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Case Report

Pathology Section

# A Rare Case of Granular Cell Tumour of Tongue in a 13-year-old Girl

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## ABSTRACT

Granular Cell Tumour (GCT) is a rare benign tumour that usually affects adults in the third to sixth decades, with females being more commonly affected. Here, a rare case of GCT occurring in a 13-year-old child is presented. A young girl presented with a painless swelling on the right-side of her tongue. Her past medical history was unremarkable. Upon examination, a firm, well-defined, non pulsatile, non tender lesion measuring 1×0.8 cm was noted, involving the right lateral border of the tongue. The lesion was excised and sent for histopathological examination. Gross examination revealed a 1×0.8×0.6 cm mass with a grey-white cut surface. Microscopy showed hyperplastic stratified squamous epithelium overlaying a submucosal tumour composed of polygonal cells arranged in sheets. The tumour cells had central small round nuclei with abundant granular eosinophilic cytoplasm and intervening skeletal muscle fibres. No necrosis, atypia, or increased mitosis were observed. Immunohistochemistry showed strong nuclear positivity and bright granular cytoplasmic positivity for S-100, confirming the diagnosis of GCT. The patient was followed-up for 14 months after surgery and reported no recurrences. GCTs typically manifest in older individuals, with the highest prevalence in the fifth and sixth decades of life. However, this case deviates from the norm, being noted in a 13-year-old child. This exceptionally unusual presentation should prompt the inclusion of GCT in the differential diagnosis of tongue neoplasms in paediatric patients as well. Periodic follow-up of these patients is recommended to detect malignant transformations and late recurrences at early stages.


**Keywords:** Abrikossof's tumour, S-100, Tongue neoplasms

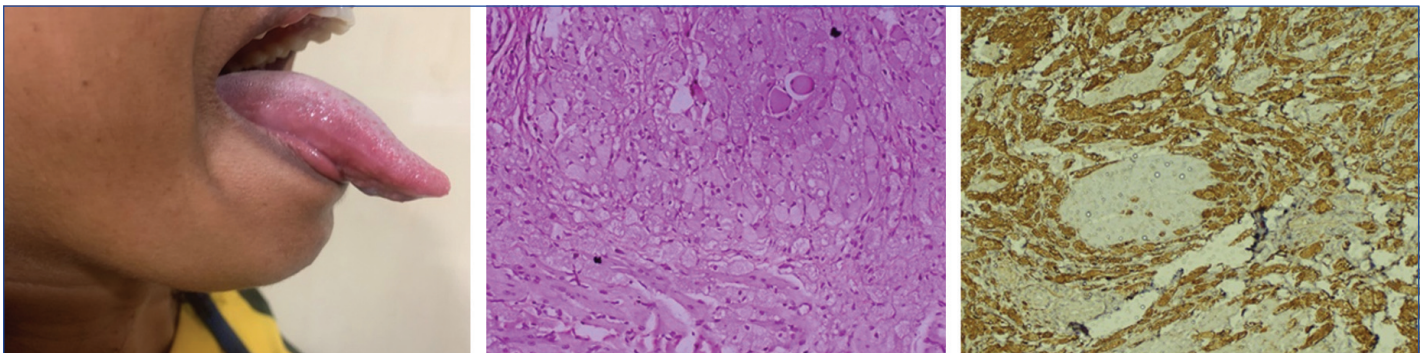
## CASE REPORT

A 13-year-old girl presented to the otorhinolaryngology clinic with a swelling on the right-side of her tongue that had been present for two months. It had an insidious onset, was slowly progressive in size, and was painless. Her past medical history was unremarkable. Local examination revealed a solitary swelling measuring 1×0.8 cm involving the right lateral border of the tongue [Table/Fig-1]. The swelling was non pulsatile, non tender, firm, with fairly well-defined borders, and the overlying mucosa appeared normal. General physical examination was within normal limits, and there was no other significant personal or family history. A clinical differential diagnosis of neurofibroma, lipoma, schwannoma, and GCT was considered. Based on these findings, a decision was made to excise the lesion. The swelling was excised under general anaesthesia, appropriate sutures were placed, and haemostasis was achieved. The specimen was sent for histopathological examination. On gross examination, the lesion measured 1×0.8×0.6 cm with a grey-white cut section. Microscopy revealed hyperplastic stratified squamous epithelium overlying a submucosal tumour composed of polygonal cells arranged in sheets. Individual tumour cells had central small round nuclei with abundant granular eosinophilic cytoplasm and intervening skeletal muscle fibres [Table/Fig-2]. There was no necrosis, atypia, or increased mitosis observed. These features were suggestive of GCT. Immunohistochemical staining with S-100 was performed to confirm the diagnosis. The tumour cells showed strong nuclear positivity and bright granular cytoplasmic positivity for S-100 [Table/Fig-3], thereby confirming the diagnosis of GCT. In the present case, complete healing occurred in one week, and no recurrence was observed after 14 months of follow-up.

## DISCUSSION

The GCT is a rare, benign tumour that commonly affects the tongue. With an incidence of approximately 1 in 1,000,000 population per year, it affects adults between the second and sixth decades of life [1,2]. It is often accidentally detected and has a female preponderance. It presents as a small lesion, with a size ranging from 1-3 cm. It is a painless, slow-growing tumour that is often asymptomatic at presentation. The reported prevalence ranges from 0.019-0.03% of all human neoplasms [2-4]. The present case, reports a GCT of the tongue in a 13-year-old girl.

GCT is also known as Abrikossoff's tumour, named after Russian pathologist Alexei Ivanovich Abrikossoff who described it in 1926



**[Table/Fig-1]:** Solitary swelling measuring 1×0.8 cm on the right lateral border of the tongue. **[Table/Fig-2]:** Tumour cells having central small round nuclei and abundant granular eosinophilic cytoplasm with intervening skeletal muscle fibres (Haematoxylin and eosin, 40x). **[Table/Fig-3]:** Tumour cells immunopositive for S-100. (S-100, 40x). (Images from left to right)

[1,5]. Historically, different terminologies were applied to this lesion, which include myoblastoma, granular cell nerve sheath tumour, and granular cell schwannoma owing to the uncertain histogenesis of this tumour, said to be derived from adult or embryonic muscle cells or Schwann cells [1,2,4,6]. In 1948, Fust and Custer were the first to point out its neurologic origin and stated that these tumours arise from Schwann cells. Later, using electron microscopy and histochemical techniques, Fischer and Wechsler provided convincing evidence that the cell of origin is the Schwann cell and suggested that these lesions be called granular cell schwannomas [6].

GCT usually involves adults between the second and sixth decades of life, and its incidence in children is rare. A thorough search of literature to identify published cases of GCT of the tongue in the paediatric age group (<15 years) was done, and the results are tabulated [Table/Fig-4] [5,7-12]. Females are known to be affected 2-3 times more frequently when compared to men. GCT can affect any part of the body [1,3,13]. About 45-65% of the GCTs involve the head and neck region, with 70% of these noted in the intraoral region. The tongue is the most common intraoral region affected, followed by the lips, retrocommissural area, buccal mucosa, and hard palate in order of frequency. The tongue, being rich in nerve fibres encased by Schwann cells, can be the cells from which GCTs arise. GCTs can be seen at various other locations like the skin, subcutaneous tissue, central nervous system, trachea, larynx, bladder, uterus, and vulva [2,6,14]. In the present case, the lesion involved the right lateral border of the tongue.

| S. No. | Study | Age (years)/sex | Presentation |
|---|---|---|---|
| 1 | Beemster G et al., [7] 1979, Amsterdam | 12, M | Mass at dorsum of tongue |
| 2 | Ozer E at al., [8] 2004, Turkey | 2.5, F | Painless mass under the anterior tongue |
| 3 | Nagaraj PB et al., [9] 2006, Karnataka, India | 6, F | Painless swelling in the right lateral margin of the tongue |
| 4 | Munhoz EA et al., [10] 2008, Brazil | 10, M | Painless swelling in the right border of the tongue |
| 5 | Barbieri M et al., [11] 2011, Italy | 14, M | Painless mass on the apex and body of tongue |
| 6 | Van de Loo S et al., [5] 2015, Amsteram | 8, F | Mass at dorsum of tongue |
| 7 | Solomon LW and Velez I [12] 2016, USA | 12, M | Tongue mass |
| 8 | Present case, 2024 | 13, F | Painless swelling in the right lateral margin of the tongue |

**[Table/Fig-4]:** Comparison of present case with other reported cases [5,7-12].

On intraoral examination, GCTs of the tongue appear as solitary asymptomatic nodules, pink in colour, occasionally being yellowish. They are small lesions and are often less than three cm in size. They involve the subcutaneous or submucosal tissues. A few patients may present with a past history of inflammation or trauma at the involved site. Clinical differential diagnosis include fibroma, lipoma, neurofibroma, and schwannoma [2,8,15]. On histopathological examination, GCTs are characterised by submucosal proliferation of polygonal cells, arranged in sheets. The abundant granular eosinophilic cytoplasm and small round to oval monotonous nuclei are characteristic features. These histologic features noted in present case helped us consider a diagnosis of GCT and rule out clinical differential diagnoses of lipoma, schwannoma, and neurofibroma.

Approximately 1-2% of benign GCTs can show metastasis. The characteristic features of malignant GCTs are described by Fanburg-Smith. These criteria include spindling of the tumour cells, high nuclear-cytoplasmic ratio, vesicular nuclei with large nucleoli, nuclear pleomorphism, increased mitotic rate (>2/10 hpf), and necrosis. Malignant GCTs show three or more of these features. The common sites for metastasis include the bone, lung, breast, lymph nodes, and peritoneum. The present case didn't show any features of malignant transformation. Immunohistochemically, these tumours are positive for neuron-specific enolase and S-100. The neurogenic origin is supported by the immunohistochemical localisation of these markers in the tumour cells. Genetically, loss of heterozygosity involving chromosomes 9p and 17p has been described [2,4,5,14].

The histopathological differential diagnoses include histiocytosis, amelanotic melanoma, oral granular cell leiomyoma, Pecoma (perivascular epithelioid cell tumour), xanthoma, alveolar soft part sarcoma, Rosai-Dorfman disease, and primitive non neural GCT [16-20]. Correlation of clinicopathological parameters and immunohistochemical marker expression helps differentiate GCT from the other tumours. The differential diagnosis of oral lesions with cells having granular cytoplasm, their distinguishing features from GCT, and Immunohistochemistry (IHC) findings are tabulated [Table/Fig-5].

As GCTs are non encapsulated and a small risk of recurrence (7%) is associated with positive margins, a complete surgical excision with margin clearance is warranted. Long-term follow-up of these patients is advised as there is a risk of malignant transformation in about 10% and distant metastasis in about 2% of cases. Laser excision surgery has also been used as a treatment of choice in

| S. No. | Lesion | Histopathological features | Distinguishing features from GCT | IHC |
|---|---|---|---|---|
| 1 | Langhan cell histiocytosis (Eosinophilic granuloma-localised variant) | Sheet-like proliferation of pale-staining Langerhans cells, with abundant cytoplasm, indistinct cell borders, rounded or indented "coffee-bean-" shaped vesicular nuclei, and absence of mitotic activity. | Presence of eosinophils, indented coffee-bean nuclei of tumour cells. | CD1a, CD207, CD68, and S100 positivity. |
| 2 | Amelanotic melanoma | Sheets of large ovoid to polygonal tumour cells with pale eosinophilic granular cytoplasm and eccentrically placed nuclei, few showing high nuclear to cytoplasmic ratio (N:C). | Cells with high N:C ratio, vesicular nuclei with prominent nucleoli. | S100, HMB-45, Melan-A-positive; Cytokeratin, NSE, CD68-negative |
| 3 | Oral granular cell leiomyoma | Large polygonal to fusiform-shaped cells with abundant, eosinophilic, granular cytoplasm arranged in sheets. The nuclei are round to ovoid, and hyperchromatic. | Randomly distributed occasional spindle cells with blunt ended nuclei. | Smooth muscle actin and desmin positivity; S-100-negative. |
| 4 | Pecoma | No cohesive epithelioid cells with clear to eosinophilic granular cytoplasm. | Variable cytologic atypia and mitotic index; nucleoli, intranuclear pseudo inclusions, multinucleated cells, Touton giant cells and melanin pigment. | HMB-45, SMA, Desmin-positivity. |
| 4 | Xanthoma | Foamy macrophages within dermal papillae covered by acanthotic or verrucous epithelium without atypia. | Presence of overlying verrucous epithelium. | CD68-positive, S100-negative. |
| 5 | Alveolar soft part sarcoma | Proliferation of large polygonal/polyhedral cells with abundant eosinophilic, granular cytoplasm, vesicular nuclei with prominent nucleoli separated by delicate vascular channels and bands of fine connective tissue. | Large vesicular nucleus, 1 or 2 prominent nucleoli, low mitotic figure. Intracytoplasmic rod shaped/ rhomboid shaped crystals. | TFE3-positive, Cathepsin K-positive. |
| 6 | Rosai-Dorfman disease | Sheets of large histiocytic cells with abundant cytoplasm and dense lymphoplasmacytic infiltrate admixed with some neutrophils. | Emperipolesis is a typical distinguishing feature. | S-100, CD68, CD1a positive. |

| | | | | |
|---|---|---|---|---|
| 7 | Primitive non neural Granular Cell Tumour (GCT) | Large ovoid to spindle cells with abundant granular cytoplasm, variable nuclear pleomorphism. | Nuclei are prominent, vesicular with prominent pink nucleoli. | CD10, CD68, D2-40-positive; S-100-negative. |
| 8 | Xanthoma | Foamy macrophages within dermal papillae covered by acanthotic or verrucous epithelium without atypia. | Presence of overlying verrucous epithelium. | CD68-positive, S100-negative. |

**[Table/Fig-5]:** Differential diagnosis of oral lesions with cells having granular cytoplasm.

a few cases. The advantages include a reduction in bleeding and postoperative pain. It is also associated with more rapid healing.

Some authors have also stated that the vaporisation effect on remnant tissues could eliminate GCT cells on the surgical bed, thus hypothetically leading to a lower rate of recurrence [3,5,21]. Lafuente Ibáñez de Mendoza I et al., conducted a multicentric study and a systematic review of oral GCTs in Spain and Brazil [22]. A total of 272 cases of oral GCT were studied. Only 12 cases out of 272 were GCTs of the tongue in children <15 years of age. This study proves the rarity of GCTs of the tongue in the paediatric age group. A high index of suspicion, thorough clinical examination backed by histopathological and IHC studies help us arrive at a diagnosis. Excision is the treatment of choice, and periodic follow-up of these patients is recommended to detect malignant transformations and late recurrences at early stages.

## CONCLUSION(S)

GCT is a rare tumour that occurs on the tongue. The clinicopathological features of this lesion are derived from isolated case reports or case series. Categorising GCTs as benign and malignant is further challenging. GCTs typically manifest in older individuals with the highest prevalence in the fifth and sixth decades of life. However, the present case deviates from the norm and was noted in a 13-year-old child. This exceptionally unusual presentation should prompt the inclusion of GCT in the differential diagnosis of tongue neoplasms in paediatric patients as well.

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