



CASE STUDY

GORLIN-GOLTZ SYNDROME: A RARE CASE REPORT

¹Dr. Saraswathi Gopal, K. and ²,*Dr. J. K. Singh Kshatri,

Prof & HOD Dept of Oral Medicine and Radiology, Meenakshi Ammal Dental College, India
²Post Graduate Student, Meenakshi Ammal Dental College, India

ARTICLE INFO

Article History:

Received 24th December, 2016
Received in revised form
15th January, 2017
Accepted 14th February, 2017
Published online 31st March, 2017

Keywords:

Keratocystic Odontogenic Tumor (KCOT),
Gorlin-Goltz syndrome,
Basal Cell Carcinoma,
Autosomal dominant, CBCT.

Abbreviations:

GGS-Gorlin Goltz Syndrome,
NBCCS-nevoid basal cell carcinoma
syndrome, BCC-basal cell carcinoma,
OKC- Odontogenic Kerato Cyst,
KCOT-Keratocystic Odontogenic tumor
(KCOT), PTCH-Human homolog of
patched gene.

ABSTRACT

Although odontogenic keratocysts are common in clinical practice, the simultaneous occurrence of multiple cysts in both the maxilla and mandible of a patient is rare. Gorlin-Goltz syndrome is an inherited autosomal dominant disorder with complete penetrance and extreme variable expressivity. It is characterized by keratocystic odontogenic tumors (KCOT) in the jaws, multiple basal cell nevi carcinomas and skeletal abnormalities. This syndrome may be diagnosed early by a dentist by routine radiographic exams in the first decade of life, since the KCOTs are usually one of the first manifestations of the syndrome. This paper reports the case of a patient, a 11-year-old girl with Gorlin Goltz Syndrome, emphasizing its clinical and radiographic manifestations with known family history.

INTRODUCTION

Gorlin-Goltz syndrome (GGS) is an uncommon autosomal dominant inherited disorder with a high level of penetrance and variable expressivity due to a genetic defect or mutation in human homolog of patched (PTCH) gene, which is a tumour suppressor gene responsible for growth, and development of normal tissue is located on long arm of chromosome no 9q 22.1-3-1, but a significant fraction of cases are sporadic with no previous family history (30%) (Ajit Auluck *et al.*, 2006). This syndrome presents with a variable prevalence of 1 in 57,000 to 1 in 2,56,000 amongst general population. It appears early in life after 5 years of age with equal predilection for either sex. It is characterized by a wide range of developmental abnormalities and a predisposition to neoplasms (Ashutosh Agrawal *et al.*). This syndrome has been termed with several names such as, basal cell nevus syndrome, Gorlin Goltz Syndrome (GGS), nevoid basal cell carcinoma syndrome (NBCCS), multiple basal cell carcinoma (BCC) syndrome, multiple basalioma syndrome, jaw cyst basal cell tumor skeletal anomalies syndrome, jaw cyst bifid rib basal cell nevus

syndrome, nevoid basalioma, odontogenic keratocysts skeletal anomalies syndrome and fifth phacomatosis (Ana R. Casaroto *et al.*, 2011).

CASE REPORT

A 11-year-old girl reported to our department with a chief complaint of swelling in the lower right jaw since 15 days. The swelling was slowly progressive in nature not associated with any other symptoms and trauma. Past medical and dental history was non contributory, family history revealed mother had history of swelling in maxilla and undergone surgery at the age of 17. There was no consanguineous marriage between the parents. On extra oral examination, hypertelorism, broad nasal bridge, competent lips were noted giving a coarse facial appearance. (Figure 1) Mild facial asymmetry noted due to swelling in the right cheek region. A diffuse swelling from right para symphysis region up to angle of mandible antero posteriorly and from the occlusal plane up to the base of mandible supero inferiorly. The skin over the swelling appeared normal. Intraoral examination revealed mixed dentition, buccal vestibular obliteration from 42 to 46 region is noted. (Figure 2) On palpation, swelling was non-tender, soft, fluctuant causing expansion of buccal cortical plate. There was no paresthesia or

*Corresponding author: Dr. J. K. Singh Kshatri,
Post Graduate Student, Meenakshi Ammal Dental College, India.

lymphadenopathy associated with the swelling. Fine needle aspiration yielded yellow cheesy aspirate (Fig-3). Based on the history, clinical examination and fine needle aspiration a provisional diagnosis of odontogenic keratocyst (OKC) of right side of mandible was established, considering the differential diagnosis of ameloblastoma, central giant cell granuloma.

43 and 44 near inferior border of mandible. And also a well defined unilocular radiolucency in relation to 63 to 26 region with superior displacement of developing tooth bud of 24 (as shown in Fig. 4).



Figure 1. Extra oral photograph showing coarse facial features



Figure 2. Intraoral photograph showing obliteration of vestibule from 42 to 46 region



Figure 3. Fine needle aspiration yielded yellow cheesy aspirate

Radiographic investigation

Orthopantomograph (OPG) reveals mixed dentition with a unilocular well defined radiolucency surrounded by thin sclerotic border in the left side of maxilla and right side of mandible. A well defined unilocular radiolucency with scalloped margins in the anterior mandible in relation to distal apical region of 42 to mesial aspect of 46 with displacement of



Fig. 4. OPG showing discrete well defined, discrete radiolucencies in maxilla and mandible

Axial section of CBCT of mandible reveals a uniformly hypodense lesion measuring approx 4 x 2.5 cms from 43 to 45 region with discontinuity of margin and expansion of buccal cortical plate (as shown in Fig. 5). Coronal section of CBCT of maxilla (Figure 6) revealed hypodense lesion involving the left maxillary sinus measuring approx 3cm x 3cm with a thin sclerotic border and uniformly hypodense internal structure.

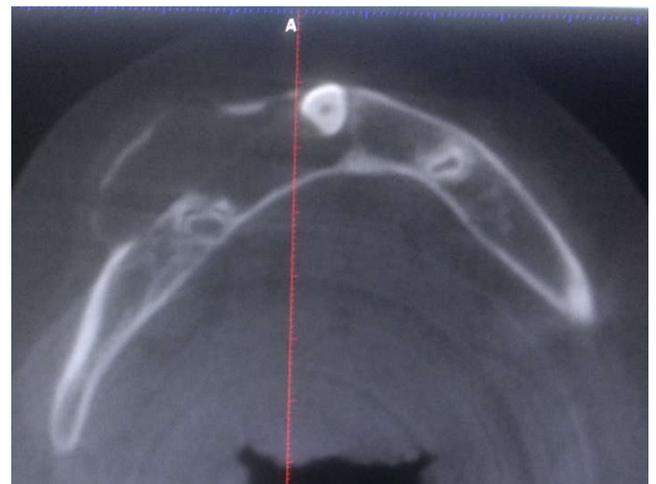


Fig. 5. Axial section of CBCT of Mandible



Fig. 6. Coronal section of CBCT of maxilla revealed hypodense lesion measuring with hyperdense continuous border involving the left maxillary sinus

Skull radiographs radiograph revealed no abnormality.

Table 1. Diagnostic criteria for nevoid basal cell carcinoma syndrome according to Evans and others (2 major or 1 major and 2 minor criteria should be satisfied for positive diagnosis)

Major criteria
More than 2 basal cell carcinomas (BCCs), 1 BCC before 30 years of age; or more than 10 basal cell nevi
Any odontogenic keratocyst (proven on histology) or polyostotic bone cyst
3 or more palmar or plantar pits
Ectopic calcification; lamellar or early (< 20 years of age) falx calcification
Family history of nevoid basal cell carcinoma syndrome
Minor criteria
Congenital skeletal anomaly (e.g., bifid rib, fused, splayed or missing rib, wedged or fused vertebrae)
Occipital–frontal circumference higher than the 97th percentile, with frontal bossing
Cardiac or ovarian fibroma
Medulloblastoma
Lymphomesenteric cysts
Congenital malformations, such as cleft lip or palate, polydactylism or eye anomaly (cataract, coloboma, microphthalmos)

PA chest revealed characteristic radiographic features and fusion of 2nd and 3rd ribs (Figure 5) on the left side. Routine blood investigations were within normal limits. Genetic analysis was not advised, as it was not affordable by patient.

of OKC. Based on the clinical, radiographic, histopathologic features and family history a final diagnosis Gorlin Goltz Syndrome was established.

DISCUSSION

Several studies have presented OKCs, basal cell naevi and skeletal anomalies as the principal clinical features of Gorlin Goltz Syndrome (GGS) (Lorenzo Lo Muzio). However, according to Manfredi *et al.*, the diagnostic criteria of GGS requires the presence of two major or one major and two minor criteria. Major criteria included the presence of more than two basal cell carcinomas or one under the age of 20 years, histologically-proven OKC of the jaw, cutaneous palmar or plantar pits, and bifid, fused or markedly splayed ribs (Balachander *et al.*, 2016). Any one of the following features is considered a minor criterion, such as orofacial congenital malformations (cleft lip or palate, frontal bossing or moderate or severe hypertelorism), skeletal and radiological abnormalities (bridging of the sella turcica and vertebral anomalies), ovarian fibroma and medulloblastoma (Maya Ramesh *et al.*, 2015). The present case report showed a child patient presenting such as multiple OKC in the maxilla and mandible, rib anomalies, ocular hypertelorism which confirmed the diagnosis of nevoid basal cell carcinoma syndrome (NBCCS) or Gorlin-Goltz syndrome (Mubeen Khan *et al.*, 2015).

OKCs are the hallmark of this rare syndrome. 75% of the affected individuals represent this initial manifestation as in this reported case. OKCs related to this syndrome are often multiple involving both the jaws, frequently recurrent and occurs at an early age, with an aggressive biological behaviour. Despite of their aggressive nature, they often remain asymptomatic⁸. There are however no distinctive radiological feature between isolated keratocysts and those associated with GGS. OKC associated with nevoid basal cell carcinoma syndrome (NBCCS) have occasionally noted to be transformed into ameloblastomas and squamous cell carcinoma (Lo Muzio *et al.*, 1999). Palmar and/or plantar pits are specific signs of this syndrome and are present in about 50 to 70% of the patients. They appear as multiple punctiform brownish black depression ranging from 2 to 3 mm in diameter and 1 to 3 mm in depth (Chandra Shekar *et al.*). They are caused by partial or complete absence of stratum corneum or dense keratin in sharply defined areas. Rib anomalies are found in 49% of patients, where presence of fused/bifid ribs is the most characteristic finding. Other anomalies of ribs include splayed/fused ribs, absent/rudimentary ribs and

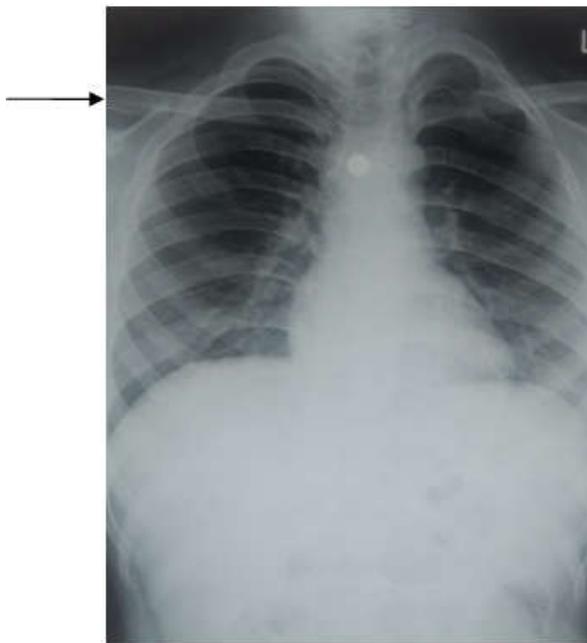


Figure 7. PA chest showing fusion of 2nd and 3rd ribs

Routine hematological evaluations were carried out and the patient was hospitalized. A surgical curette were used with saline irrigation for enucleating the cysts. Curettage was done using a curette and a round bur. The remnants of the cysts were removed using chemical cautery with Carnoy's solution (2.5%) for 3 min without chloroform followed by irrigation with saline. The cysts were enucleated from both the quadrants followed by extraction of 64, 65, 83, 85 and unerupted tooth buds in relation to 24, 25, 44 and 45. The tissues removed were put in separate bottles containing formalin and the corresponding quadrant number was noted. As bone regeneration in children is faster, bone grafts were not used. The enucleated tissues were sent for histopathological evaluation. The histopathological examination of the excised tissue showed a cystic wall lined by parakeratinised stratified squamous epithelium of 4–8 layers with loss of rete ridges. The basal cell layer showed palisaded arrangement with hyperchromatic nuclei and reversal of polarity. Superficial layer of epithelium has surface corrugations features suggestive

presence of cervical rib. As GGS presents with broad range of clinical manifestations, thus requires a multidisciplinary approach which constitutes a true challenge for dermatologists and dentists, who often first encounter and become primary care physicians for GGS patients. Genetic counselling is mandatory, as the syndrome is hereditary and to rule out the expression in future generations (Chandra Shekar *et al.*). There are two methods of treating odontogenic keratocysts: Conservative or aggressive. In the conservative method, simple enucleation with or without curettage and marsupialization are suggested. Aggressive methods include peripheral ostectomy, chemical curettage with Carnoy's solution and resection. Application of Carnoy's solution into the cyst cavity for 3 min after enucleation results in a lower rate of recurrence (0–2.5%) without any damage to the inferior alveolar nerve. Moreover, the use of Carnoy's solution following cyst enucleation (applied over areas where the cyst was attached to the mucosa) and cryosurgery (because liquid nitrogen devitalizes bone, while leaving the inorganic framework untouched) is advised to destroy epithelial remnants and dental lamina within the osseous margin and thus, prevent recurrences. Cryosurgery using liquid nitrogen is indicated in the large complex mandibular lesions if there is a risk of damage to vital structures with conventional treatment methods (Jawa *et al.*, 2009).

Conclusion

It is important to make an early diagnosis of GGS, as the case presents malignant predisposition and hence can be managed appropriately. The occurrence of multiple OKCs may be the first and only manifestation. Multiple OKCs may occur a decade before other symptoms and clinical manifestations of the syndrome. Hence a dentist may be the first person to detect this syndrome. Proper evaluation and characterization of the clinical features are of the utmost importance for the correct diagnosis and treatment of affected patients. In order to be able to establish early diagnosis of GGS, specialists should carry out clinical and imaging examinations in early ages of life. Physicians and dentists must aware of the syndrome well.

REFERENCES

- Ajit Auluck, Setty Suhas, Keerthilatha M. Pai, 2006. Multiple Odontogenic Keratocysts: Report of a Case JCDA, September 2006, Vol. 72, No. 7
- Ashutosh Agrawal, Aditi Murari, Sunil Vutukuri, and Arun Singh, Gorlin-Goltz Syndrome: Case Report of a Rare Hereditary Disorder
- Ana R. Casaroto, Daniela C.N. Rocha Loures, Eduardo Moreschi, Vanessa C. Veltrini, Cleverson L. Trento, Vilmar D. Gottardo, Vanessa S. Lara, 2011. Early diagnosis of Gorlin-Goltz syndrome: case report; *Head & Face Medicine* 2011 7:2.
- Lorenzo Lo Muzio, Nevoid basal cell carcinoma syndrome (Gorlin syndrome)
- Balachander, N. Malathi, L. J. Jenita Jacobina and N. Aravindha Babu, 2016. Gorlin-goltz Syndrome (Nevoid Basal Cell Carcinoma Syndrome) - A Case Report; *Biomedical & Pharmacology Journal* Vol. 9(2), 853-857.
- Maya Ramesh, Ramesh Krishnan, Paul Chalakkal, George Paul, 2015. Goltz-Gorlin Syndrome: Case report and literature review; *Journal of Oral and Maxillofacial Pathology*, Vol. 19 Issue 2 May - Aug 2015
- Mubeen Khan, K.R. Vijayalakshmi, Preeti Rajguru, 2015. Gorlin-Goltz syndrome: A rare case report; *Int J Dent Sci Res.*, (2015).
- Gorlin, R.J. and Goltz, R.W. 1960. Multiple nevoid basal cell epithelioma, jaw cysts and bifid rib: A syndrome. *New Engl J Med.*, 262:908-12.
- Lo Muzio, L., Nocini, P.F., Savoia, A., Consolo, U, Procaccini, M., Zelante, L., Pannone, G., Bucci, P., Dolci, M., Bambini, F., *et al.*, 1999. Nevoid basal cell carcinoma syndrome. Clinical findings in 37 Italian affected individuals. *Clin Genet* 1999, 55:34-40.
- Chandra Shekar, L., Sathish, R. and Beena, S. Sachin Ganeshan, Gorlin Goltz Syndrome, *Journal of Dental Sciences and Research*, 2(2): 1-5.
- Jawa, D.S., Sircar, K., Somani, R., Grover, N., Jaidka, S. and Singh, S. 2009. Gorlin Gotz syndrome. *J Oral Maxillofac Pathol.* 2009; 13(2): 89–92.
