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Case Report

Multifocal Giant Cell Tumor of the Nasal Fossa: Case Report and Literature Review

Edoardo Serafini, MD; Margherita Basso, MD; Claudio Melchiorri, MD; Gianluca Di Massa, MD; Massimo Lupi, MD; Matteo Alicandri-Ciufelli, MD, FACS, FEBORL-HNS; Daniele Marchioni, MD

Giant cell tumors of bone (GCT) are rare soft tissue tumors, that account for 3%–5% of primary bone tumors with <2% occurring in the head and neck. The nasal cavity is a highly unusual site of presentation. We reviewed 15 cases of GCT of nasal cavity and paranasal sinuses. We add 1 case to the literature. The case herein reported, appears to be the second nasal fossa GCT described in the literature and the first documented case with multifocal localization. A case of multifocal GCT of the nasal cavity is described. Although rare in the general population, GCT should be included among the possibilities in the differential diagnosis when evaluating tumors of the head and neck. Management of this particular tumor remains challenging; surgical removal is still the gold standard treatment, preferring a minimally invasive trans-nasal approach to reduce intra and postoperative morbidity.

Key Words: endoscopic transnasal approach, giant cell tumor, nasal fossa, paranasal sinus.

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INTRODUCTION

Giant cell tumors (GCTs) are rare soft tissue tumors that can be found in both superficial and deep soft tissues. They are classified as tumors of intermediate malignancy, with less than 2% occurring in the head and neck. Only a few cases are reported as multicentric, usually involving central and peripheral sites. The prevalent nose and paranasal sinuses localization is represented by the sphenoid sinus,[1] while the nasal cavity is an unusual site of presentation with one case reported in literature.[2] GCT localized into the nasal cavity usually presents with epistaxis, frequent sinus infections, and nasal obstruction. A gold standard for the diagnostic work up is still not defined. MRI is effective in demonstrating soft tissue extension, but CT scan provides a better definition of bone erosion.[3] The optimal management strategy remains controversial: surgical removal seems to be the most employed treatment, with trans-nasal endoscopic approaches replacing more invasive open ones reported in older case reports (Table I).

CASE REPORT

This work was approved by the local institutional review board (IRB). A 51-years-old woman has referred hyposmia, posterior nasal drip, and left nasal respiratory obstruction for 3 months. Endoscopic examination showed a yellowish mass in the left nasal cavity. MRI could not be performed due to metallic dental prostheses, therefore, the patient was addressed to CT scan, showing solid tissue occupying the whole left nasal cavity being composed of multiple nodular areas with moderate contrast enhancement, apparently involving the lamina papyracea, the nasal septum and the region of the middle turbinate (Fig. 1). CT scan images provided a good definition of the lesions themselves and optimal definition of nasal cavity bony limits. Moreover, being the lesions limited to the nasal cavity without any main vascular or intracranial involvement, further imaging examinations were not deemed necessary in the preoperative setting. For the same reason, intraoperative neuronavigation system was not exploited. An incisional biopsy was performed with subsequent histological examination being compatible with GCT. Blood tests did not show any hormonal or ions alteration.

The patient eventually underwent endoscopic transnasal resection of the tumor. The tumor filling the anterior aspect of the nasal cavity was first mobilized and its origin from the lateral nasal wall could be appreciated. After its debulking, endoscopic examination confirmed the presence of 3 different pedicles of origin (at the level of the middle turbinate, lateral nasal wall, and nasal septum) (Fig. 2).

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From the Department of Otolaryngology Head and Neck Surgery (E. S., M.B., C.M., M.A.-C., D.M.), University Hospital of Modena, Modena, Italy; Department of Pathology (G.D.M., M.L.), University Hospital of Modena, Modena, Italy.

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Send correspondence to Margherita Basso, Department of Otorhinolaryngology, Head & Neck Surgery, University Hospital of Modena, Modena, Italy. Email: margherita.basso410@gmail.com

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TABLE I.
Reported Giant Cells Tumor of the Nasal Cavity and Paranasal Sinuses.

Case	Age (Years)	Sex	Symptoms	Worsening of Symptoms	Duration	Site	Type of Surgery	Extent of Resection	Adjuvant Therapy	Follow-Up	Recurrence	Author
1.	32	F	Nasal obstruction		6	Lateral wall of Nasal Cavity	Septoturbinoplasty	Total	n	12	n	Tuluc et al. 2006
2.	29	F	Headache, decrease in vision	Progesterone prescription	0.5	Sphenoid	EETS	Total	n	60	n	Huang et al. 2013
3.	25	F	Headache, optic neuropathy		9	Sphenoid	Craniotomy	Subtotal	RT	168	n	James et al. 1983
4.	16	F	Headache, decrease in vision, diplopia		1.5	Sphenoid	Transeptal biopsy and decompression	Subtotal	RT	96	n	James et al. 1983
5.	19	F	diplopia, progressive optic neuropathy		24	Sphenoid	Craniotomy	Subtotal	RT	134	n	James et al. 1983
6.	20	M	Headache, optic neuropathy, VII cranial nerve paralysis		2	Sphenoid	Craniotomy	Subtotal	RT	12	n	James et al. 1983
7.	29	F	Headache, diplopia, V cranial nerve deficit		22	Sphenoid	Craniotomy	Subtotal	n	60	y	James et al. 1983
8.	19	M	diplopia, headache, eyelid ptosis, pituitary insufficiency		8	Sphenoid	Transsphenoidal biopsy	Subtotal	RT	6	Stable persistence	James et al. 1983
9.	12	F	facial swelling			Maxillary antrum	Radical maxillary resection	Total	n	48	n	Fu et al. 1974
10.	23	F	facial swelling			Maxillary antrum	Radical maxillary resection with orbital exenteratio	Total	n	132	n	Fu et al. 1974
11.	34	F	nasal obstruction, epistaxis, hypophosphatemic osteomalacia		24	Sphenoid sinus	Craniofacial resection	Total	RT	36	n	Battoo et al. 2010
12.	44	F	Headache, VI cranial nerve deficit			Sphenoid	EETS	Subtotal	STRT	23	Stable persistence	Esposito et al. 2006
13.	27	F	Headache, optic neuropathy, nasal obstruction, diplopia		1	Sphenoid	EETS	Subtotal	Denosumab	15	n	Pousti et al. 2020
14.	34	M	Diplopia		0.3	Sphenoid	EETS	Subtotal	Denosumab	7	n	Goto et al 2016
15	24	F	Nasal obstruction, eye swelling		1	Ethmoid	EETS	Total	n	12	y	Li et al. 2017

Duration of symptoms and duration of follow-up are expressed in months.
ETSS = endoscopic trans-nasal sinus surgery; F = female; M = male; n = no; RT = radiotherapy; STRT = stereotactic radiotherapy; y = yes.

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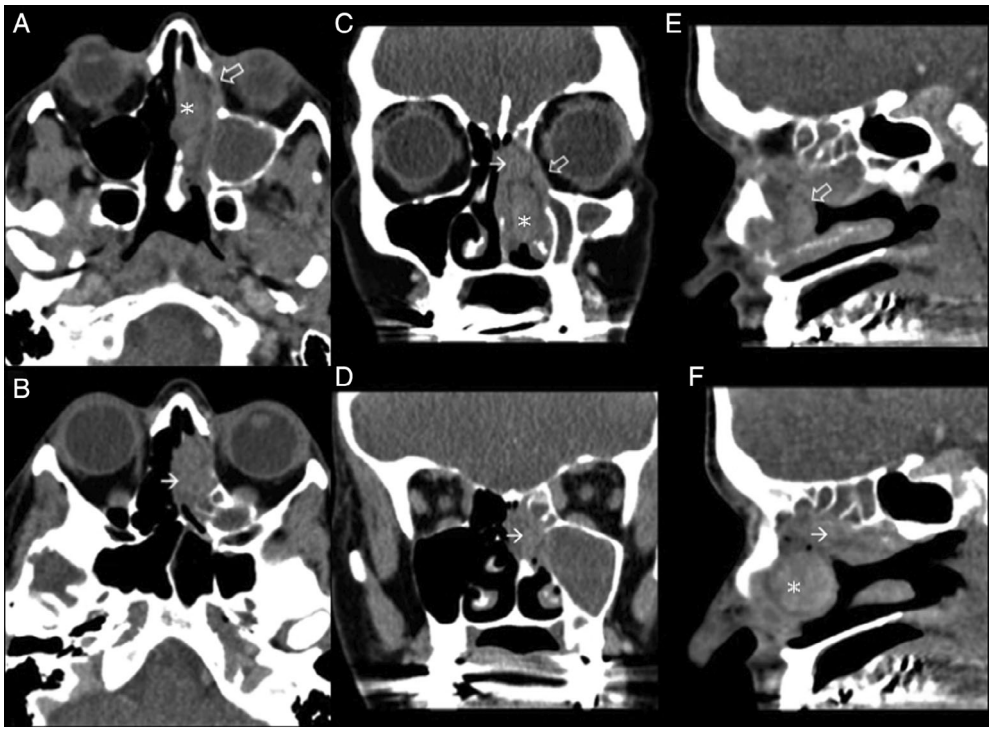


Fig. 1. CT scan showing solid tissue with nodular morphology in the right nasal fossa. In axial scan (A) the mass involving the middle turbinate (white asterisk) and the one originating from the lateral nasal wall (empty white arrow) are clearly distinguishable; the third mass attached to the nasal septum (full white arrow) is evident more cranially (B). The three nodules are fully visible on coronal scan (C); posterior scan reveals only the mass involving the septum (D). The multifocality of the tumor remains detectable also on the sagittal plane (E, F).

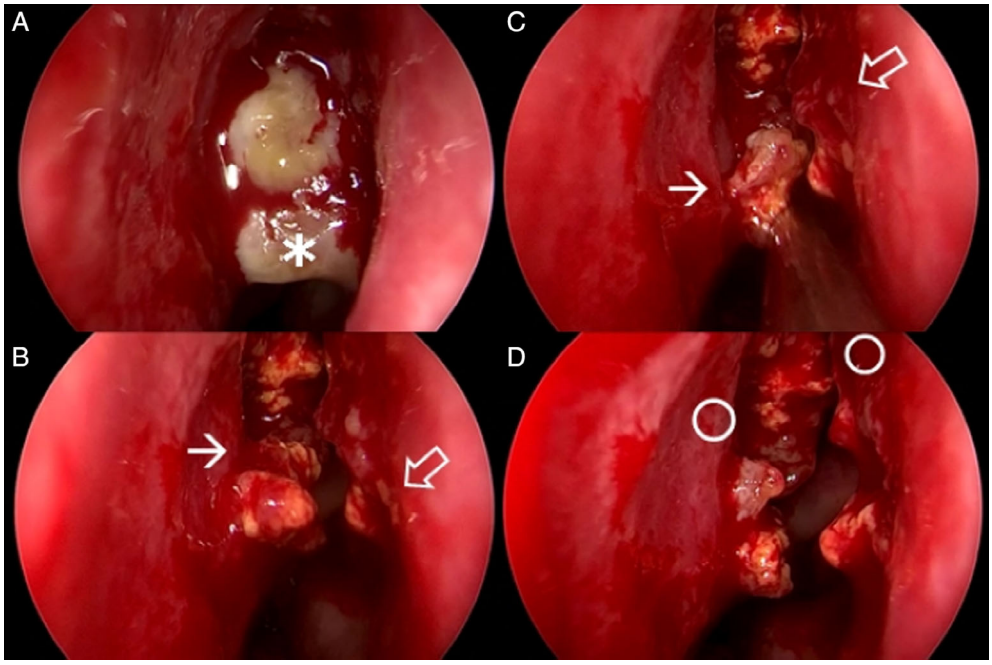


Fig. 2. Multifocal GCT is identified with endoscopic vision of the left nasal cavity; the mass originating from the middle turbinate (white asterisk) is immediately evident (A); once that mass was removed, other two nodular focality were distinguishable: a first one originating from the lateral nasal wall (empty white arrow) and the second one attached to the nasal septum extending posteriorly and cranially in the nasal cavity (full white arrow) (B, C). Figure D shows healthy mucosa (empty circles) adjacent to the tumor localizations, which were sampled for frozen section.

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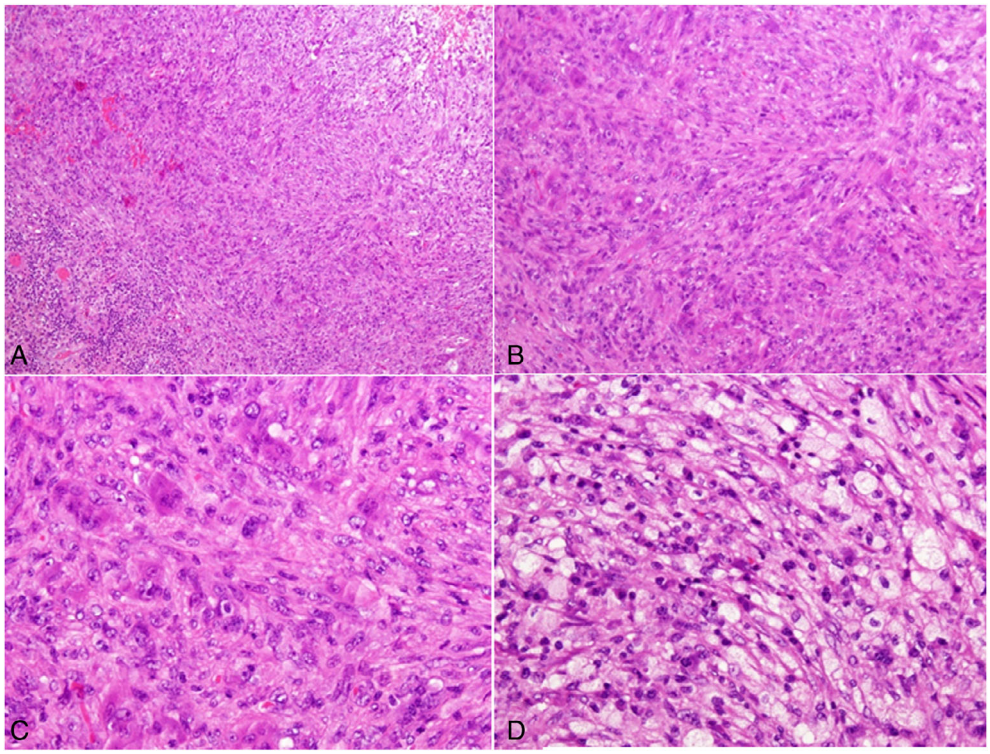


Fig. 3. Histological analysis in hematoxylin–eosin staining; Giant cells in the background of mononuclear components, 100× (A); 400× (B); mitotic figures of the mononuclear component, 400× (C); histiocytic infiltrate, 400× (D).

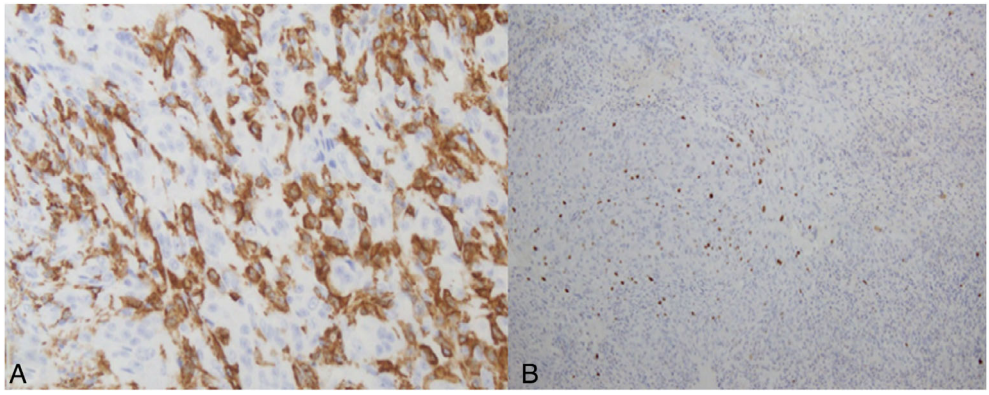


Fig. 4. Immunohistochemical analysis: staining of histiocytes with CD163 (marker of cells from the monocyte/macrophage lineage), 400× (A); MIB1 staining showing low mitotic index, 100× (B).

Complete excision of all 3 lesions was performed separately through middle turbinectomy and subperiosteal dissection without observing bone involvement. After tumor removal, several frozen sections of mucosal samples between the three different localizations were sent, resulting negative for GCT presence. This finding was confirmed at the definitive histological examination, thus proving three different localizations of disease. Hematoxylin–eosin staining analysis showed multinucleated giant cells in a background of mononuclear component made of round, oval, and spindled cells. A histiocytic infiltrate was also highlighted, which is typical of this tumor histotype (Fig. 3). Staining with MIB1 demonstrated poor mitotic rate of tumor cells (Fig. 4), thus confirming the benign nature of the lesion.

Postoperative course was uneventful. The patient was discharged after 48 hours with nasal therapy, consisting of nasal irrigation and daily application of antibiotic ointment. The patient was addressed to clinical follow-up, as an eventual recurrence would be easily detectable at clinical examination. At 20 months follow-up nasal crusting was not observed and no signs of recurrence were detectable.

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DISCUSSION

To our knowledge, this is only the third ascertained case of GCT of nasal cavity reported in the literature and the first one with multifocal extension.[1,2]

Concerning nose and paranasal sinuses district, the greatest part of GCT reported in the literature involves the sphenoid sinus and maxillary sinus (Table I).

Due to the paucity of data, usually in the form of case reports and small or old case series, clear treatment guidelines do not exist regarding nasal and paranasal sinus localization.

GCT comprises 3%–7% of all primary bone tumors most commonly occurring in the epiphyseal–metaphyseal regions of long bones and usually showing a locally aggressive behavior without the tendency to distant metastases. Multifocality in GCT has been observed in other anatomical sites, but never reported in paranasal sinuses or nasal cavity.

Chondroblastoma, chondrosarcoma, and pigmented villonodular synovitis are the most important entities that should be included in the differential diagnosis, which is only obtained through a definitive histological examination due to lack of specific radiological features (the most frequent being an expansive lesion that progressively extends to the adjacent soft tissues). Light microscopic examination of a GCT specimen reveals osteoclast-like giant cells in a background of mononuclear components with no atypical forms. A few studies suggest a correlation between primary bone diseases (e.g., Paget's disease) and the development of GCT.

The histological differential diagnosis should include other processes in which multinucleated giant cells can be found, such as "brown tumor" in hyperparathyroidism, giant cell reparative granuloma (GCRG), fibrous dysplasia, aneurysmal bone cyst or tenosynovial GCTs.[4] In the clinical case reported above, immunohistochemical examination and blood tests confirmed a normal ion and hormonal asset, then allowed to rule out other histological diagnoses. To date, complete surgical resection remains the most employed treatment for GCT, with radiotherapy suggested for cases that could not be addressed by surgery or for residual disease. After the discovery of GCT stromal cells RANKL (receptor activator of nuclear factor kappa-B ligand) overexpression, Denosumab has been proposed in an adjuvant or even neoadjuvant setting even in head and neck GCT, showing a tumor burden reduction upwards to 90%, with minimal side effects.[5]

CONCLUSION

To our knowledge, this is the first case of multifocal GCT of nasal cavity reported in literature. Due to the rarity of disease, a consensus on treatment has not been developed yet and decisions should be made carefully case by case after accurate radiological staging. Surgical removal might still be considered the gold standard of treatment, preferring a minimally invasive trans-nasal approach to reduce intra and post-operative morbidity.

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