Case Report

Primary osteoclast-like giant cell tumor of parotid gland: A rare extraskeletal presentation with diagnostic challenges

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Abstract

Primary osteoclast-like giant cell tumor (OC-GCT) has been rarely described in extraskeletal sites. The diagnosis primarily hinges on the detection of giant cells. However, these giant cells are also seen in many giant cell lesions, thus creating diagnostic confusion and dilemma. Here, we describe a rare case of a 24-year-old male with primary extraskeletal, OC-GCT presenting as a swelling in the right parotid region and highlight its cytological, histological and immunohistochemical characteristics with diagnostic challenges.

Key Words: Extraskeletal GCT, osteoclast-like giant cell, parotid region

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INTRODUCTION

Primary osteoclast-like giant cell tumor (OC-GCT) has been reported in skeletal and extraskeletal sites such as pancreas,[1] urinary bladder,[2] thyroid[3] and liver.[4] It is a rare tumor of the salivary gland with very few histopathologically confirmed cases, which have been reported in world literature.

Twenty-four cases have been described previously in the salivary gland, of which parotid gland involvement was reported in twenty cases,[5-20] followed by submandibular gland involvement in three cases[20-22] and the minor salivary gland in one case.[22] It presents as a rapidly enlarging mass, which may or may not be painful.

CASE REPORT

A 24-year-old male presented with a swelling in the right parotid region for the past 2 years. The swelling had increased in size over the last 6 months. Physical examination revealed a firm, nontender mass measuring 5 cm × 3 cm.

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Radiological findings

Computed tomography scan of the head and neck showed a heterogeneous solid mass arising from the superficial lobe of the right parotid region extending superiorly in the subcutaneous plane of the right temporal region with no bony fixation or erosion, suggesting primary involvement of the parotid gland [Figure 1a].

Cytological findings

Aspiration from the swelling yielded an adequate sample. The Giemsa-stained smears were prepared, which on microscopy were cellular, revealing numerous regularly distributed osteoclast-like giant cells along with mononuclear cells present in clusters and scattered individually. Osteoclast-like giant cells showed multiple nuclei ranging from 5 to 50. The mononuclear cells were of variable shapes and sizes and were round, oval and spindled. Some of these cells had high nuclear-cytoplasmic ratio [Figure 1b]. A cytological diagnosis of a tumor/lesion rich in giant cells was suggested.

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Histopathological findings

The patient underwent right parotidectomy. Grossly, the specimen measured 5 cm × 3.5 cm × 3 cm. Its cut surface showed ill-defined, gray-tan tumor measuring 5 cm × 3 cm × 2.5 cm with focal areas of hemorrhage and congestion [Figure 1c]. The surgical margins were not involved by the tumor.

Microscopic examination revealed a cellular, poorly circumscribed biphasic tumor consisting of numerous regularly distributed osteoclast-like giant cells along with mononuclear cells. The osteoclast-like giant cells had sharp cellular borders with abundant acidophilic cytoplasm and multiple nuclei varying in number from 5 to 50. Their nuclei were round to oval and vesicular with prominent nucleoli. The giant cell nuclei did not show any pleomorphism or atypia.

The mononuclear cells had moderate-to-scant amount of acidophilic cytoplasm with oval-to-spindle-shaped nuclei showing nuclear irregularity, most of the nuclei had vesicular chromatin whereas few mononuclear cell nuclei were hyperchromatic [Figure 1d]. Mitotic activity was low with a count of 0–2 mitosis/10 high-power fields with no atypical mitosis. Stromal hemorrhage was present along with focal areas showing osteoid formation.

Immunohistochemical finding

On immunohistochemical analysis, the osteoclast-like giant cells showed diffuse cytoplasmic positivity for vimentin and CD68. They were negative for cytokeratin (CK), S100 and smooth muscle actin (SMA). Mononuclear cells showed cytoplasmic positivity for vimentin and focal positivity for CD68. The mononuclear cells with hyperchromatic irregular nuclei which were focally present showed positivity for CK. S100 and SMA were negative [Figure 2a-c]. With radiological, cytological, histological and immunohistochemical findings in consideration, a final diagnosis of OC-GCT of the parotid gland was rendered.

DISCUSSION

Primary OC-GCT of the salivary gland was first described in 1984 by Eusebi *et al*. in the parotid gland.[5]

Since then, 24 cases have been described in the salivary gland, of which parotid gland involvement was reported in twenty cases,[5-20] followed by submandibular gland involvement in three cases[20-22] and the minor salivary gland in one case.[2] The tumor is five times more common in males than in females and generally presents between 28 and 92 years of age.[5-22]

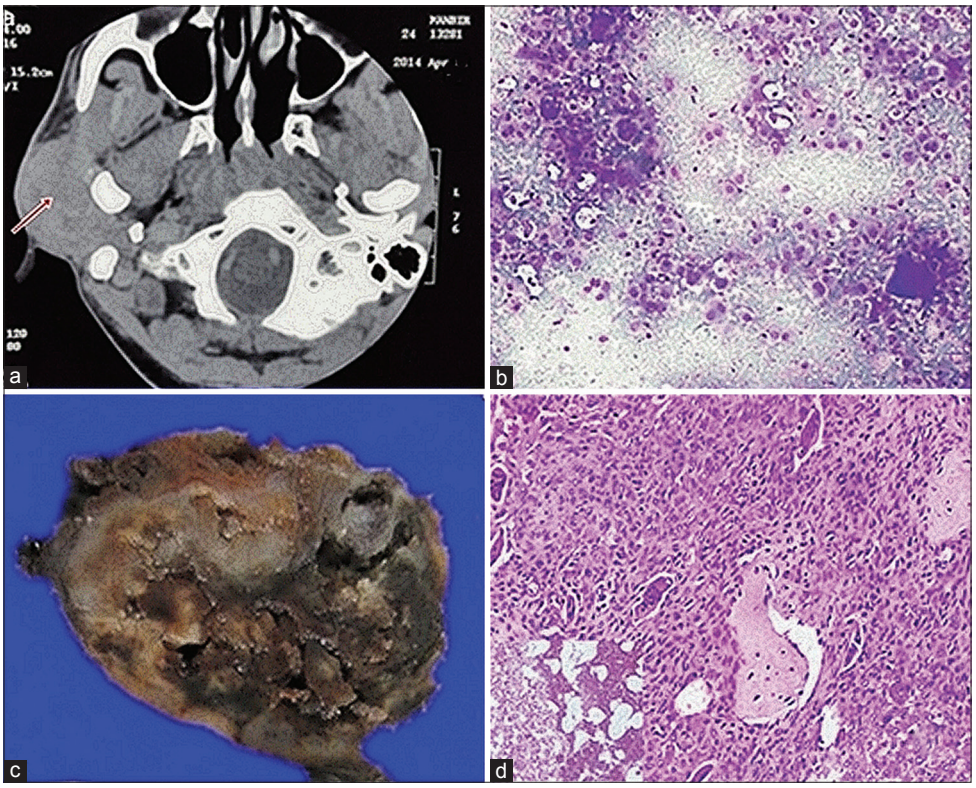

Figure 1: (a) Computed tomography scan of head and neck showing a solid mass arising from the superficial lobe of the parotid gland. No bony fixation or erosion noticed. (b) Numerous regularly distributed osteoclast-like giant cells with oval-to-spindle mononuclear cells (Giemsa stain, ×200). (c) Gross photograph showing an ill-defined, gray-tan tumor with areas of hemorrhage and congestion. (d) Biphasic tumor with osteoclast-like giant cells and mononuclear cells which show nuclear irregularity and hyperchromasia along with foci of osteoid formation (H&E stain, ×400). Inset shows tumor with residual salivary gland tissue (H&E stain, x100)

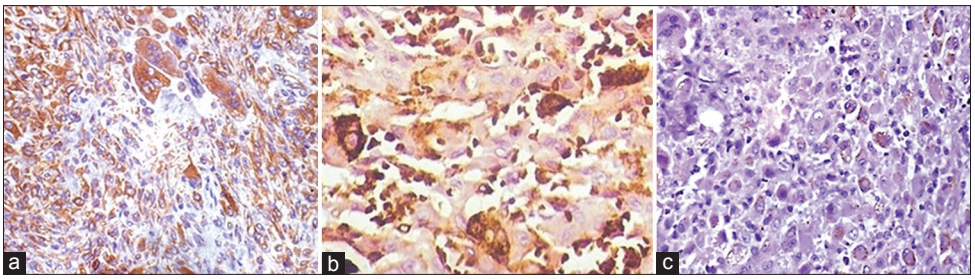

Figure 2: (a) Vimentin positivity in osteoclast-like giant cells and mononuclear cells (IHC stain, ×200). (b) CD68 positivity seen in osteoclast-like giant cells and some mononuclear cells (IHC stain, ×200). (c) Focal cytokeratin positivity in mononuclear cells (IHC stain, ×400)

Table 1: Summary of the previously described osteoclast-like giant cell tumor of the salivary gland cases

Authors (year)	Number of cases	Gender/age	Site	Histopathological diagnosis
Eusebi *et al*.[5]	03	Male/30, male/43, male/52	Parotid	02 case - pure GCT 01 case - GCT with carcinoma ex pleomorphic adenoma
Balogh *et al*.[6]	01	Male/67	Parotid	GCT with infiltrating intraductal carcinoma
Batsakis *et al*.[7]	02	Male/59, male/92	Parotid	01 case - pure GCT 01 case - GCT with high-grade ductal carcinoma
Ellis *et al*.[19]	04	Female/28, male/65, female/70, male/73	Parotid - 03 Submandibular - 01	03 - pure GCT 01 case - GCT with adenocarcinoma
Itoh *et al*.[10]	01	Male/53	Parotid	Pure GCT
Grenko *et al*.[9]	01	Female/66	Parotid	GCT with carcinosarcoma
Donath *et al*.[8]	01	Male/82	Parotid	GCT with carcinoma ex pleomorphic adenoma
Doğusoy *et al*.[20]	01	Female/55	Submandibular	GCT with pleomorphic adenoma
Snyder and Paulino[21]	01	Male/71	Submandibular	GCT with carcinoma ex pleomorphic adenoma
Tse *et al*.[11]	01	Male/75	Parotid	GCT with salivary duct carcinoma
Torabinezad *et al*.[12]	01	Female/35	Parotid	GCT with small component of pleomorphic adenoma
Kadivar *et al*.[13]	01	Male/75	Parotid	GCT with salivary duct carcinoma
Kusafuka *et al*.[22]	01	Male/40	Minor salivary gland	GCT with salivary duct carcinoma
Fang *et al*.[14]	01	Male/43	Parotid	GCT with salivary duct carcinoma
Yang *et al*.[15]	01	Male/57	Parotid	GCT with carcinoma
Wu *et al*.[16]	01	Male/58	Parotid	Pure GCT
Rammeh *et al*.[17]	01	Female/51	Parotid	Pure GCT
Pasricha *et al*.[18]	01	Male/62	Parotid	GCT with salivary duct carcinoma
Present case	01	Male/24	Parotid	Pure GCT

GCT: Giant cell tumor

In the previously reported cases, the association of primary OC-GCT of the salivary gland with coexisting benign neoplasm (pleomorphic adenoma in two cases)[12,20] and malignant neoplasms (carcinoma in 13 cases)[5-9,11,13-15,18,19,21,22] has been reported. The tumor is also known to exist as a "pure form" without any associated neoplasm (nine cases).[5,7,10,16,17,19] The review of previous cases is presented in Table 1.[5-22]

In the present case, the radiological evaluation suggested the presence of a tumor arising from the parotid. No soft tissue or bony involvement was seen ruling out any primary tumor that may arise from these sites, which may involve the salivary gland.

Cytological findings in the present case revealed a bimodal cell population with benign-appearing osteoclast-like giant cells and pleomorphic population of mononuclear cells. Histopathology confirmed the presence of a pure form of OC-GCT of parotid gland with a biphasic cell population consisting of benign-appearing osteoclast-like giant cells, the presence of which raised a possibility of an underlying OC-GCT of the bone and mononuclear cells. The OC-GCT of bone has numerous regularly distributed osteoclast-like giant cells in a mononuclear cell population. However, histopathology of these mononuclear cells is unlike that of OC-GCT of the salivary gland, in which nuclear pleomorphism and hyperchromasia are present, and it is an important finding to differentiate the two.[5,9,11,15,20]

A possibility of giant cell granuloma was also considered as needle aspiration showed many osteoclast-like giant cells with mononuclear cells with few atypical cells, however unlike OC-GCT of the salivary gland, giant cell granuloma is smaller in size with fewer and smaller nuclei in the osteoclast-like giant cells.[8]

A possibility of giant cell carcinoma or undifferentiated carcinoma with anaplastic giant cells needs to be excluded which histologically shows an anaplastic tumor with bizzare highly pleomorphic giant cells whereas in OC-GCT of the salivary gland, has a bland appearance.

Possibility of soft tissue tumors with giant cells was also ruled out histopathologically along with primary epithelial tumor of the salivary gland.

Immunophenotypically, in the present case, both giant cells and mononuclear cells expressed CD68 and vimentin. Focal cytoplasmic expression of CK in mononuclear cells was seen, which has been noted in the previously reported cases.[6,7,11,17,18] This expression of epithelial marker is not found in the mononuclear cells of OC-GCT of the bone and is seen rarely in OC-GCT of soft tissue. In the present case, clinical and radiological details and the presence of the tumor in the substance of parotid gland excluded the possibility of OC-GCT of bone.

GCT-like neoplasm in other parenchymal organs has been described, but it has been classified as "undifferentiated carcinoma with osteoclast-like giant cells."[11] OC-GCT of the salivary gland is not included in the above category, and compared to undifferentiated carcinoma of the salivary gland, OC-GCT of the salivary gland shows male predominance, lesser degree of cellular atypia and a favorable 5-year survival rate.[15]

Some authors believe that OC-GCT of the salivary gland is a carcinoma and prefer the terminology of "osteoclast-type giant cell carcinoma" instead of "undifferentiated carcinoma with osteoclast-like giant cells"[11,13] to avoid confusion with a high-grade carcinoma because of the following reasons:

- In many of the previously reported cases, there is an association with a carcinomatous component which many a times may be very small, necessitating a diligent search
- Expression of both epithelial and histiocytic markers by the mononuclear cells
- The microsatellite pattern of the giant cell tumor component is more akin to carcinomas reported by some studies.[11]

However, in spite of all the efforts, the origin of this tumor still remains controversial. Even though epithelial marker expression in mononuclear cells has been reported, in some of the cases,[5,15,16,20] no epithelial marker expression was found; adding further to the existing diagnostic dilemma.

Even electron microscopic studies have suggested histiocytic[5] origin in some cases, but some have suggested an epithelial origin of the mononuclear cell.[6]

Despite the controversy surrounding the tumor origin, treatment involves a complete excision of the tumor with adequate surgical margin which warrants a long disease-free survival even in cases with co-existent carcinomatous foci.[16] Postoperative radiotherapy is also advised under conditions where negative surgical margins may only be achieved with increased morbidity or if surgery has been contraindicated.[16]

CONCLUSION

To conclude, identification of OC-GCT of the salivary gland on histopathology or cytology should warrant extensive sampling to rule out any associated neoplasm, especially carcinomatous foci. In addition, a detailed evaluation is needed to establish the tumor origin and histogenesis.

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Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Jeffrey I, Crow J, Ellis BW. Osteoclast-type giant cell tumour of the pancreas. J Clin Pathol 1983;36:1165-70.
2. Wu PJ, Su CK, Li JR, Yang CR, Chen CL. Osteoclast-like giant cell carcinoma of the urinary bladder. J Chin Med Assoc 2009;72:495-7.
3. Cibull ML, Gray GF. Ultrastructure of osteoclastoma-like giant cell tumor of thyroid. Am J Surg Pathol 1978;2:401-5.
4. Park CS, Kim JE, Chang MS. Fine needle aspiration cytology of osteoclast-like giant cell tumor of the liver: A case report. Korean J Cytopathol 1999;10:79-84.
5. Eusebi V, Martin SA, Govoni E, Rosai J. Giant cell tumor of major salivary glands: Report of three cases, one occurring in association with a malignant mixed tumor. Am J Clin Pathol 1984;81:666-75.
6. Balogh K, Wolbarsht RL, Federman M, O'Hara CJ. Carcinoma of the parotid gland with osteoclastlike giant cells. Immunohistochemical and ultrastructural observations. Arch Pathol Lab Med 1985;109:756-61.
7. Batsakis JG, Ordonez NG, Sevidal PA Jr., Baker JR. Osteoclast-type giant cell neoplasms of the parotid gland. J Laryngol Otol 1988;102:901-4.
8. Donath K, Seifert G, Röser K. The spectrum of giant cells in tumours of the salivary glands: An analysis of 11 cases. J Oral Pathol Med 1997;26:431-6.
9. Grenko RT, Tytor M, Boeryd B. Giant-cell tumour of the salivary gland with associated carcinosarcoma. Histopathology 1993;23:594-5.
10. Itoh Y, Taniguti Y, Arai K. A case of giant cell tumor of the parotid gland. Ann Plast Surg 1992;28:183-6.
11. Tse LL, Finkelstein SD, Siegler RW, Barnes L. Osteoclast-type giant cell neoplasm of salivary gland. A microdissection-based comparative genotyping assay and literature review: Extraskeletal giant cell tumor of bone or osteoclast-type giant cell carcinoma? Am J Surg Pathol 2004;28:953-61.
12. Torabinezad S, Kumar PV, Hashemi SB, Rahimi A. Osteoclastomalike giant cell tumor of the parotid gland: Report of a case with fine needle aspiration diagnosis. Acta Cytol 2006;50:80-3.
13. Kadivar M, Nilipour Y, Sadeghipour A. Osteoclast-like giant-cell tumor of the parotid with salivary duct carcinoma: Case report and cytologic, histologic, and immunohistochemical findings. Ear Nose Throat J 2007;86:628-30.
14. Fang X, Hicks DG, Hicks W Jr., Zhang S. Osteoclastlike giant cell tumor of the salivary gland. Ann Diagn Pathol 2009;13:114-8.
15. Yang JW, Kim HC, Lee JH, Lee JS, Kim DC, Song DH, *et al*. Osteoclast-like giant cell tumor of parotid gland with a carcinomatous component: A case report. Korean J Pathol 2012;46:297-301.
16. Wu CJ, Wu PH, Chu ST, Yu WW, Chen PC. Features of a giant cell tumour of the parotid gland: A case report. Oncol Lett 2013;6:829-832.
17. Rammeh S, Hergli I, M'farrej MK, Znaidi N, Nechi S, Zermani R.

Osteoclast-type giant cell tumor of the parotid gland. Rev Stomatol Chir Maxillofac Chir Orale 2014;115:185-7.
18. Pasricha S, Gandhi JS, Mehta A, Gupta G, Pradhan T. Low to intermediate grade salivary duct carcinoma associated with osteoclast like-giant cell tumor of parotid gland: A rare case with distinct pathological features. J Cancer Res Ther 2013;9:314-6.
19. Ellis GL, Auclair PL, Gnepp DR. Surgical Pathology of the Salivary Glands. Vol. 25. Philadelphia: WB, Saunders; 1991. p. 490-509.
20. Doğusoy G, Ozbay G, Girişken G, Dervişoğlu S. Giant cell tumor of major salivary glands in association with pleomorphic adenoma. Arch Hell Med 1999;16:380-2.
21. Snyder ML, Paulino AF. Pathologic quiz case: An unusual salivary gland tumor. Arch Pathol Lab Med 2000;124:1559-60.
22. Kusafuka K, Nakamura S, Asano R, Kamijo T, Iida Y, Onistuka T, *et al.* Osteoclast-type giant cell tumor of minor salivary gland with mucin-rich salivary duct carcinoma: A case report of unusual histology with immunohistochemical analysis. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2010;109:870-7.