Indian Journal of Surgical Oncology (March 2019) 10(1):61–64
https://doi.org/10.1007/s13193-018-0822-y

CASE REPORT

Carcinosarcoma of Submandibular Salivary Gland with a Rare Sarcomatous Variant

Shalini Bhalla[1] · Naseem Akhtar[2] · Puneet Prakash[2] · Malti Kumari[1] · Madhu Mati Goel[1]

Received: 11 July 2018 / Accepted: 17 October 2018 / Published online: 31 October 2018

Introduction

Mixed malignant tumors of salivary gland are uncommon tumors of the salivary gland. They can be of three types, namely carcinoma ex-pleomorphic adenoma where only the epithelial component is malignant and arises in an existing pleomorphic adenoma. Second is metastasizing pleomorphic adenoma and lastly where both epithelial and mesenchymal components are malignant also known as carcinosarcoma [1]. We report a case of submandibular salivary tumor in a 50-year-old male arising in a long-standing submandibular swelling.

Case Report

The 50-year-old male presented with a history of long-standing submandibular swelling, initially a small lump in the right submandibular region. There was a progressive slow increase in the size of swelling. There was no history of pain, nonhealing ulcer, spontaneous decrease in size, or any other associated swelling. On examination, a 7 × 5-cm nontender mobile lump was palpable in the right submandibular area. A CECT scan revealed a 70 × 46-mm large lobulated heterogeneously enhancing mass in the right submandibular and mid cervical region (Fig. 1). Fascial planes with carotid artery were maintained. Multiple adjacent confluent heterogeneous space-occupying lesion, largest measuring 31 × 22 mm Rt. IJV, thrombosed. A fine-needle aspiration cytology (FNAC) was done and a diagnosis of adenocarcinoma (NOS) was rendered. Based on this report, an excision of the submandibular gland was done along with right neck dissection.

Pathologic Findings

The FNAC revealed cellular smears comprising clusters of loosely cohesive atypical epithelial cells against a hemorrhagic background. The atypical epithelial cells had enlarged overlapping nucleolated nuclei with moderate amount of cytoplasm, and at places, there was cytoplasmic vacuolation. No other tissue component was seen. The preoperative operative diagnosis was adenocarcinoma (NOS) (Fig. 2). The patient underwent surgery. The resected right submandibular gland received with attached skin was bosselated surface, measuring 10 × 6.5 × 4.2 cm and the overlying skin measured 7 × 6.5 cm. On cut surface revealed a partially encapsulated grayish white growth measuring 9 × 6 × 4 cm, firm in consistency (Fig. 3). Growth was infiltrating but no skin surface ulceration was present. The right neck dissection measured 10 × 7 × 3 cm and 29 lymph nodes were found. Histologically, the tumor was composed of two malignant intermixed components comprising of malignant epithelial component with adenocarcinoma in the form of glandular and acinar patterns and foci of squamous cell carcinoma (Fig. 4). The malignant mesenchymal component was composed of pleomorphic spindle cells arranged in haphazard sheets, vague storiform pattern and short fascicles, and large number of bizzare tumor cells and tumor giant cells with multiple hyperchromatic irregular nuclei which were interspersed. Mitotic activity with atypical mitosis was present. Immunohistochemical studies showed cytokeratin positivity in the both the malignant epithelial glandular and squamous areas. The sarcomatoid areas showed diffuse vimentin and CD68 positive (Fig. 5). The Ki67 proliferation index was 25%. GFAP, p63, SMA, desmin, and S100 were negative.

Manuscript was not presented as part of any meeting.

✉ Shalini Bhalla
bhalashalini@gmail.com

[1] Department of Pathology, King George's Medical University, Lucknow, Uttar Pradesh, India

[2] Department of Surgical Oncology, King George's Medical University, Lucknow, Uttar Pradesh, India

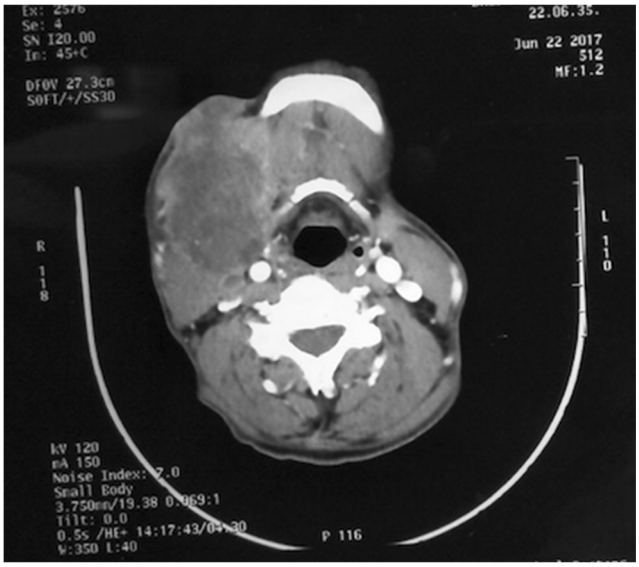

Fig. 1 CECT of the patient showing heterogeneously enhancing lesion in the rt. submandibular region with maintained fascial planes with the carotid artery and thrombosed Rt. IJV (white arrow)

Multiple areas were examined, before a small focus of pleomorphic adenoma was found with surrounding stromal hyalinization and merging with surrounding stroma. Twelve of the 29 lymph nodes had metastatic tumor.

Discussion

Salivary gland malignancies are uncommon and account for around 0.3% of all malignancies and around 2–7% of head and neck neoplasms [2]. Carcinosarcoma of the salivary gland is an extremely rare tumor comprising 0.4% of all salivary gland tumors. The commonest site for the tumor is parotid gland (approx. 65%), followed by submandibular gland (19%) and sublingual gland (14%). These tumors have a wide range of presentation from 14 to 87 years with mean age of presentation at 58 years [3]. The clinical presentation is usually

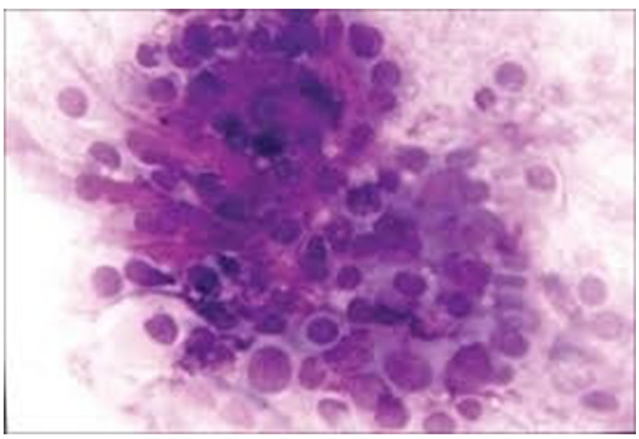

Fig. 2 FNAC of submandibular gland: Sheets of atypical epithelial cells with enlarged overlapping nuclei and variable cytoplasm

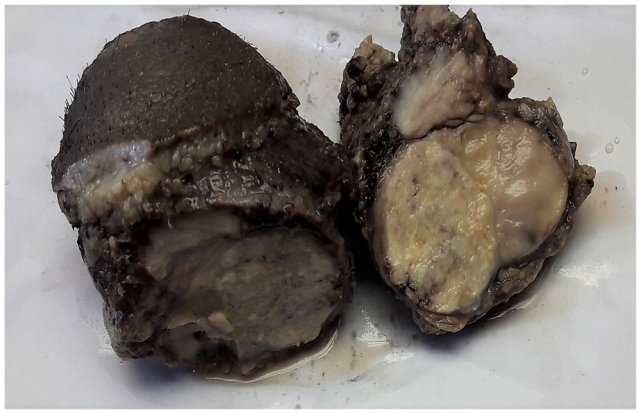

Fig. 3 Gross photograph of submandibular salivary gland showing whitish firm growth with overlying skin intact

a swelling in the region of the salivary gland with associated pain in some cases. The duration of symptoms is usually short; however, it can occur in a long-standing swelling. In our case, the history was of a long-standing submandibular swelling with gradual increase in size in the last 30 years.

Fine-needle aspiration cytology is a cost-effective outpatient procedure for early diagnosis of salivary gland lesion. It helps triage patients for early surgical treatment. However, the cytological diagnosis of carcinosarcoma is rare as the cytomorphological features overlap with other high-grade salivary gland tumors [4]. In this case, the FNAC smears were cellular; however, only the malignant epithelial component was established. The mesenchymal component was missed possibly due to sampling errors.

In carcinosarcoma, the malignant epithelial component is composed of poorly differentiated adenocarcinoma, salivary duct carcinoma, or squamous cell carcinoma. Adenoid cystic carcinoma, neuroendocrine carcinoma, and mucoepidermoid carcinoma have also been reported [1, 3]. The mesenchymal components are usually either osteosarcoma or chondrosarcoma. Fibrosarcoma and myxosarcoma have been reported occasionally while rhabdomyosarcoma and malignant fibrous histiocytoma rarely [5–7]. Reports of admixture of tumor types like chondrosarcoma and undifferentiated sarcoma reminiscent of fibrosarcoma or neurofibrosarcoma have also been done [8]. Extensive literature search has shown that malignant fibrous histiocytoma or undifferentiated pleomorphic sarcoma as referred to the current WHO classification of soft tissue tumors has previously been reported in only three cases [9–11]. All cases have arisen de novo, two in the parotid gland and only one in the submandibular gland. The malignant epithelial component in these cases was squamous cell carcinoma, undifferentiated carcinoma, and salivary duct carcinoma respectively. Our case to the best of our knowledge is the only case where the uncommon sarcomatous component of carcinosarcoma has arisen from a pre-existing pleomorphic adenoma in the submandibular gland. Immunohistochemical findings have been reported for the epithelial component to be

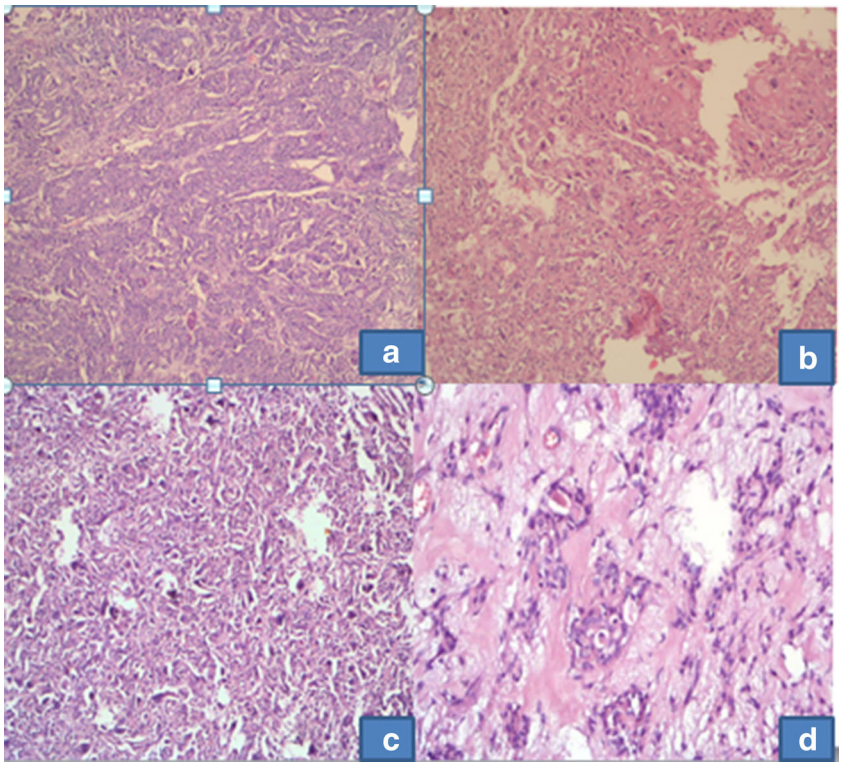

Fig. 4 **a** Photomicrograph showing high-grade adenocarcinoma (H&E, × 10). **b** Photomicrograph showing area of squamous cell carcinoma at the top with underlying sarcomatous area (H&E, × 10). **c** Photomicrograph showing undifferentiated pleomorphic sarcomatous area with interspersed multinucleated tumor giant cells. d. Photomicrograph showing area of pre-existing pleomorphic adenoma (H&E, × 10)

cytokeratin and EMA positive while vimentin, S-100, smooth muscle actin, desmin, p63, and others depend on the malignant mesenchymal component. In the current case, the epithelial component was cytokeratin positive and mesenchymal component was vimentin and CD68 diffuse positive.

Mode of metastasis can be either hematogenous or lymphatic. Most common site of distant metastasis is the lung followed by the bone, liver, and brain [5]. Radiology helps in identifying extent of disease and planning of surgery. Cervical metastasis in this case was seen in 12 nodes with both components present.

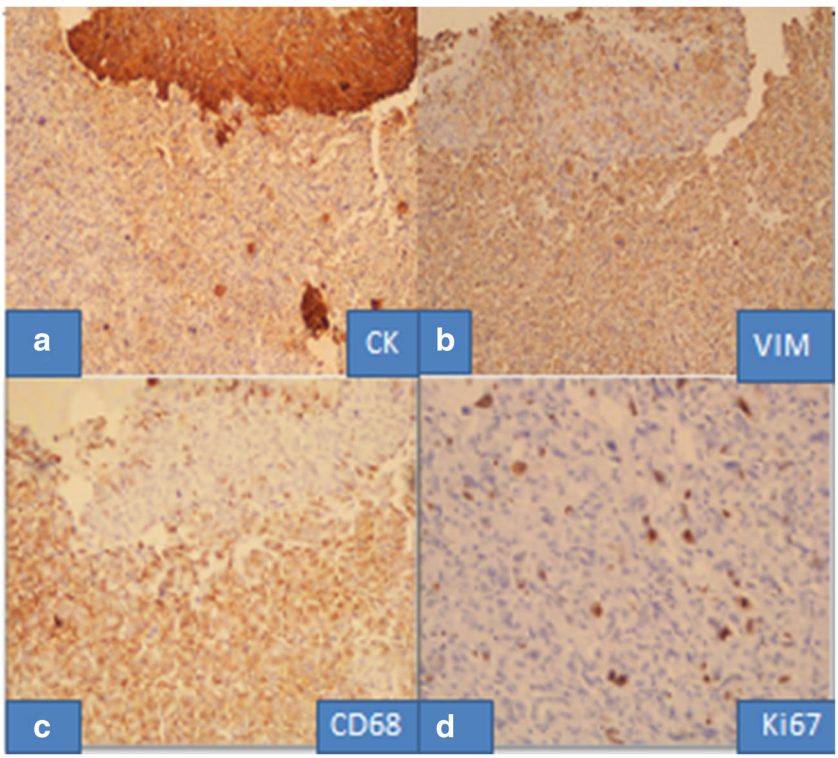

Fig. 5 **a** Immunostain for CK antibody showing strong positive reactivity in the squamous cell carcinoma (SCC) (× 10). **b** Vimentin stain demonstrating diffusely positive tumor cells in the sarcomatous area (× 10). **c** Immunostain for CD68 showing diffuse positivity in sarcomatous area and SCC area is negative (× 10). **d** Immunostain for Ki67 from the undifferentiated pleomorphic sarcoma showing positivity in some tumor cells

Carcinosarcomas are thought to arise from pleomorphic adenomas, and in approximately 33% of cases, a preexisting history or histological confirmation of pleomorphic adenoma is present and if it was absent, it arises de novo [12]. A common clonal origin of the tumor is favored for both components. Modified myoepithelial cell is considered the common precursor cell [13]. Fowler et al. studied the mutational profile of these tumors and found that similar patterns of allelic losses with sarcomatous areas accumulating more mutations suggesting that more number of genetic hits [14]. This has also been supported with other studies and expression of Ki67 is a prognostic marker and the clinical behavior of it is closely related to carcinomatous component [15, 16].

The treatment of carcinosarcoma is radical surgery. This may be followed by radiotherapy although no definite advantage in terms of increased survival has been found [6]. In our case, wide local excision of the tumor along with left radical neck dissection was done and no further treatment was given. Patient on follow-up for the last 12 months is disease free. Although overall survival cases of carcinosarcoma are 29.3 months and 23% have a survival-free period from 5 months to 19 years [17], they are considered as aggressive tumors with a poor 5-year survival rates [18, 19].

Conclusion

Carcinosarcoma is a rare salivary gland malignancy which can arise de novo or from pre-existing pleomorphic adenoma. Both epithelial and mesenchymal components are malignant. Mesenchymal component is usually chondrosarcoma or osteosarcoma. According to the authors, undifferentiated pleomorphic sarcoma as the only sarcomatous component of carcinosarcoma arising in a preexisting pleomorphic adenoma of the submandibular gland has not been reported earlier. Mainstay of treatment here was surgery with a disease-free period of 12 months. Follow-up studies are needed in these uncommon tumors to develop defined protocols.

References

1. Gnepp DR (1993) Malignant mixed tumors of the salivary gland: a review. Pathol Annu 28:279–328
2. McHugh JB, Visscher DW, Barnes EL (2009) Update on selected salivary gland neoplasms. Arch Pathol Lab Med 133(11):1763–1774. https://doi.org/10.1043/1543-2165-133.11.1763.
3. Gnepp DR (2005) Carcinosarcoma. In: Barnes L, Eveson JW, Reichart P, Sidransky D (eds) World Health Organization Classification of Tumours, Pathology and genetics of Head and/neck Tumours. IARC Press, Lyon, p 244
4. Naoyo I, Takako K, Masaki M, Hideki M, Makoto O et al (2014) Cytological features of Carcinosarcoma ex pleomorphic adenoma of the parotid gland: a case report. Acta Cytol 58:419–426
5. Stephen J, Batsakis J, Luna MA, von der Heyden U, Byers RM (1986) True malignant mixed tumors (carcinosarcoma) of salivary glands. Oral Surg Oral Med Oral Pathol 61:597–602
6. Gandour-Edwards RF, Donald PJ, Vogt PJ, Munn R, Min KW (1994) Carcinosarcoma (malignant mixed tumor) of the parotid: report of a case of pure rhabdomyosarcoma component. Head Neck 16:379–382
7. Keh S, Tait A, Ahsan F (2011) Primary carcinosarcoma of the parotid gland. Clin Pract 1:e117. https://doi.org/10.4081/cp.2011.e117
8. de la Torre M, Larssson E (1995) Fine–needle aspiration cytology of carcinosarcoma of the parotid gland: cytohistological and immunohistochemical findings. Diagn Cytopathol 12:350–353
9. Latkovich P, Johnson RL (1998) Carcinosarcoma of the parotid gland: report of a case with cytohistologic and immunohistochemical findings. Arch Pathol Lab Med 122(8):743–746
10. Tomas D, Vagic D, Bedekovic V, Kruslin B (2014) Carcinosarcoma *de novo* of the parotid gland with unusual sarcomatous component. Braz J Otorhinolaryngol 80:364–365
11. Hyo JA, Hye JB, Jin PK, Min HK, Dae HS (2018) Fine-needle aspiration cytology of carcinosarcoma in the salivary gland: an extremely rare case report. J Pathol Transl Med 52(2):136–139. https://doi.org/10.4132/jptm.2017.07.27
12. Feng D, Fidele NB, Agustin MM, Jian G, Bourleyi SI, Augustin L, Olivier NK (2015) Carcinosarcoma of parotid gland (malignant mixed tumor). Ann Maxillofac Surg 5:240–243
13. Carson HJ, Tojo DP, Chow JM, Hammadeh R, Raslan WF (1995) Carcinosarcoma of salivary glands with unusual stromal components. Report of two cases and review of literature. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 79(6):738–746
14. Fowler MH, Fowler J, Ducatman B, Barnes L, Hunt JL (2006) Malignant mixed tumors of the salivary gland: a study of loss of heterozygosity in tumor suppressor genes. Mod Pathol 19(3):350–355
15. Götte K, Riedel F, Coy JF, Spahn V, Hörmann K (2000) Salivary gland carcinosarcoma: immunohistochemical molecular genetic and electron microscopic findings. Oral Oncol 36:360–366
16. Xin W, Paulino A (2002) Prognostic factors in malignant mixed tumors of the salivary glands: correlation of immunohistochemical markers with histologic classification. Ann Diagn Pathol 6(4):205–210
17. Gnepp DR, Wening BM (1991) Malignant mixed tumors. In: Ellis GL, Auclair PL, Gnepp DR (eds) Surgical pathology of the salivary glands. WB Saunders Co, Philadelphia, pp 357–363
18. Tortoledo ME, Luna MA, Batsakis JG (1984) Carcinomas ex pleomorphic adenoma and malignant mixed tumors. Arch Otolaryngol 110:172–176
19. Wahlberg P, Anderson H, Biorklund A et al (2002) Carcinoma of the parotid and submandibular glands-a study of survival in 2465 patients. Oral Oncol 38:706–713