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Malignant Salivary Gland Tumors – A Brief Review

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Abstract

Salivary glands are rare, with an annual incidence rate of approximately 1 in 100,000 account for around 3% of all head and neck tumors. Types of Salivary Gland Tumors: 1. Parotid Gland: Tumors arise from acinar, ductal, and myoepithelial cells, resulting in a diverse range of benign and malignant tumors. 2. Submandibular and Sublingual Glands: Tumors in these glands are more likely to be malignant, with: Submandibular gland: approximately 50% malignant. Sublingual gland: approximately 80% malignant. 3. Minor Salivary Gland: Carcinomas can be difficult to diagnose early, as they often develop gradually and painlessly, presenting as a subtle lump in submucosal tissue. Salivary gland malignancies are a rare and distinct category of tumors, accounting for an annual incidence rate of approximately 1 in 100,000. Approximately 3% of all head and neck neoplasms.

Keywords : Malignant salivary gland tumor, etiology, histopathology, treatment

INTRODUCTION

PAROTID GLAND

Parotid tumors can arise from the various cell types within the parotid gland, including acinar, ductal, and myoepithelial cells, resulting in a diverse range of both benign and malignant tumors.

SUBMANDIBULAR AND SUBLINGUAL GLAND

Tumors of the submandibular and sublingual glands have a higher likelihood of being malignant, with approximately 50% and 80% of cases, respectively, compared to the relatively lower malignancy rate in parotid gland tumors.

MINOR SALIVARY GLAND

Minor salivary gland carcinomas can be challenging to diagnose early, as they typically develop gradually and painlessly, often presenting as a subtle lump in the submucosal tissues of various sites, including:

SITES OF MALIGNANT MINOR SALIVARY TUMOR

Common sites involved are:

- Oral Cavity
- Hard palate
- Buccal mucosa
- Alveolar mucosa
- Floor of mouth
- Tongue
- Oropharynx
- Larynx^[6]

ETIOLOGY

The exact cause of Salivary Gland Tumors (SGTs) remains unclear, but several potential risk factors have been identified, including:

- Cigarette smoking
- Viral infections
- Occupational exposure (e.g., rubber manufacturing workers)
- Genetic predisposition

However, the only firmly established risk factor for SGTs is exposure to ionizing radiation.

HISTOPATHOLOGY:

ACINIC CELL CARCINOMA:

Acinic cell carcinoma (ACC) exhibits a diverse range of histopathological and cellular characteristics. The tumor typically exhibits solid and microcystic patterns, with follicular and papillary-cystic patterns being less frequent. At the cellular level, serous-acinar cells are predominant, while intercalated duct cells and vacuolated clear cells are less common.

Characteristics of acinic cell carcinoma

The Pattern involved are

- Solid (50%)
- Microcystic (30%)
- Follicular (15%)
- Papillary-cystic (5%)

The Cell types encountered are

Serous acinar (75%)
Intercalated duct (20%)
Vacuolated (5%)

Gender:

Female predominance

The prognosis if

Local recurrence (45%)
Metastases (20%)

Common Site involved are:

Mostly parotid gland
Minor salivary glands: palate, upper lip

MUCOEPIDERMOID CARCINOMA

Mucoepidermoid carcinoma is characterized by the presence of three distinct cell types: epidermoid cells, mucin-producing goblet cells, and intermediate cells.^[2]

The Cell types involved are

Epidermoid
Mucus-producing (goblet-like)
Intermediate

The Growth pattern encountered are:

Solid sheets
Microcysts
Macrocyts

Subtypes are

Well-differentiated (low-grade)
Poorly-differentiated (high-grade)^[2]

ADENOID CYSTC CARCINOMA

accounts for a varying percentage of salivary gland tumors, specifically:

- 2-6% of parotid gland tumors
- 15% of submandibular gland tumors

- 30% of minor salivary gland tumors

Characteristics of a specific variant of adenoid cystic carcinoma:

- Darkly staining epithelial islands
- Cuboidal or ovoid cells with hyperchromatic nuclei
- Limited stromal tissue
- Central necrosis
- Infrequent mitoses
- Rare cribriform patterns

This variant accounts for 10-20% of adenoid cystic carcinoma cases.

POLYMORPHOUS LOW-GRADE ADENOCARCINOMA

This tumor exhibits:

- Diverse histological patterns, including cords, tubules, papillae, gland-like structures, and solid aggregates
- Uniformity of myoepithelial or luminal duct cells at the cellular level
- Infiltrative growth pattern
- Low malignant potential, with:
 - Rare local recurrence
 - Metastases occurring in approximately 10% of cases, typically limited to regional lymph nodes

POLYMORPHOUS LOW-GRADE ADENOCARCINOMA (PLGA):

A Rare Salivary Gland Tumor

Typical Locations are:

Minor salivary glands, especially in the palate

Histological Features are

- Diverse range of patterns, including cords, tubules, papillae, glandular, and adenoid structures
- Solid aggregates of cells
- Uniform cellular morphology
- Presence of both myoepithelial and luminal epithelial cells

Immunohistochemical Markers:

- S-100 protein and EMA (expressed in >90% of cases)
- Keratin (positive in 75-90% of cases)
- Muscle-specific antigen (positive in 10-65% of cases)
- CEA (positive in 75% of cases)

Behavior includes:

- Characterized by infiltrative growth
- Rarely recurs or metastasizes

BASAL CELL ADENOCARCINOMA

A key indicator of malignancy is the tumor's invasive growth into surrounding tissues which may include:

- Perineural invasion (spread along nerve pathways)
- Perivascular invasion (spread along blood vessels)

characteristics

Histological Features are:

- Predominantly solid cell nests
- Less common trabecular or tubular patterns
- Small basal membrane structures

Growth Patterns include:

- Infiltrative growth
- Perineural and intravascular invasion

Clinical Behavior are:

- Recurrence rate: 25%
- Metastasis rate: 10%^[2]

CARCINOMA IN PLEOMORPHIC ADENOMA

The risk of a pleomorphic adenoma transforming into a malignancy is relatively low, with:

- 1.5% risk within 5 years
- 9.5% risk after more than 15 years

This suggests that the risk of malignant transformation increases significantly over time.

Characteristics and Classification of Carcinoma in Pleomorphic Adenoma:**Malignant Features include:**

- Cellular atypia and increased mitoses
- Infiltrative growth patterns
- Necrosis and hemorrhage
- Hyalinization and calcification
- Facial paralysis (in some cases)

Histological Types of Carcinoma are:

1. Undifferentiated carcinoma
2. Mucoepidermoid carcinoma
3. Squamous cell carcinoma
4. Various types of adenocarcinoma
5. Mixed differentiation subtypes
6. Non-invasive carcinoma
7. Invasive carcinoma
8. Carcinosarcoma
9. Metastasizing pleomorphic adenoma^[2]

IMAGING AND DIAGNOSTIC TOOLS FOR SALIVARY GLAND TUMORS:

1. MRI or CT scans: Provide detailed images to predict malignancy, define tumor boundaries, and assess relationships with surrounding structures (nerves, bones, and cartilage).
2. Lymph node evaluation: Essential to determine potential lymph node involvement.
3. Fluorodeoxyglucose PET-CT: Under investigation for detecting distant metastases.^[6]
4. Fine Needle Aspiration Biopsy (FNAB): Offers accurate cytologic diagnosis (81-98%) when performed by experienced pathologists, enabling informed surgical planning and patient counseling.

MANAGEMENT

The clinical and histopathological factors associated with parotid gland malignancies suggest that a treatment approach combining conservative surgery with postoperative radiation therapy is effective and beneficial.^[1]

THE PROGNOSIS FOR SALIVARY GLAND CANCER PATIENTS VARIES BY TUMOR TYPE:

- Low-grade mucoepidermoid and acinic cell carcinomas generally have a favorable prognosis.
- In contrast, adenoid cystic carcinomas are known for their slow progression and eventual lethal outcome^[6]

CONCLUSION:

Parotid tumors can arise from the various cell types within the parotid gland, including acinar, ductal, and myoepithelial cells, resulting in a diverse range of both benign and malignant tumors. Tumors of the submandibular and sublingual glands have a higher likelihood of being malignant. Exact cause of Salivary Gland Tumors (SGTs) remains unclear. Surgery remains the primary treatment for salivary gland cancer, with radiotherapy playing a supporting role in advanced cases. Low-grade mucoepidermoid and acinic cell carcinomas generally have a favorable prognosis.

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