A Review of Salivary Gland Malignancies

Common Histologic Types, Anatomic Considerations, and Imaging Strategies

Remy Lobo, MD, Jeffrey Hawk, MD,
Ashok Srinivasan, MBBS, MD*

KEYWORDS

• Parotid • Submandibular • Sublingual • Minor salivary gland • Perineural tumor spread

KEY POINTS

- Most parotid neoplasms (approximately 4/5) are not malignant. Most sublingual neoplasms (approximately 4/5) are malignant. Approximately half of the minor salivary and submandibular neoplasms are malignant.
- The parotid gland has lymph nodes within its fascia, which makes it an important site in both primary and secondary malignancy evaluation.
- In addition to local aggressive features, important directions of spread for parotid malignancy include routes along the cranial nerves (CNs), most commonly trigeminal (CN V) and facial (CN VII), with their anastomotic connections. Knowledge of local tumor and nodal staging offers crucial prognostic and management information in tumor-node-metastasis staging of disease.

TUMOR EPIDEMIOLOGY AND PRESENTATION

Salivary gland malignancies are a rare group of heterogeneous neoplasms arising along the aerodigestive tract and its major secretory structures. They represent less than 8% of head and neck tumors and a total of less than 2500 new cases per year in the United States. Both viral and environmental factors have been implicated as potential causes of neoplasia.[1]

These tumors can present in various clinical scenarios. Major salivary gland malignancy typically manifests as a palpable abnormality to a clinician or patient. The major (parotid, submandibular, and sublingual) gland is often enlarged and may (or may not) be painful on examination. Pertinent features for the clinician involve the evaluation of the adjacent nervous structures. For example, cranial nerve (CN) VII (facial) should be scrutinized in the setting of parotid enlargement because facial muscle weakness can alert a clinician to a parotid neoplasm affecting CN VII as it passes through the gland. Minor salivary gland malignancies present according to the surrounding tissue affected. For example, a hard palate tumor may be quite small, but if it affects a branch of CN V (trigeminal), the patient may present with numbness. Other scenarios can be imagined: a minor neoplasm along the optic canal could present with vision complaints and a nasal mass could present with obstruction. Nasopharyngeal masses often present late to the clinician and may already have invasion at the skull base.[2] If the primary site is more occult, a nodal mass may be the presenting sign, leading to imaging evaluation. Certain salivary malignancies (eg, mucoepidermoid carcinoma

Department of Neuroradiology, University of Michigan, B2-A209D, 1500 East Medical Center Drive, Ann Arbor, MI 48109, USA
* Corresponding author.
E-mail address: ashoks@med.umich.edu

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[MEC]) have a tendency for nodal metastases. Close attention should be paid to the aerodigestive tract and associated salivary glands in all cases of pathologic nodal enlargement.

Most salivary gland neoplasms arise in the parotid gland, approximately 73% in 1 large study,[3] but they are not usually malignant; merely one-fourth (15%–32%) of parotid neoplasms are malignant on histology.[4] Less than 11% of salivary gland neoplasms arise in the submandibular gland, where they carry a 41% to 45% chance risk of being malignant. Less than 0.5% of salivary neoplasms arise in the sublingual gland, but they carry a 70% to 90% chance of being malignant. Minor salivary glands account for the remaining approximately 14% of salivary tumors.[1] Among the 450 to 750 minor salivary glands overall, approximately half of the tumors found are malignant. Risk of malignancy is stratified among the minor salivary glands; approximately half of the palatal neoplasms found are malignant; however, in the floor of mouth, the risk increases to 90%.[5] Although most large population studies are somewhat dated, recent studies have generally held these percentages stable over time.[6] The 1 addition is that more cancers are now diagnosed, yet causative factors remain elusive.

In summary, and as a rule, the risk of malignancy increases as the gland decreases in size. Although tumors are most commonly found in the parotid, they are least likely to be malignant in that location; the majority are adenomas. Although the sublingual gland is a small structure, tumors found within it are usually (almost 90% of the time) malignant. Still, given the overall disproportionate distribution of tumors to the parotid gland, the parotid is the most likely major salivary gland in which malignancy arises.

TUMOR HISTOLOGY

According to the World Health Organization (WHO), there are more than 25 types of distinct salivary gland tumors. New histologic and biochemical techniques allow for identification of different molecular and genetic subtypes (including hallmark translocations), which can help direct targeted therapy. The WHO updated their 2005[7] *Classification of Head and Neck Tumours* with a new list of salivary gland malignancies in 2017.[8] The most common salivary malignancies (**Box 1**) still include adenocarcinomas, carcinoma ex pleomorphic adenoma, acinic cell carcinoma, adenoid cystic carcinoma (ACCa), MEC, and lymphomas. Important additions include the mammary analog secretory carcinoma (an acinic cell variant based on gene fusion) and several differences in grouping (eg, low-grade cribriform adenocarcinoma is now grouped in with intraductal carcinoma). The update grants pathologists increased flexibility to characterize the tumors according to which translocations and gene fusions are identified. Pathologists can also incorporate descriptions of high/intermediate/low-grade rates of mitoses into their analysis, and preference is now given to a new phrase, "high-grade transformation," which replaces dedifferentiation.[8] Genetic rearrangements are also described and help determine tissue of origin. Although much of the update revolved around primary neoplasms, it must be remembered that secondary malignant pathology can also occur in the salivary glands, specifically, malignant metastases to intraparotid lymph nodes.

Box 1
Common histologic types of salivary malignancies

Primary

Adenocarcinomas

Carcinoma ex pleomorphic adenoma

Acinic cell carcinoma

ACCa

MEC

Intraductal carcinoma

Mammary analog secretory carcinoma

Lymphomas

Secondary

Intraparotid lymph node metastases

Abbreviations: ACCa, adenoid cystic carcinoma; MEC, mucoepidermoid carcinoma.

IMAGING AND STAGING OF SALIVARY GLAND MALIGNANCIES

Major salivary gland malignancies have a separate, dedicated American Joint Committee on Cancer (AJCC) tumor-node-metastasis (TNM) staging system. Minor salivary gland malignancies are staged according to the local site of origin. AJCC TNM classifications for malignancies of the paranasal sinuses/nasal cavity, nasopharynx, oral cavity, oropharynx, hypopharynx, or larynx (with subsites) are used. Proper radiologic assessment of salivary gland malignancies requires having familiarity with the AJCC TNM staging schemes in the head and neck and apply these guidelines when mapping the extent of tumors.[9] Simply identifying the presence of a tumor or speculating as to the histologic type of tumor is not the primary role of the radiologist in these cases.