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Malignant Parotid Gland Tumours: A Case Series From A Tertiary Care Centre In Western Uttar Pradesh

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ABSTRACT

Background: Malignant parotid gland tumors are uncommon but aggressive lesions with diverse histological subtypes. Their diagnosis and management remain challenging, particularly in regions with limited data.

Objective: To describe the clinical presentation, histopathological spectrum, surgical management, and early outcomes of malignant parotid tumors in a tertiary care centre in Western Uttar Pradesh, India.

Materials and Methods: Eleven patients diagnosed with malignant parotid gland tumors between September 2023 and September 2024 were managed. Clinical evaluation, radiological assessment, and histopathological confirmation were performed. Surgical treatment included superficial or total parotidectomy, with adjuvant therapy where indicated. Postoperative complications and short-term outcomes were assessed during follow-up at 2 weeks and 1 month.

Results: The case series included 11 patients (6 females, 5 males) aged 22–68 years. Mucoepidermoid carcinoma was the most common malignancy (27.3%). Surgical procedures comprised superficial parotidectomy in 54.5% and total parotidectomy in 45.5%. Complications included transient facial nerve paresis (27.3%), neck hematoma (9.1%), and wound infection (9.1%). No immediate mortality occurred during follow-up.

Conclusion: Malignant parotid tumors, though rare, carry significant morbidity. Surgery remains the cornerstone of management, with adjuvant radiotherapy reserved for advanced disease. This case series highlights the clinical patterns and outcomes of parotid malignancies in a regional Indian setting.

Keywords: Malignant parotid tumor, Case series, Mucoepidermoid carcinoma, Parotidectomy, Facial nerve pals

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INTRODUCTION

Salivary gland tumors can either be benign or malignant, with malignant cases being either primary or metastatic. Due to the presence of epithelial and non-epithelial nature of the affected glandular tissue, different varieties of histological types of parotid tumors exist, though some are relatively not so common.[1] These tumors are notable for their diverse histological features and varying biological behaviors. Differentiating between tumor types can be particularly challenging, especially when relying on fine-needle aspiration (FNA) samples. Salivary gland tumors hold significant interest for several reasons. For instance, the most common benign tumor, pleomorphic adenoma, has the potential for malignant transformation. Additionally, while it is classified as benign, there is a notable risk of recurrence following treatment.[2] Given the broad spectrum of pathology, clinical presentations, diagnostic complexities, and debates surrounding treatment, salivary gland neoplasms are frequently explored in clinical evaluations and examinations.
Malignant salivary gland tumors are seen more commonly after the sixth decade of life, whereas benign lesions tend to be seen earlier, often in the fourth or fifth decade. Benign tumors are more commonly seen in women, whereas malignant tumors affect men and women equally. The majority of salivary gland tumors originate in the parotid gland,

with approximately 10% arising in the submandibular gland and fewer than 4% in the minor salivary glands. Among parotid gland tumors, most are benign, with pleomorphic adenoma being the most significant subtype. Rather submandibular gland tumours and minor salivary gland tumours are more likely to be malignant.

The mortality associated with salivary gland tumors largely depends on the disease stage at diagnosis. On average, the five-year survival rate is approximately 70%.

Salivary glands are a frequent site of benign conditions, while malignant tumors are relatively uncommon. In the United Kingdom, approximately 300 cases of primary salivary gland malignancies are documented each year, with less than ten of these occurring in children.[3] Malignant salivary gland tumors are most often diagnosed in patients in their sixth decade of life. Globally, the incidence ranges between 0.5 and 3.0 cases per 100,000 individuals annually, representing about 5% of all head and neck cancers.[4][5] The five-year survival rate for malignant salivary gland tumors is closely linked to the stage of the disease and is reported to be approximately 70%.

SUBJECTS AND METHODS

This case series included 11 patients with malignant parotid gland tumors managed in the Department of Otorhinolaryngology, Saraswathi Institute of Medical Sciences, Hapur, between September 2023 and September 2024.

Sample size: 11 patients.

Inclusion criteria:

1. Patients diagnosed with parotid malignancies on Histopathology.
2. Patients Aged ≥ 18 years,
3. Patients who gave consent for study.

Exclusion criteria:

1. Pregnant women,
2. Patients with previous surgical interventions for any parotid pathology.
3. Patients with infective and benign Parotid lesions.

Clinical evaluation

All patients underwent detailed clinical history, physical examination, and radiological investigations (USG, CT, and MRI where indicated). Fine-needle aspiration cytology (FNAC) was performed preoperatively.

Surgical management

Superficial or total parotidectomy was performed depending on tumor extent and facial nerve involvement. Neck dissection and adjuvant therapy (radiotherapy/chemotherapy) were considered for advanced disease or high-risk histology.

Follow-up

Patients were followed at 2 weeks and 1 month postoperatively. Complications such as facial nerve paresis, wound infection, and hematoma were recorded.

STATISTICAL ANALYSIS

Data was analyzed using SPSS version 29 (SPSS Inc., Chicago, IL). Chi-square and Fisher exact tests were performed to test for differences in proportions of categorical variables between two or more groups. The level $P < 0.05$ was considered as the cutoff value or significance.

Ethical considerations

All treatments were part of routine clinical care. Patient data were anonymized, and informed consent was obtained for the use of clinical details and images for academic and publication purposes. As this is a descriptive case series without experimental intervention, formal ethical committee approval was not required under institutional guidelines.

RESULTS AND OBSERVATIONS IN MY STUDY

The case series was done in the department of E. N. T - HNS for duration of 1 year from SEPTEMBER 2023 – SEPTEMBER 2024. During this period 11 cases of parotid swellings were admitted in the department/attended ENT OPD. The results and observations are made according to the following tables & charts.

TABLE 1 – AGE DISTRIBUTION

AGE DISTRIBUTION	NO. OF CASES	PERCENTAGE
21 -30 YRS	1	9.09%
31 – 40 YRS	2	18.18%
41 – 50 YRS	4	36.36%
51 – 60 YRS	3	27.27%

61 – 70 YRS	1	9.09%

The present study shows commonest age group as the fifth decade followed by sixth decade. The youngest patient was 22 years of age and the oldest was 63 years of age

TABLE 2 -SEX DISTRIBUTION

SEX	NO. OF CASES	PERCENTAGE
MALE	5	45.45%
FEMALE	6	54.54%

They were more commonly seen in females with 54.54%

TABLE 3 -TYPE OF CASES

TYPE OF SWELLINGS	NO. OF CASES	PERCENTAGE
MUCOEPIDERMOID CARCINOMA	3	27.27%
CARCINOMA EX PLEOMORPHIC ADENOMA	2	18.18%
MAMMARY ANALOGUE SECRETORY CARCINOMA PAROTID	2	18.18%
BASAL CELL ADENOCARCINOMA PAROTID	1	9.09%
MYOEPITHELIOMA	1	9.09%
ACINIC CELL TUMOUR	1	9.09%
ONCOCYTOMA	1	9.09%

Mucoepidermoid carcinoma was most common in 27.27% cases.

TABLE 4 -ODE OF TREATMENT – out of 11 parotid gland swelling cases,

OPERATIVE APPROACH	NO. OF CASES	PERCENTAGE
SUPERFICIAL PAROTIDECTOMY	6	54.54 %
TOTAL PAROTIDECTOMY	5	45.45%

TABLE 5 - COMPLICATIONS

TYPE OF COMPLICATION	NO. OF CASES	PERCENTAGE
FACIAL NERVE PARESIS	3	27.27%
YFJHJV	1	9.09%
INFECTION	1	9.09%

We also encountered a few complications .Treatment was done conservatively.
FOLLOW UP: Follow up of cases were done after 2 weeks and 1 month of discharge from hospital.
CASE 1 A 65 year old female came with right preauricular swelling.

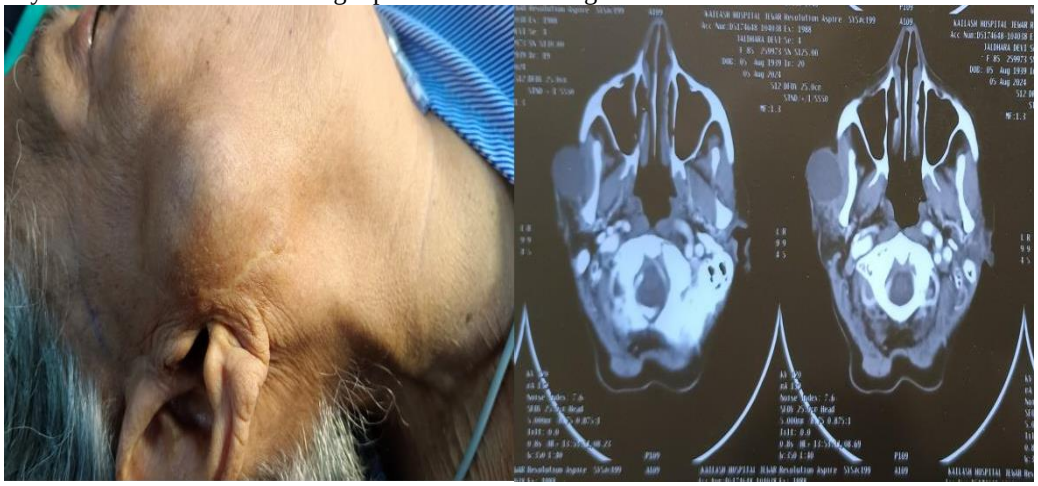

IMAGE 1 **IMAGE 2**

IMAGE 1- PREOPERATIVE PICTURE SHOWING SWELLING IN RIGHT PAROTID REGION.
IMAGE 2 – NCCT SCAN SHOWING SOFT TISSUE DENSITY IN RIGHT PAROTID REGION

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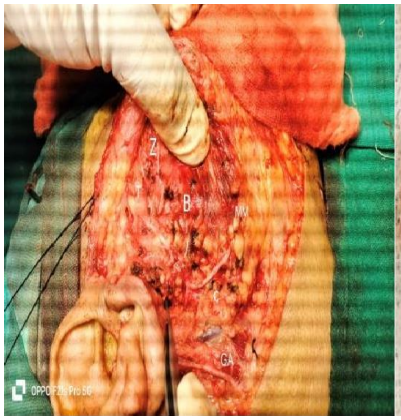
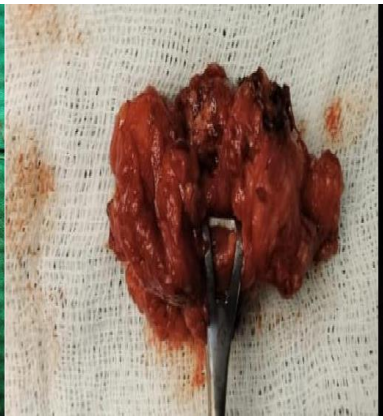
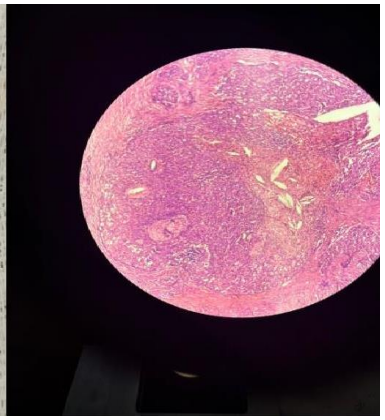

IMAGE 3 **IMAGE 4** **IMAGE 5**

IMAGE 3 – INTRAOPERATIVE PICTURE SHOWING BRANCHES OF FACIAL NERVE
IMAGE 4 – EXCISED SPECIMEN
IMAGE 5 – HPE SHOWING INTERMEDIATE CELLS WITH INTERSPERSED MUCOCYTES SEEN ALONG WITH GRANULAR CYTOPLASM AND DISTINCT CELL MEMBRANE BORDERS SUGGESTIVE OF MUCOEPIDERMOID CARCINOMA

CASE 2 A 58 year old male came with right preauricular swelling

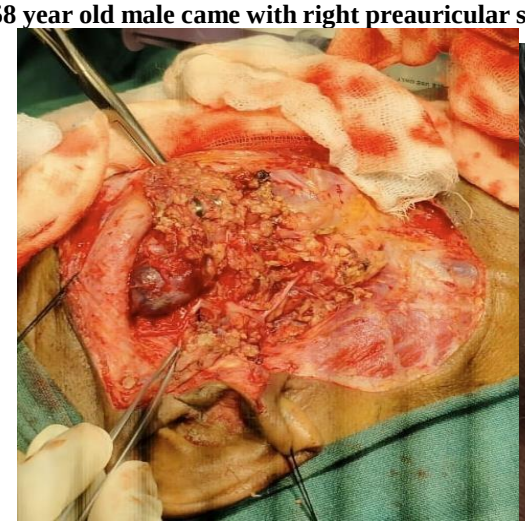
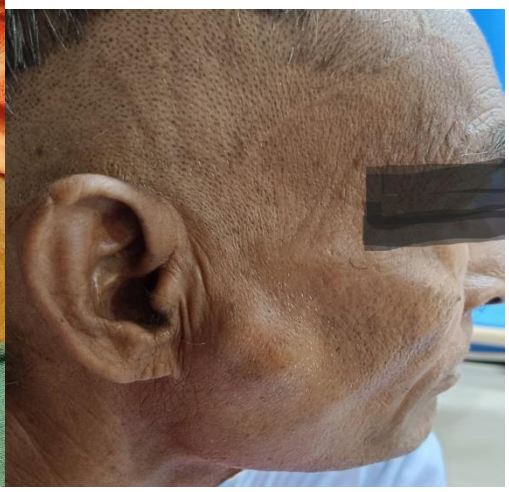

IMAGE 1 **IMAGE 2**

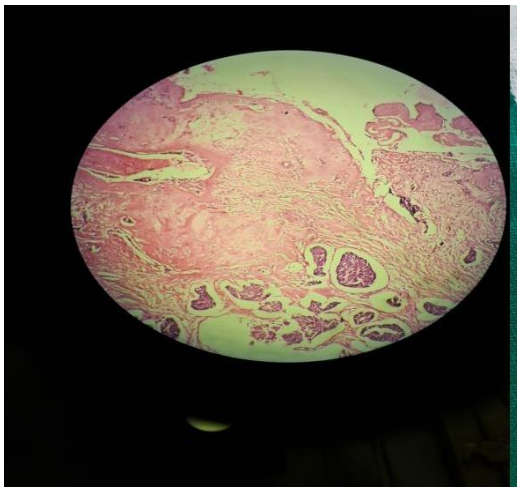
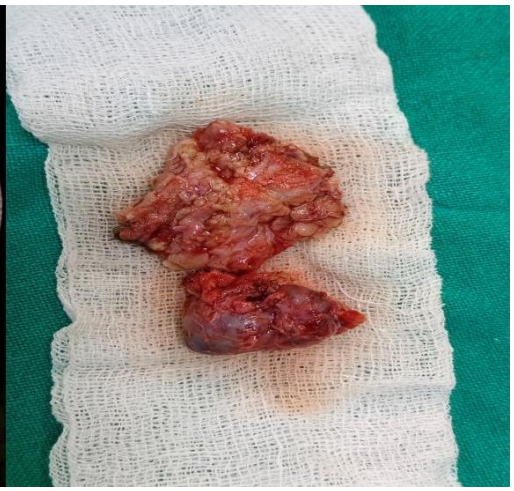

IMAGE 3 **IMAGE 4**

IMAGE 1 – PREOPERATIVE PICTURE SHOWING SWELLING IN RIGHT PREAURICULAR REGION
IMAGE 2- INTRAOPERATIVE PICTURE
IMAGE 3 – EXCISED SPECIMEN
IMAGE 4 – HPE SHOWING FEATURES OF CARCINOMA EX PLEOMORPHIC ADENOMA PAROTID

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CASE 3 A 23 year old female came with right preauricular swelling

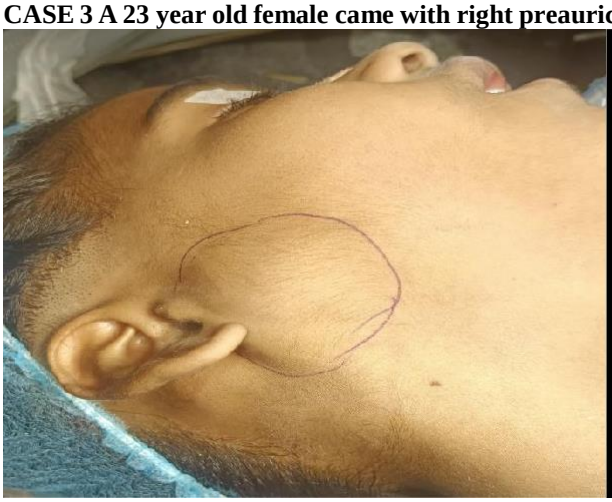

IMAGE 1

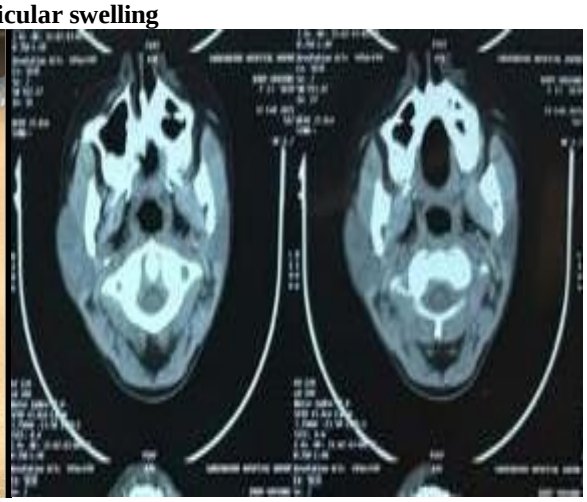

IMAGE 2

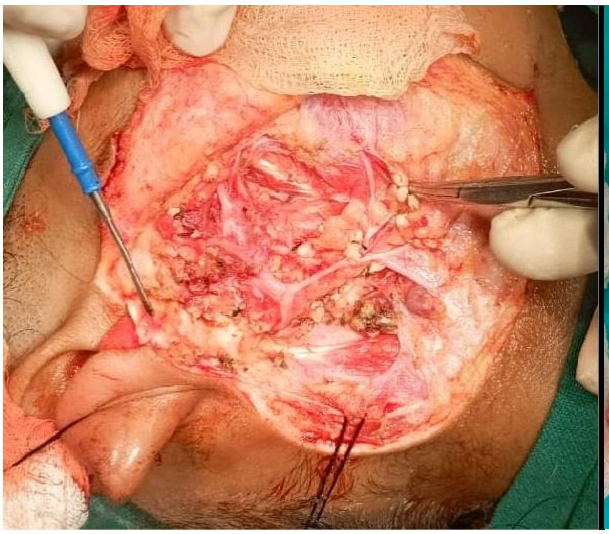

IMAGE 3

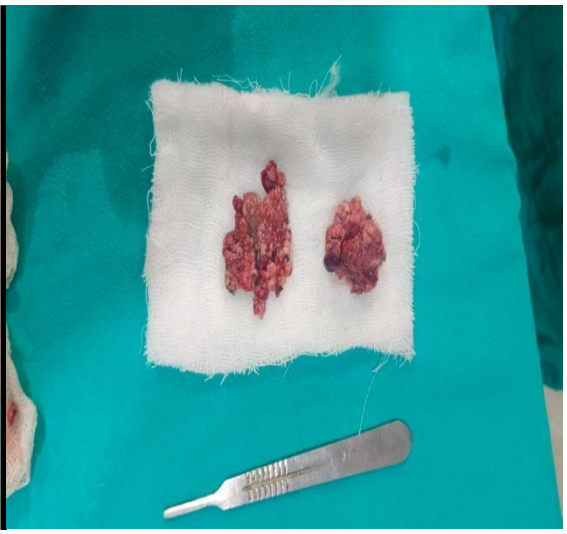

IMAGE 4

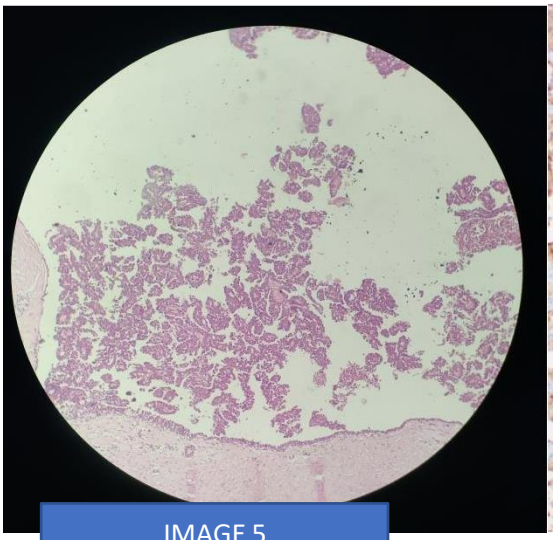

IMAGE 5

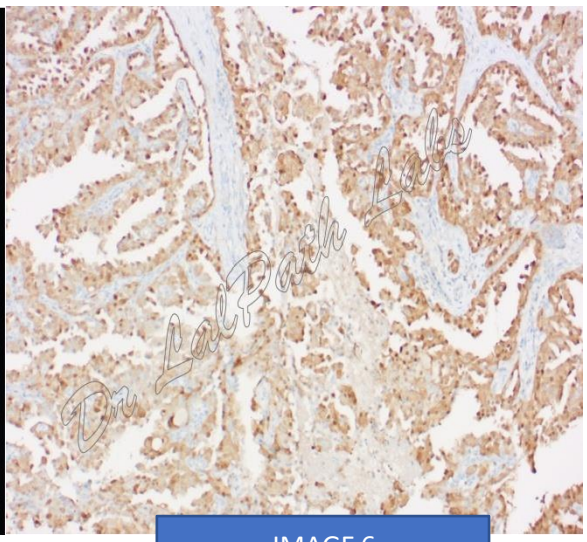

IMAGE 6

IMAGE 1 – PREOPERATIVE PICTURE SHOWING SWELLING IN RIGHT PREAURICULAR REGION
IMAGE 2 – NCCT SCAN PAROTID SHOWING SOFT TISSUE LESION IN RIGHT PAROTID REGION

IMAGE 3 – INTRAOPERATIVE PICTURE
IMAGE 4 – EXCISED SPECIMEN
IMAGE 5 - HPE SHOWING UNENCAPSULATED TUMOUR COMPOSED OF CYSTIC SPACES SHOWING PAPILLARY PROJECTIONS DEVOID OF STROMA
IMAGE 6 – IHC SHOWING S100 POSITIVITY, SUGGESTIVE OF MAMMARY ANALOGUE SECRETORY CARCINOMA PAROTID

DISCUSSION

Malignant salivary gland tumors are rare, comprising approximately 3% to 5% of all head and neck cancers. The parotid gland is the most common site for these tumors, with around 80% of parotid tumors being benign and 20% malignant. In comparison, tumors in the submandibular, sublingual, and minor salivary glands are more likely to be malignant. The World Health Organization recognizes more than 30 distinct types of salivary gland tumors, highlighting their significant histological diversity[6].

Among malignant subtypes, mucoepidermoid carcinoma (MEC) and adenoid cystic carcinoma (AdCC) are the most prevalent. MEC is characterized by a mixture of mucous, intermediate, and epidermoid cells, with grading based on the proportion of these components influencing prognosis. AdCC is notable for its propensity for perineural invasion and a tendency for late distant metastases, often involving the lungs and bones[7].

The accurate diagnosis of malignant salivary gland tumors requires a thorough approach involving clinical evaluation, imaging, and histopathological analysis. Fine-needle aspiration (FNA) biopsy is widely used due to its minimally invasive nature and it offers a high diagnostic yield. However, a systematic review and meta-analysis by **Schmidt et al**. highlighted that ultrasound-guided core needle biopsy provides greater diagnostic accuracy than FNA, particularly in differentiating between benign and malignant lesions[8].

Imaging studies, such as magnetic resonance imaging (MRI) and computed tomography (CT), play a critical role in evaluating tumor size, extent, involvement of nearby structures, and regional lymph node status. MRI is especially useful due to its superior soft-tissue contrast and its ability to detect perineural spread, which is a common characteristic of adenoid cystic carcinoma (AdCC)[9][10].

The primary treatment for malignant salivary gland tumors is surgical resection with an emphasis on achieving negative margins. The scope of the surgery depends on factors such as tumor size, location, and the extent of involvement with surrounding structures. When the facial nerve is affected, efforts are made to preserve it whenever oncologically appropriate. However, in cases of significant perineural invasion, nerve sacrifice may be required[11][12].

Adjuvant radiotherapy is frequently used, especially in cases involving high-grade tumors, positive surgical margins, perineural invasion, or lymph node metastases. A study by **Terhaard et al.** showed that postoperative radiotherapy significantly enhances local control rates in patients with unfavorable prognostic factors[13]. A total dose of 60-66 Gy divided into daily fractions of 2 Gy over 6 weeks has been recommended. Elective neck radiotherapy for clinically negative neck disease is optional and one can go for wait and watch policy.

Malignant salivary gland tumors, chemotherapy's effectiveness is limited. Combining agents such as carboplatin, paclitaxel, fluorouracil, and hydroxyurea with adjuvant radiation has shown moderate benefits, achieving 5-year locoregional control rates of 90% to 95% in some studies. However, no significant overall survival advantage has been observed compared to non-responding patients[14]. In patients unsuitable for surgery or radiation, palliative chemotherapy with cisplatin, paclitaxel, and gemcitabine has shown partial responses in 20% to 25% of non-adenoid cystic carcinoma cases and less than 10% of adenoid cystic carcinoma cases [15].

Targeted therapies against proteins such as C-Kit (imatinib), HER2 (trastuzumab), EGFR (cetuximab), and mTOR (temsirolimus) have been explored due to the expression of these biological receptors in several malignant salivary tumors. However, response rates have not been superior, likely due to discrepancies between protein overexpression and gene mutations, as well as the loss of tumor suppressor PTEN, which interferes with target therapy responsiveness [16].

The prognosis of malignant salivary gland tumors is determined by several factors, including histological subtype, tumor grade, stage at diagnosis, and the presence of perineural invasion. High-grade tumors, such as high-grade mucoepidermoid carcinoma (MEC) and salivary duct carcinoma, are linked to worse outcomes compared to their low-grade counterparts. Although adenoid cystic carcinoma is considered a low- to intermediate-grade tumor, its tendency for late distant metastasis contributes to a cautious long-term outlook [17].

Lymph node involvement is another critical prognostic indicator. A review of over 20,000 parotid malignancy cases in the National Cancer Database revealed high incidences of occult nodal metastasis in relatively high-grade tumors, underscoring the importance of comprehensive neck evaluation and management in these patients [18].

Molecular pathology advancements have significantly enhanced the understanding of the genetic foundations of malignant salivary gland tumors. Identifying specific genetic alterations, such as the ETV6-NTRK3 fusion in mammary analog secretory carcinoma (MASC) and the MYB-NFIB fusion in adenoid cystic carcinoma (AdCC), has improved diagnostic accuracy and opened avenues for targeted therapies [19]. The application of next-generation sequencing in routine diagnostics holds promise for personalized treatment approaches, enabling the identification of actionable mutations and the development of targeted therapeutic strategies.

Immunohistochemical studies have also provided insights into the expression and prognostic significance of various biomarkers in salivary gland tumors. A systematic review by **Kalogirou et al**. highlighted the role of stem cell markers in predicting tumor behavior and patient outcomes, suggesting potential targets for future therapeutic interventions[20].

CONCLUSION

Malignant salivary gland tumors encompass a diverse and complex group of neoplasms with variable clinical behaviors and outcomes. A multidisciplinary approach, integrating surgical resection, radiotherapy, and emerging targeted therapies, is essential for optimal management. Advances in research into the molecular landscape of these tumors holds promise for the development of personalized treatment strategies, eventually improving patient outcomes.

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