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Canalicular Carcinomas of the Parotid Gland: A Rare and Aggressive Entity

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1. Abstract

1.1. Objective

To report the epidemiological, therapeutic, and evolutionary characteristics of ductal carcinoma of the parotid gland.

1.2. Material and Methods

A retrospective study of five cases of primary or secondary ductal carcinoma of the parotid gland, managed in our department from 2014 to 2022.

1.3. Results

The study involved five men with a mean age of 64 years, with no significant medical history. The reason for consultation was a parotid swelling in three cases and facial asymmetry in two cases. Cutaneous infiltration was observed in one case. Ultrasound-guided fine-needle aspiration was performed in all cases, revealing high-grade adenocarcinoma in four cases and pleomorphic adenoma in one case. All patients underwent total parotidectomy, with complete facial nerve sacrifice in two cases and extension to the skin in one case. A functional neck dissection was performed in four cases and a triangular dissection in one case. The ductal carcinoma was primary in all cases. Postoperative radiotherapy was administered to all patients. Local and distant control was achieved in three cases, while one case showed local and nodal recurrence.

1.4. Conclusion

Ductal carcinoma is a rare and aggressive high-grade malignant tumor affecting the parotid gland. It can be of primary or secondary origin. Management is mainly based on surgical excision, often combined with adjuvant radiotherapy, with an overall poor prognosis.

2. Introduction

Ductal carcinoma is a rare neoplastic entity, distinguished by its high locoregional aggressiveness and significant metastatic potential [1]. It develops in the ductal cells of exocrine organs, primarily affecting the breast, prostate, and salivary glands, particularly the parotid gland, which is the most common site among salivary glands [1,2]. From a histopathological perspective, it is generally high-grade, with marked anaplastic features, explaining its aggressive nature and often poor prognosis [1,3]. Through our five cases, we aim to report the epidemiological, clinical, therapeutic, and evolutionary characteristics of ductal carcinomas of the parotid gland.

3. Material and Methods

This is a retrospective study of five cases of primary or secondary ductal carcinoma of the parotid gland, managed in our department from 2014 to 2022. Epidemiological, clinical, paraclinical, histopathological, therapeutic, and evolutionary data were collected for each patient.

4. Results

This study included five male patients with a mean age of 64 years (range: 45–69 years), with no significant medical history. The primary reason for consultation was a parotid swelling in three cases and facial asymmetry in two cases. A decline in general health status, characterized by weight loss, asthenia, and anorexia, was observed in only two patients.Clinical examination revealed, in all cases, a firm, fixed parotid mass with an average size of 3 cm, adherent to the deep planes. Cutaneous infiltration was noted in one case. The mass was located on the left side in three cases. Peripheral facial nerve paralysis was observed in two patients, classified as grade 3 and 4 according to the House-Brackmann scale. The contralateral parotid region was normal in all cases. No cervical lymphadenopathy was detected, and intraoral examination of the salivary duct orifices showed no abnormalities.

Ultrasound-guided fine-needle aspiration (FNA) was performed in all cases, revealing high-grade adenocarcinoma in four cases and pleomorphic adenoma in one case. Magnetic resonance imaging (MRI) was systematically performed and confirmed malignancy in all five patients. The lesion appeared as a poorly defined, infiltrative parotid mass with low signal intensity on both T1- and T2-weighted sequences, along with a low apparent diffusion coefficient (ADC). The tumor extended into the parapharyngeal space in two cases (Figure 1). Distant metastasis screening was negative in all cases.All patients underwent total parotidectomy, with facial nerve sacrifice in three cases: the main trunk in one case and the cervicofacial branch in two cases. The tumor was located in the superficial lobe in two cases, the deep lobe in one case, and both lobes in two cases. Intraoperative frozen section analysis confirmed the diagnosis of ductal carcinoma in all cases. An ipsilateral functional neck dissection was performed

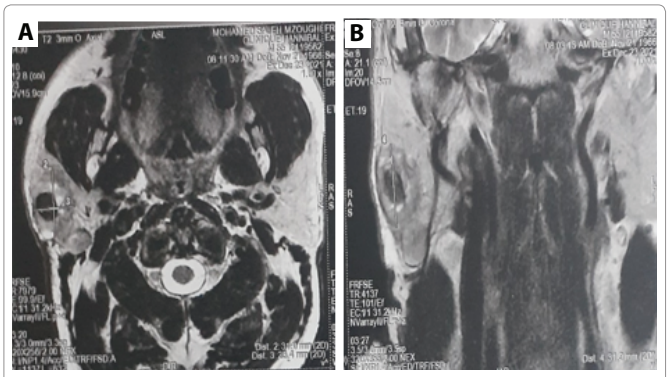

Figure 1: Parotid MRI in axial **(A)** and coronal **(B)** sections showing a poorly defined parotid mass extending to the deep lobe in T2 hyposignal with areas of necrosis.

in all patients, encompassing levels I–V in four cases and levels II, III, and IV in one case. Final histopathological examination confirmed the diagnosis of primary infiltrative ductal carcinoma of the parotid gland in all cases. Perineural invasion and vascular emboli were observed in two cases, while capsular rupture was noted in one case. Resection margins were positive in two cases. Lymph node metastases were identified in three cases, with extracapsular extension in one of them. Adjuvant radiotherapy was administered to all patients, delivering a total dose of 64 Gy to the tumor bed and 54 Gy to the cervical lymphatic areas. Concurrent chemoradiotherapy was indicated in one case.After a mean follow-up of 20.35 months, locoregional and distant disease control was achieved in four patients, whereas one patient experienced a local recurrence.

5. Discussion

Ductal carcinoma is a rare and aggressive malignancy with a poor prognosis, accounting for 5% to 10% of malignant salivary gland tumours [3,4]. The most common sites of occurrence are the parotid and submandibular glands, although cases involving minor salivary glands have also been reported [3,5]. This carcinoma primarily affects men in their fifth and sixth decades of life [1,2,6]. In our series, all patients were middle-aged men with exclusively primary parotid involvement.

6. Clinical Presentation

The clinical presentation of ductal carcinoma is not specific to this histological type and shares similarities with other malignant parotid tumours. Features suggestive of malignancy include facial asymmetry, mass fixation, firm consistency, cutaneous infiltration, and cervical lymphadenopathy. However, due to its neurotropic nature, ductal carcinoma is associated with facial paralysis in approximately 60% of cases [1,2,7]. In our series, facial paralysis was observed in 50% of cases.Regarding lymph node involvement, ductal carcinoma is known for its high prevalence of occult nodal metastases, reported in up to 80% of cases [1,8]. However, none of our patients exhibited clinical signs of lymph node involvement at diagnosis.

7. Imaging and Diagnosis

Imaging plays a crucial role in staging ductal carcinoma, although no radiological findings are specific to this histological type. Features indicative of malignancy include irregular tumour margins, hypo- or iso-intense signal on T1- and T2-weighted MRI sequences, and intense enhancement after contrast administration. Necrosis, which is more frequently observed in ductal carcinoma, is another suggestive feature [1-3]. Intra-tumoral calcifications may indicate the malignant transformation of a pleomorphic adenoma, which accounts for 20% to 59% of ductal carcinoma cases [3].Fine-needle aspiration cytology can confirm malignancy but is insufficient for a definitive diagnosis, which relies on histopathological examination of the surgical specimen [3,9].Histologically, salivary ductal carcinoma is a high-grade tumor with distinctive features, including marked cellular pleomorphism, moderate to severe nuclear atypia, abundant eosinophilic cytoplasm, frequent mitotic figures, and necrosis, including comedonecrosis, a common finding [1,10]. Another key feature is its perineural invasion, reported in 80% of cases, making it a hallmark of ductal carcinoma [1,9,11].Immunohistochemical analysis is essential for diagnosing salivary ductal carcinoma and distinguishing it from differential diagnoses, such as metastatic ductal carcinomas of breast or prostate origin and high-grade mucoepidermoid carcinoma [9]. Salivary ductal carcinoma is characterized by strong androgen receptor (AR) expression and negativity for estrogen and progesterone receptors, which aids in differentiation [3,9].

8. Therapeutic Management

The treatment of parotid ductal carcinoma relies on a multimodal approach combining surgery, radiotherapy, and targeted therapy [2]. Surgery is the first-line treatment and should be radical due to the aggressive nature of this histological type. It typically involves total parotidectomy with resection of invaded structures and ipsilateral functional neck dissection, systematically including levels II, III, and IV [1,2,10].Adjuvant radiotherapy is systematically indicated regardless of TNM staging or resection margins, given the tumor's high histological grade [4,12]. Chemotherapy is reserved for cases with distant metastases, as its efficacy in localized disease remains unproven [1,12].Recent studies have increasingly focused on the immunohistochemical profile of ductal carcinoma, given the demonstrated efficacy of targeted therapies, particularly anti-HER-2 agents, which are recognized treatment options for tumors expressing androgen receptors and HER-2 [1,12].

9. Prognosis

The prognosis of parotid ductal carcinoma remains poor. These tumours are associated with high local recurrence rates, reported in 11% to 48% of cases [1,3], and a propensity for distant metastases, most commonly affecting the lungs, bones, brain, and liver in 60% to 70% of cases [1,13,14].The five-year survival rate for salivary ductal carcinoma is approximately 30%, with a mortality rate reaching 70% [1,9]. Favourable prognostic factors include the absence of preoperative facial paralysis, wide negative resection margins, tumour size <2 cm, and the absence of extra glandular extension, vascular emboli, or perineural invasion. Conversely, poor prognostic indicators include HER-2 overexpression, sarcomatous, micropapillary, and rhabdoid variants, nodal or distant metastases, and recurrence [1,9,10,13,15].

10. Conclusion

Ductal carcinoma of the parotid gland remains a highly aggressive tumor with high recurrence rates and significant mortality. Despite poor survival rates, certain factors, such as the absence of preoperative facial paralysis, negative resection margins, and smaller tumor size, appear to slightly improve prognosis. However, distant metastases and unfavourable histological characteristics, including HER-2 overexpression and invasive variants, significantly compromise survival. Further research is needed to refine therapeutic strategies and improve outcomes for patients with this rare malignancy.

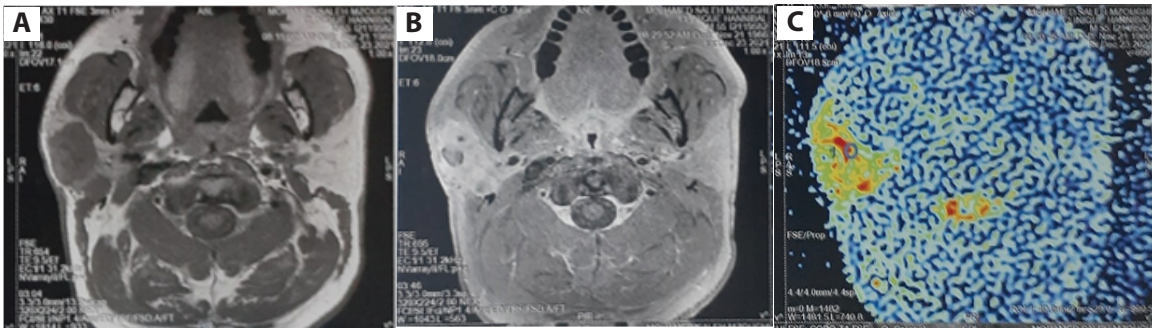

Figure 2: Parotid MRI in axial section objectifying a poorly defined parotid mass extending to the deep lobe in T1 hyposignal **(A)** enhancing with gadolinium injection **(B)** with areas of necrosis and a low ADC **(C)**.

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