SALIVARY GLAND DUCT CARCINOMA: A CASE REPORT

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ABSTRACT

Salivary gland duct carcinoma (SDC) is an uncommon high-grade and aggressive malignancy with a low rate of incidence, comprising approximately 9% of all salivary gland malignancies[1]. This malignancy has a poor prognosis and predilection for recurrence and distant metastasis [2,3,4]. SDC is found most often in the parotid gland in men over the age of 50. Frequent reported symptoms include a rapidly growing parotid gland mass accompanied by facial nerve paralysis [6,7,8]. Because of the difficulty in distinguishing benign and malignant salivary gland tumors, clinical findings offer limited information in the assessment of changes in the parotid gland [9]. Several findings in the literature suggest the use of pre-operative fine needle aspiration as a valuable method of clinical management of the malignancy and subsequent chance for long term survival [8,10]. Immunohistochemical analysis can be used to make a diagnosis of SDC by distinguishing it from other salivary gland malignancies. In this report a case of salivary duct carcinoma is presented in which a fine needle aspirate was performed. The cytologic and histologic features are described, along with additional immunohistochemical analysis to further confirm the diagnosis of this rare primary salivary duct malignancy.

Keywords: *SDC;Fine Needle Aspirate;IHC; Cribiform*

1. CASE REPORT

The patient is a 50 year old male with a history of recent onset of facial nerve paralysis. The diagnostic imaging revealed findings consistent with a left parotid gland mass. A fine needle aspirate was performed, in which 30 ml of clear fluid and two small tissue pieces were collected and placed in Cytolyte solution. A Millipore filter preparation was prepared along with two cell block preparations. The results of the pre-operative fine needle aspirate were suggestive of adenocarcinoma.

A total parotidectomy was subsequently performed. Several specimens were submitted for pathologic diagnosis. The following histologic specimens were submitted: 1) left parotid gland, 2) left cervical lymph nodes, 3) masseter muscle, 4) four left modified dissection lymph nodes, 5) nerve and fibroconnective tissue, and 6) one left submandibular lymph node. Immunohistochemical stains for Androgen Receptor and Her-2/neu were also performed.

2. CYTOLOGIC FINDINGS

The fine needle aspirate on Millipore preparation revealed a hypercellular and monomorphic specimen consisting of polygonal and columnar epithelial cells arranged in cohesive clusters and flat sheets. Cribiform and micropapillary patterns were observed in many of the sheet arrangements. Scattered single- lying tumor cells were also identified, which indicates the loss of cellular cohesion. The nuclei are described as large and round to oval in shape, with abundant cytoplasm, finely granular chromatin and prominent nucleoli. Nuclear pleomorphism and hyperchromasia were moderate. Cytoplasmic vacuoles were occasionally present.

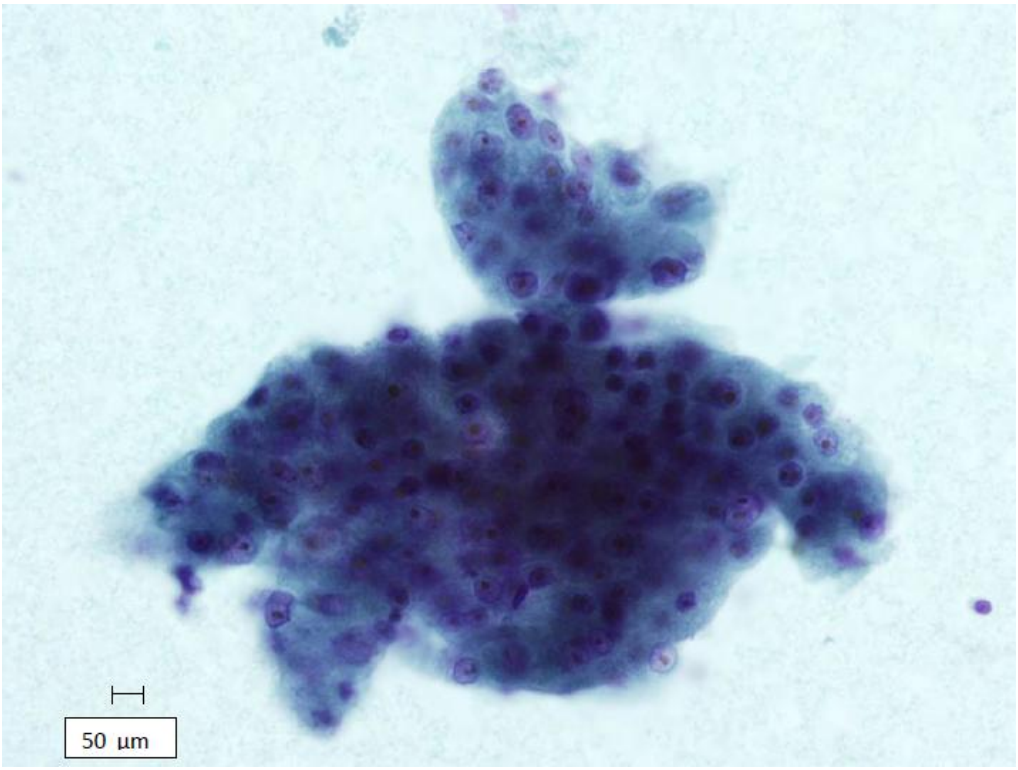

Figure 1: Millipore Preparation, 40x magnification. Micropapillary cluster of cells with nuclei containing prominent nucleoli.

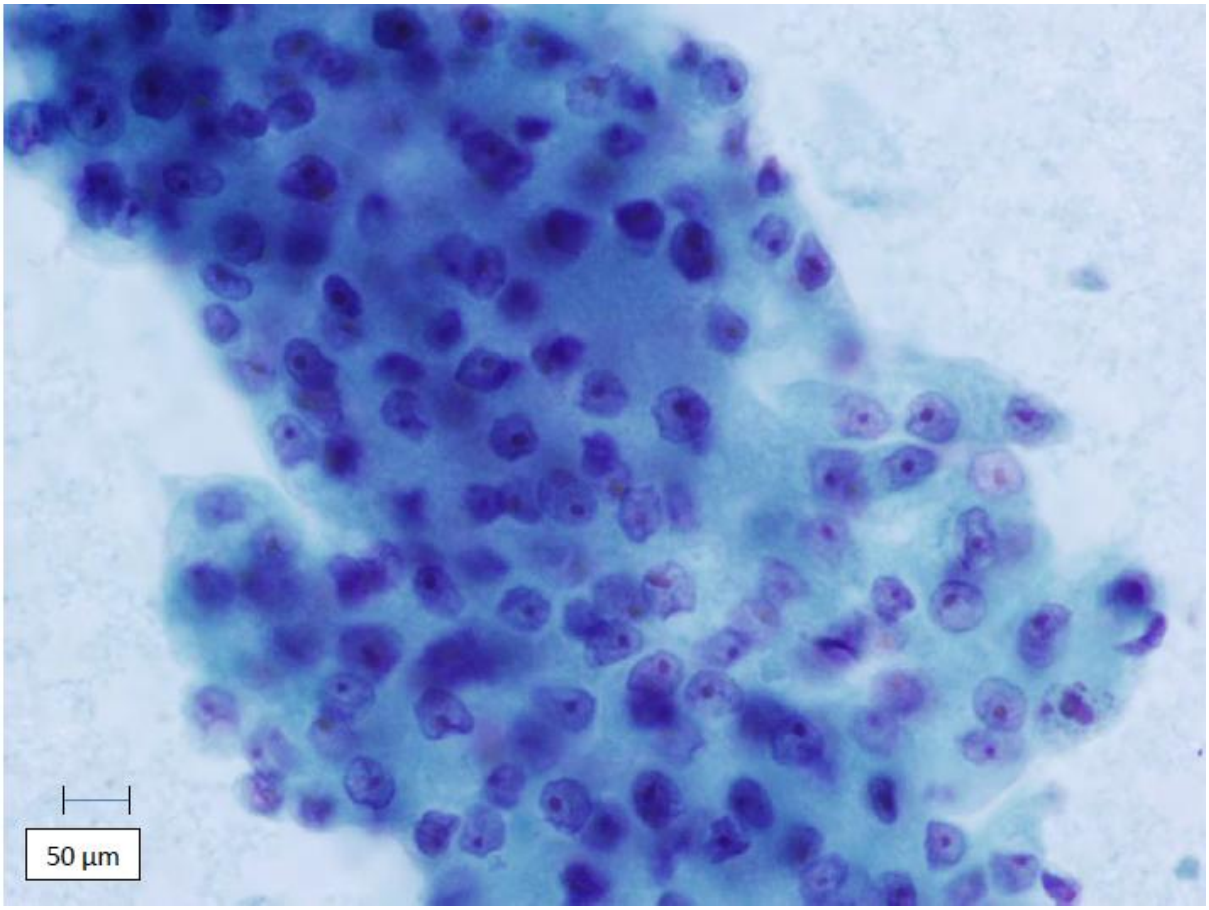

Figure 2: Millipore preparation, 60x magification. Sheet of malignant ductal cells; moderate nuclear pleomorphism, fine granular chromatin, prominent nucleoli. Moderately granular cytoplasm with vacuoles.

3. HISTOLOGIC FINDINGS

The parotid was received in formalin measuring 8.4x4x2.6 cm, tan-yellow, and slightly fragmented. Sectioning of the mass revealed in the mid-distal portion of the gland two tan-white, well-defined masses separated by approximately 0.4 cm of soft tissue. The smaller mass measured 0.5x.05x0.4 cm and the larger measuring 1.2x1x0.8 cm. Microscopic findings revealed well-defined islands of epithelial cells in a cribiform pattern. The cribiform pattern is characterized by a thin layer of neoplastic epithelial cells along the periphery of the cyst. Small nests of epithelium were found adjacent to cystic tumor nodules. The tumor cell morphology was consistent with the findings on the pre-operative fine needle aspirate, with round to oval nuclei, prominent nucleoli, abundant cytoplasm, and moderate nuclear pleomorphism. No tumor necrosis was identified.

Metastasis was also detected in nerve and fibroconnective tissue and masseter muscle. The left cervical lymph nodes, left modified neck dissection lymph nodes, and left submandibular lymph node were all negative for malignancy. Histologic examination revealed microscopic findings consistent with those of the fine needle aspirate and parotid tissue.

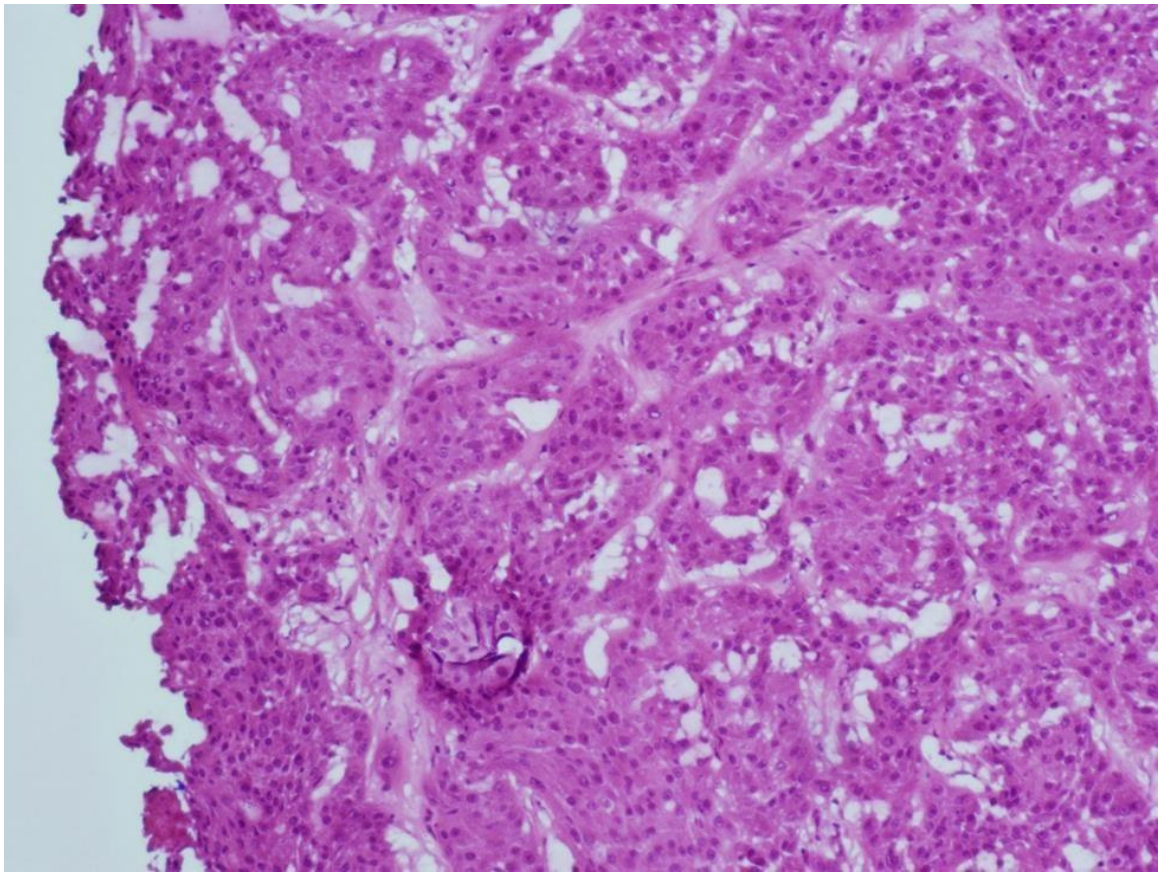

Figure 3: Left parotid, 10x magnification. Cribiform pattern

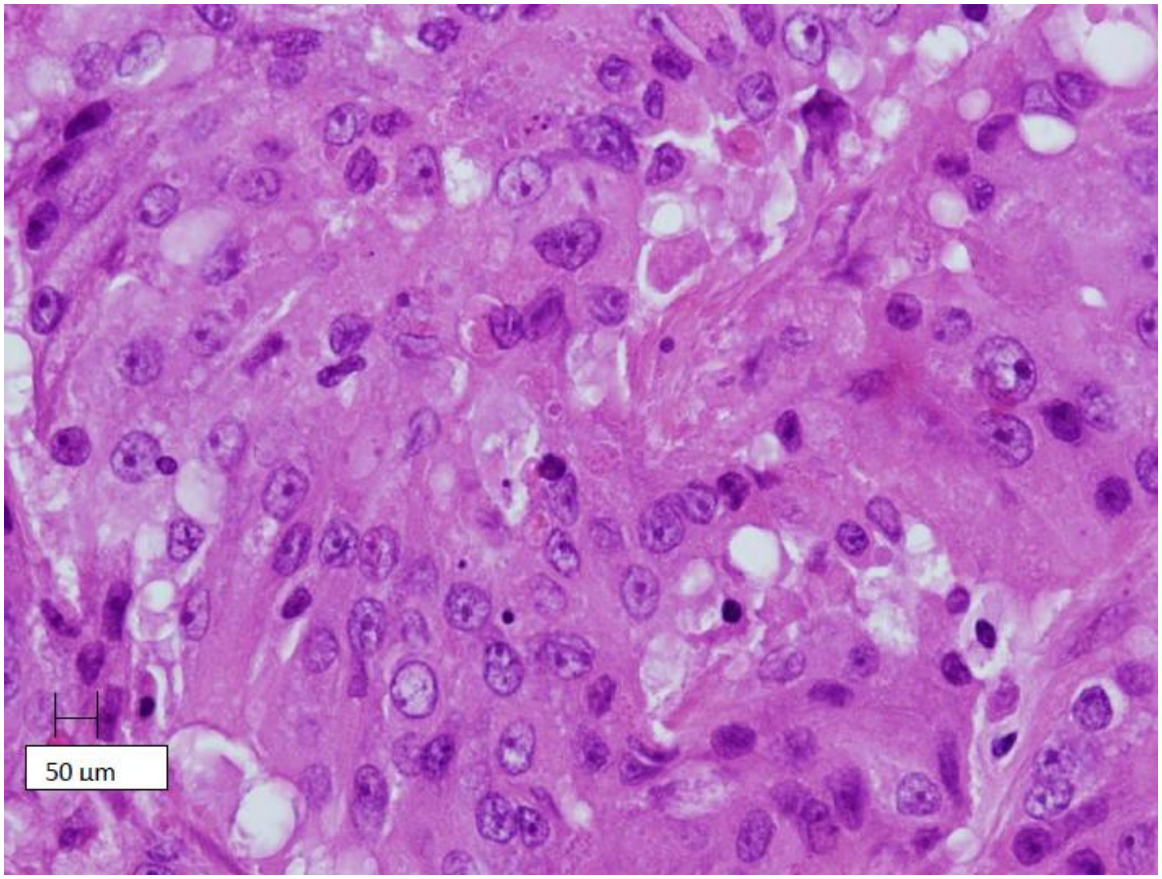

Figure 4: Histology, Left Parotid 40x mag. Malignant tumor cells morphologically identical to cells presented on cytology specimen (Millipore preparation).

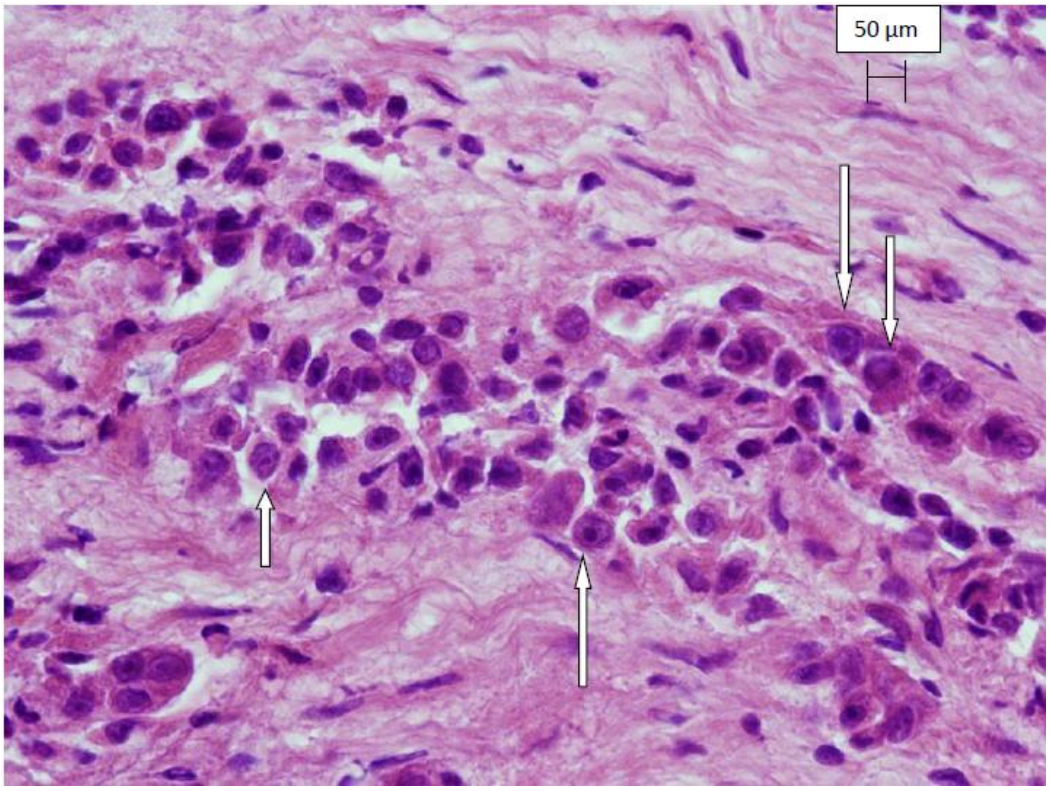

Figure 6: Histology, Nerve tissue, 40x magnification illustrating malignant tumor cells from SDC.

IMMUNOHISTOCHEMICAL FINDINGS

Immuntohistochemical stains showed the tumor cells were strongly positive for Androgen Receptor (Figure 5) and negative for Her-2/neu. No mucin was identified by mucicarmine stain.

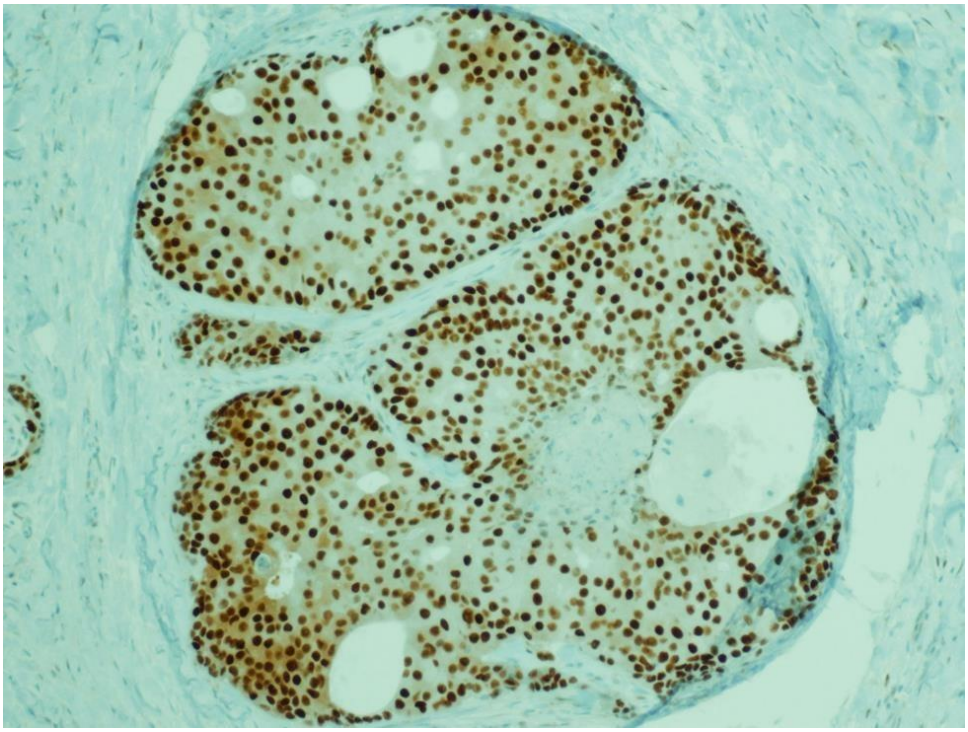

Figure 5: Histology, Left Parotid 10x magnification. Androgen receptor positivity illustrated by brown staining of nuclei.

CONCLUSION

In conclusion, the use of FNA is a valuable method in the pre-operative diagnosis of SDC. FNA shows the cytomorphologic features that are specific to this malignancy. IHC methods can also be used in instances of difficulty in distinguishing between malignant entities with similar cytomorphologic features. Due to the aggressive nature of the malignancy, an accurate diagnosis by FNA allows for proper clinical management.

DISCUSSION

The parotid gland is the most common site of salivary duct carcinoma, although the malignancy has been reported in the other major and minor salivary glands[2,3,6]. The tumor size is variable, ranging from less than 1 cm to 9 cm[8,11]. The color of the tumor is also variable, from tan-grey to grey-white with a cystic or infiltrative growth pattern[2,6]. Salivary duct carcinoma has a histologic pattern similar to that of ductal cell carcinoma of the breast, in which both intraductal and infiltrative elements are identified[3,7,12]. The similarities of cytologic features between the two malignancies include a hypercellular specimen with both papillary and cribiform groupings of malignant cells and central necrosis. The cells have large nuclei containing coarse chromatin, prominent nucleoli, and abundant cytoplasm. Moderate to high mitotic activity is frequently observed[2,6]. Mucin, although a rare finding, has been reported in several cases[6,11,12]. Metastasis to nerve and lymph tissue is also a frequent histopathologic finding[6,7,12].

Salivary duct carcinoma has a poor prognosis, with a reported 40% rate of recurrence and 60% metastatic rate1. The prognosis of the tumor is dependent on the quantity of invasive component and histologic grade[13]. Other prognostic indicators include young age at presentation of the malignancy, tumor location in a salivary gland other than the parotid, tumor size greater than 3 cm, local recurrence, and presence of distant metastases[3,6]. Surgical excision of the tumor followed by radiation is a standard treatment for the malignancy[13].

Due to the highly aggressive nature of the disease, there is a recurring theme in the literature that identifies fine needle aspiration as the preferred method for establishing a preoperative diagnosis in patients with salivary gland tumors. The sensitivity rates of fine needle aspiration of salivary gland tumors has been reported between 86-92% , and a 95% specificity rate[14,15]. Although the morphologic features of salivary duct carcinoma have been cited in the literature, there is a scarcity of reported case studies, which gives implications to the significance of this case. In a review of five cases of salivary duct carcinoma conducted by Fyrat and associates,[9] the cytomorphologic features showed flat sheets with a cribiform pattern and scattered tumor cells with large oval, hyperchromatic, moderately pleomorphic eccentrically located nuclei, prominent nucleoli, abundant granular cytoplasm, and prominent necrosis within the smear background. Our reported findings were consistent with the findings of the reported literature case, for the exceptions of tumor necrosis and hyperchromatic nuclei.

Several differential diagnoses are identified in the literature. Due to the aggressive nature of SDC and its poor prognosis, it is imperative that similar morphologic malignancies are ruled out in the diagnosis of SDC. These include oncocytic neoplasms, mucoepidermoid

carcinoma, acinic cell carcinoma, and adenoid cystic carcinoma[2,7,8]. Oncocytic neoplasms have a lower nuclear to cytoplasmic ratio than SCD along with increased granularity of the cytoplasm[16]. Cribiform pattern and necrosis are also not seen with oncocytic neoplasms. In a study by Fyrat of 5 cases[9], one case that was given a cytologic interpretation as oncocytic neoplasm had a cribiform pattern and necrosis, and therefore should have been given a diagnosis of SDC. SDC may also resemble mucoepidermoid carcinoma; however, the cytoplasm of mucoepidermoid carcinoma contains mucus secreting vacuoles which are not a feature of SDC16. A mucicarmine stain can be utilized to rule out a diagnosis of mucoepidermoid carcinoma, and our reported case was negative for the mucicarmine stain[13,16]. The cytoplasm of acinic cell carcinoma has a clear or foamy consistency, compared to the granular cytoplasm of SDC. Cribiform patterns and necrosis are not present in acinic cell carcinoma.

In addition to cytologic and histologic confirmations, immunohistochemical (IHC) stains can be used as an ancillary technique to accurately diagnose SDC. Salivary duct carcinoma shows rare positivity for both estrogen receptor (ER) and progesterone receptor (PR) in a small number of cases[13]. Androgen receptor, which is a common marker for the presence of prostate cancer, is positive in approximately 90% of salivary duct carcinomas[13]. Her-2/neu expression in salivary duct carcinoma has been reported in several cases; however its positivity is of inconsistent importance[17,18]. Several studies in the literature have suggested a strong correlation between Her-2/neu positivity and poorer prognosis compared to patients with a negative Her-2/neu reaction[5]. SDC has a histological resemblance to ductal carcinoma of the breast. An overexpression of the Her-2/neu gene has been identified in approximately 20% of invasive ductal carcinomas of the breast, and is associated with a poor prognosis and resistance to chemotherapy[19,20,21]. Because of the rarity in the number of cases of SDC, further studies should be conducted in order to further illustrate the clinical implication of an over expression of the Her-2/neu gene and patient outcomes.

Our reported case of SDC showed positivity for androgen receptor, and negative for Her-2/neu by IHC. IHC can be a valuable tool in ruling out metastatic disease that may have cytologic features similar to SDC. One such example is the morphologically similar breast or prostate metastasis to the parotid gland. Due to the cytologic and histologic similarities of the malignant entities, it is necessary to utilize IHC methods to confirm a diagnosis of SDC.

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