic and neurological abnormalities.

In addition to the characteristic diagnostic features, GGS patients may also have frontal and parietal bossing, mandibular prognathism, and cutaneous abnormalities such as multiple basal cell carcinomas and palmar and plantar keratosis. GGS can also include concomitant hypertelorism, mental retardation, strabismus, calcification of the falx cerebri and medulloblastomas **[6]**.

The genetic locus for GGS is on 9q22.3-q31, as determined by linkage analysis, which also contains the loss of human patched gene (PTCH1 gene), a tumor suppressor gene; this gene likely forms the molecular basis of the syndrome **[5,7]**. This gene is significant for embryonic development and cell cycle. Interestingly, the syndrome exhibits abnormalities similar to those seen in people exposed for long periods to UV radiation. Several different mutations of the PTCH1 gene have been identified in patients with GGS and may be responsible for its variable expressivity **[2,3]**.

CASE REPORT

A 20-year old female presented with complains of discharge from lower left tooth since 2 months. About 2 months ago, patient experienced a swelling in the posterior mandibular region which was followed by intermittent, slowly progressing, non-radiating, dull pain. On general physical examination, the patient had frontal bossing, presence of multiple nevi, palmar pits in both hands, and prominent supra orbital ridges (Figure 1 and 2).

An oral examination found carious lower left first molar, vestibular tenderness with respect to lower left first, second and third molar and on the

application of pressure with the finger, white fluid discharge with thick cheesy consistency was also seen in this region. An orthopantomogram (OPG) of the patient showed multiple cysts in maxilla and mandible (Figure 3).

An impacted left mandibular canine was seen with loss of cortex in the left mandibular body extending to the ramus and involving the neck of mandibular condyle. In the maxilla, a large radiolucent lesion was seen in the periapical region extending to the right second molar to the canine area and another radiolucent lesion in the left posterior part of maxilla, extending along the periapical region of left premolar to left second molar. The lesions also involved the mandibular canal on both sides. Surgical enucleation of all the cysts was started, followed by curettage (Figure 4). Chest radiograph of the patient showed markedly splayed ribs on the right side (Figure 5) which further substantiated the diagnosis of GGS. The specimen taken from a surgical site during enucleation was sent for histopathological examination which revealed a typical odontogenic keratocyst consisting of a thin layer of parakeratinized epithelium separated from the underlying connective tissue (Figure 6). Further skin lesions in the form of basal cell nevus, palmer or plantar pits or keratosis were present. Thus, based on major criteria such as multiple odontogenic keratocysts in the jaw, multiple palmar pits, splayed ribs on the right side, and minor criteria such as frontal bossing, prominent supraorbital ridges, and radiographical and histopathological evidence, a provisional diagnosis of GGS was made. No other neural or cardiovascular abnormality was found. We did not find a family history of GGS in this patient.

DISCUSSION

Odontogenic keratocysts are common findings in patients with GGS and are more common in mandible (69%) than maxilla (31%). In mandible, 43% of the odontogenic keratocysts occur in the molar ramus region, followed by 18% in the incisor-canine area. In maxilla, 14%

Figure 1: Frontal bossing and multiple oral nevi

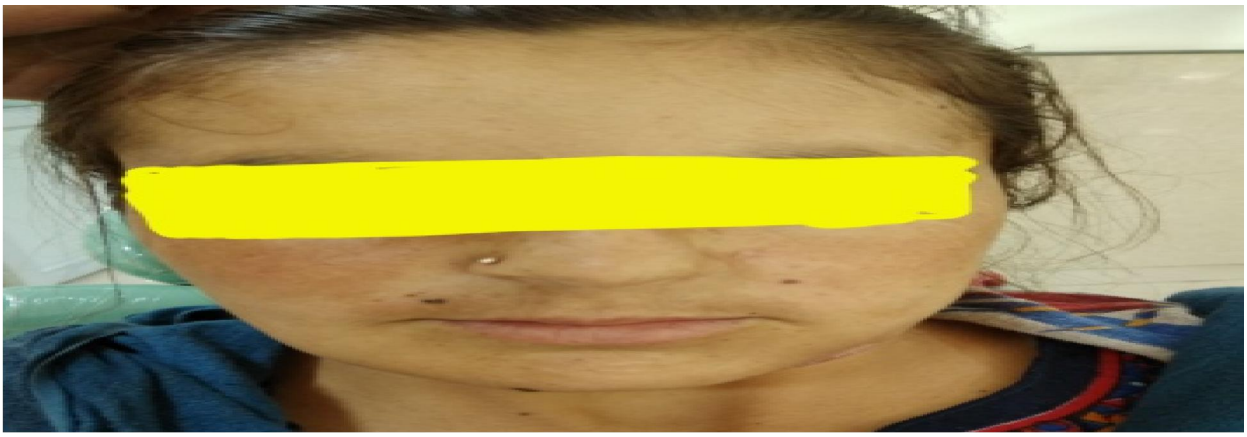


Figure 2: Multiple palmar pits

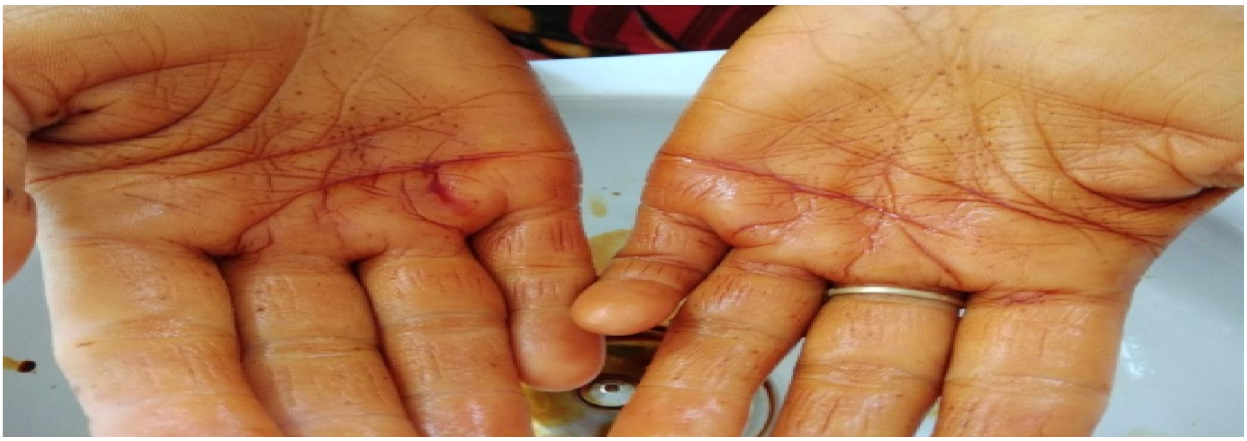


Figure 3: Multiple Odontogenic keratocysts in both maxilla

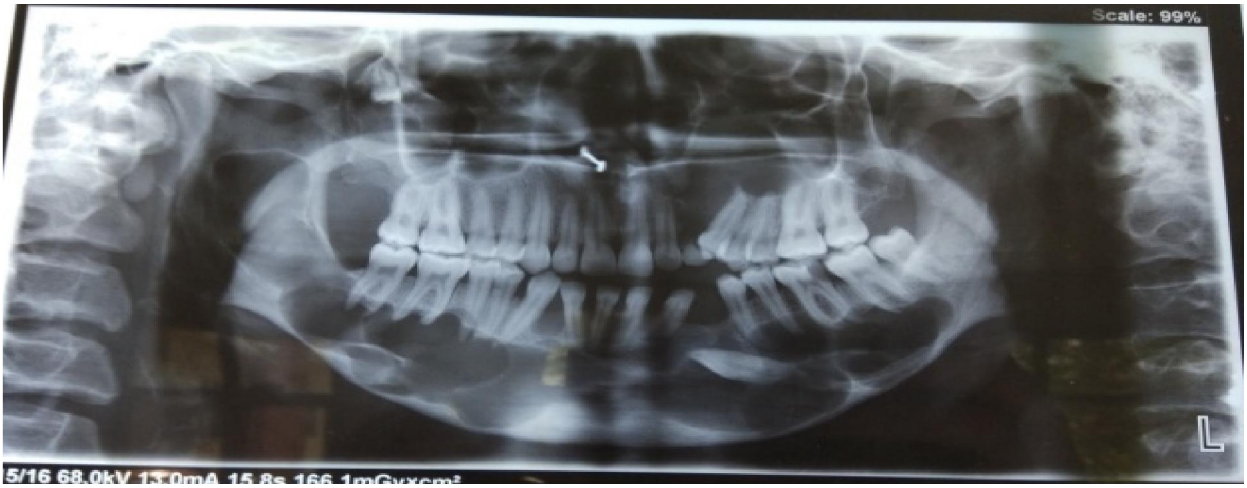


Figure 4: Curettage of the lesion and mandible

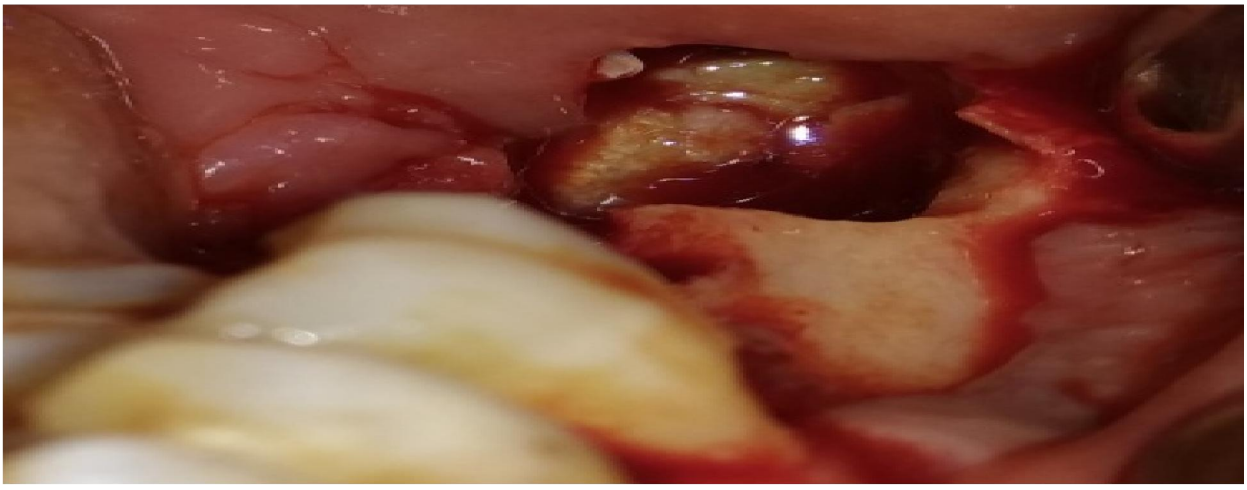
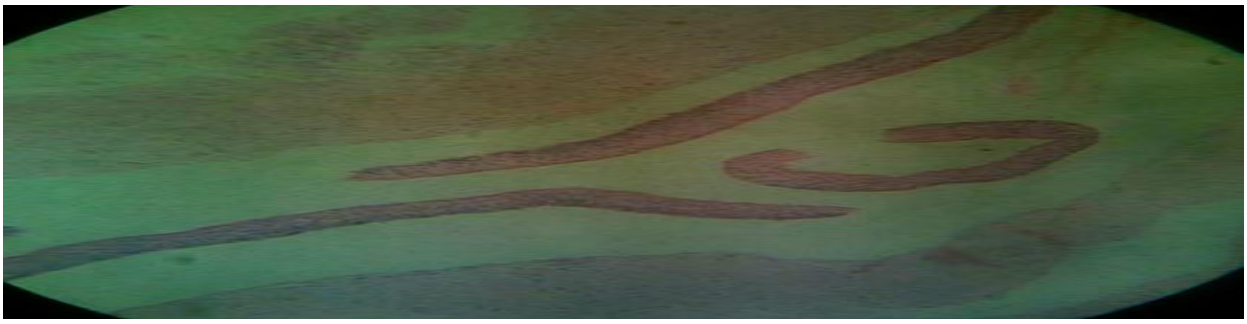


Figure 5: Splayed ribs on right side

Figure 6: Histopathology of the specimen



of the odontogenic keratocysts occur in the incisor-canine area, followed by molar tuberosity. Of note, simple keratocysts are more common in males, however, females with GGS are more likely to have odontogenic keratocysts **[8]**. Based on histopathological studies, parakeratinization, intramural epithelial remnants, and satellite cysts were more frequent among odontogenic keratocysts which were associated with GGS than in solitary keratocysts **[9]**. Of note, similar findings were found in our patient as well.

There is no specific laboratory test to diagnose GGS, although the affected patients may have high levels of cyclic adenosine monophosphate and impaired phosphate diuresis on parathormone challenge **[10]**. The treatment of the GGS is in accordance with the generally accepted rules for treatment of basal cell carcinomas and keratocysts in non-GGS patients. Radiation should be avoided as it may trigger the development of other tumors in adjacent skin areas. Cystectomy, including removal of bony walls of the resulting cavity, is an adequate surgical treatment for odontogenic keratocysts. In the treatment of recurrent odontogenic keratocysts which are associated with GGS, the overlying surface epithelium should be excised along with the cystic lining to prevent recurrences from residual epithelial islands and microcysts **[11]**.

In addition, use of Carnoy's solution following cyst enucleation (applied only over the areas where the cyst is attached to the mucosa) and cryosurgery (because of the unique ability of liquid nitrogen to devitalize the bone in situ while leaving the inorganic framework untouched) is advocated to kill epithelial remnants and dental lamina within the osseous structures and thus prevent recurrences **[12]**.

CONCLUSION

This rare case highlights the important combin-ation of clinical and radiographical findings in establishing diagnosis of rare syndromes. Genetic counselling of the family members is important in such cases.

REFERENCES

1. Casaroto AR, Loures DC, Moreschi E, et al. Early diagnosis of Gorlin-Goltz syndrome: case report. *Head Face Med*. 2011;7(1):2.
2. Yordanova I, Gospodinov DK. A familial case of Gorlin-Goltz syndrome. *Journal of IMAB–Annual Proceeding Scientific Papers*. 2007;13(1):63-7
3. Ljubenovic M, Ljubenovic D, Binic I, Jovanovic D, Stanojevic M. Gorlin-Goltz syndrome. *Acta Dermatovenerol Alp Pannonica Adriat*. 2007;16(4):166.
4. Amezaga AO, Arregui OG, Nuño SZ, Sagredo AA, Aguirre JM. Gorlin-Goltz syndrome: clinicopathologic aspects. *Med Oral Patol Oral Cir Bucal.* 2008;13(6):E338-43.
5. Gailani MR, Bale SJ, Leffell DJ, et al. Developmental defects in Gorlin syndrome related to a putative tumor suppressor gene on chromosome 9. *Cell.* 1992;69(1):111-7.
6. Lindeboom JA, Kroon FH, de Vires J, van den Akker HP. Multiple recurrent and de novo odontogenic keratocysts associated with oral-facial-digital syndrome. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2003;95(4):458-62.
7. Kalogeropoulou C, Zampakis P, Kazantzi S, Kraniotis P, Mastronikolis NS. Gorlin-Goltz syndrome: incidental finding on routine ct scan following car accident. *Cases Journal.* 2009;2(1):9087.
8. Kannan KS, Sundharam SB, Manikandan R. Nevoid basal cell carcinoma syndrome. *Indian J Dent Res*. 2006;17(1):50
9. Dominguez FV, Keszler A. Comparative study of keratocysts, associated and non-associated with nevoid basal cell carcinoma syndrome. *J Oral Pathol Med.* 1988;17(1):39-42
10. Bakaeen G, Rajab LD, Sawair FA, Hamdan MA, Dallal ND. Nevoid basal cell carcinoma syndrome: a review of the literature and a report of a case. *Int J Paediatr Dent*. 2004;14(4):279-87
11. Myoung H, Hong SP, Hong SD, Lee JI, Lim CY, Choung PH, *et al*. Odontogenic keratocyst: review of 256 cases for recurrence and clinicopathologic parameters. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2001;91(3):328-33
12. Stoelinga PJ. Excision of the overlying, attached mucosa, in conjunction with cyst enucleation and treatment of the bony defect with carnoy solution. *Oral Maxillofac Surg Clin North Am*. 2003;15(3):407-14