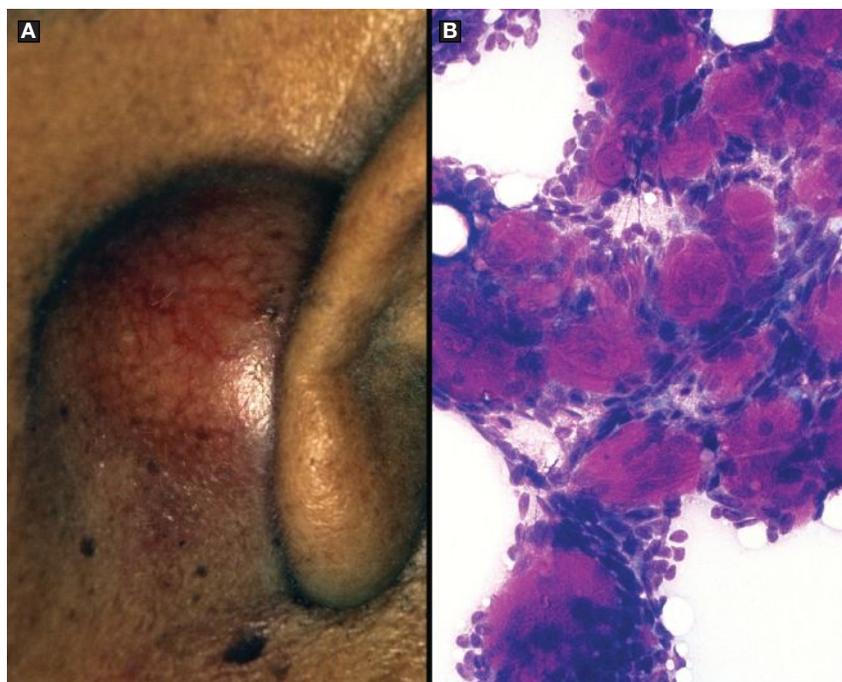


# Salivary gland adenoid cystic carcinoma

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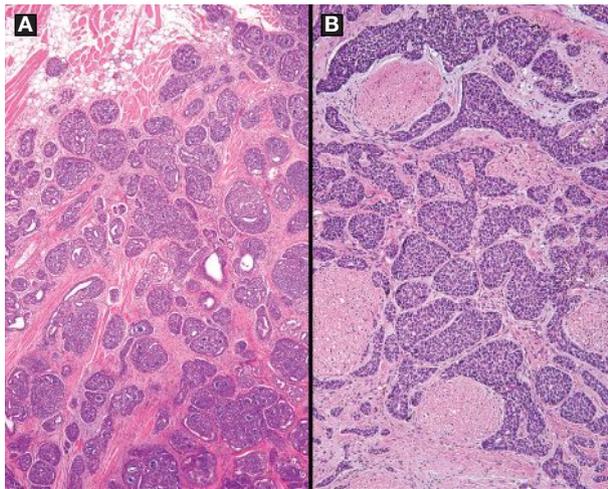


*Figure 1. A: A tail of the parotid gland mass shows erythema and tense skin. B: Air dried Diff-Quik-stained material shows the characteristic cylinders of reduplicated basement membrane surrounded by peg-shaped nuclei (fine-needle aspiration).*

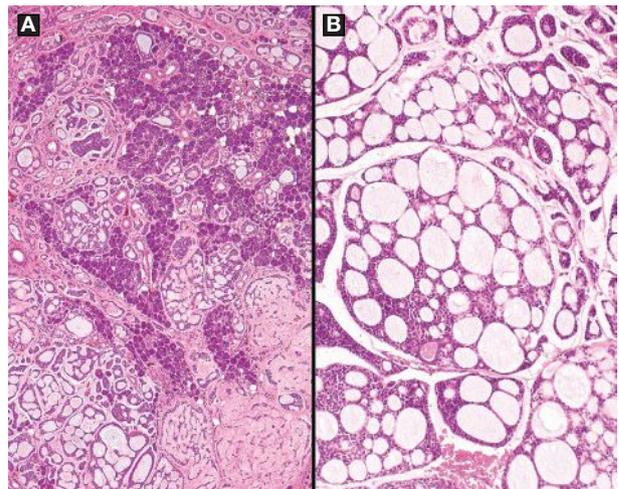
Adenoid cystic carcinoma (ACC) is a malignant epithelial salivary gland tumor with myoepithelial and ductal differentiation. Salivary gland tumors account for only about 5% of all head and neck carcinomas, with ACC the fourth most common salivary gland malignancy. ACC has a 3:2 female-to-male ratio. Patients tend to be adults, with a peak clinical presentation in the sixth decade. The tumors are found most frequently in the parotid gland but are also found in the palate, tongue, lip, and other sites in the upper aerodigestive tract and the rest of the body.

Patients present with a slowly growing mass (figure 1, A), often tender or painful, with nerve effects (paresthesia, paralysis); intraoral lesions may be ulcerated. Most tumors have been sampled before resection by fine-needle aspiration, in which the basaloid proliferation associated with the reduplicated basement membrane and glycosaminoglycan material is usually diagnostic (figure 1, B).

Radical surgery, including nerve sacrifice, may be required to remove the tumor, although nerve involvement results in a high recurrence/persistence rate. The



**Figure 2.** **A:** A tubular and solid pattern of neoplastic cells shows invasion into skeletal muscle and fat (upper left). **B:** Several large nerves are surrounded by tumor cells, a characteristic finding in ACC.



**Figure 3.** **A:** The native parotid gland is completely surrounded by tumor, which shows a cribriform and tubular pattern. Note the reduplicated basement membrane compressing the epithelial cells in the lower right. **B:** The most characteristic “cribriform” pattern is shown.

tumor has a very prolonged and progressive course, with a poor 20-year survival rate. Overall, a poor prognosis is seen with large tumors (>4 cm), lymph node or distant metastases, high Ki-67 proliferation index, submandibular gland location, large tumor size, extent of perineural invasion, and high tumor grade (solid pattern).

Targeted therapies for patients with advanced disease may be helped by the identification of the *MYB-NFIB* gene fusion, among others, since other targets, such as proto-oncogene C-kit, are not mutated. High *MYB* expression correlates with worse patient survival.

Tumors are poorly circumscribed with an infiltrative border, including extracapsular extension beyond the salivary gland; the neoplastic cells show significant perineural (figure 2) and lymphovascular invasion. While a single pattern may predominate, there is usually a combination of patterns: cribriform (“Swiss cheese” or “telephone dial” [figure 3]), tubular, compressed, or solid. The pseudocysts are not true glandular lumens but are part of the tumor stroma, showing glycosaminoglycan material (“blue goo”), or hyalinized basal lamina (figure 3). The basal lamina may be abundant, compressing the epithelial component to the point that it is hard to identify. The epithelial cells will form tubules with small lumen, surrounded by ductal and myoepithelial cells (figure 3). The cells are small to medium with scant cytoplasm, showing an angular, peg, or carrot shape. Nucleoli are inconspicuous. Mitoses are easily identified and significantly increased in

the solid pattern (>30% of the tumor must be solid to qualify as this type). Necrosis is uncommon.

Immunohistochemistry is not usually of value in distinguishing between salivary gland tumors, although differential expressions of cytokeratins, S-100 protein, GFAP, CD117, MCM2 (minichromosome maintenance proteins), and *MYB* may be of help.

The pathology differential diagnosis includes polymorphous low-grade adenocarcinoma, pleomorphic adenoma, basal cell adenoma, basal cell adenocarcinoma, epithelial-myoepithelial carcinoma, basaloid squamous cell carcinoma, neuroendocrine carcinoma, and even sialoblastoma. Clinical findings, tumor location, histology, and selected immunohistochemistry studies will help narrow the differential diagnosis.

### Suggested reading

- Barrett AW, Speight PM. Perineural invasion in adenoid cystic carcinoma of the salivary glands: A valid prognostic indicator? *Oral Oncol* 2009;45(11):936-40.
- Frierson HF Jr, Moskaluk CA. Mutation signature of adenoid cystic carcinoma: Evidence for transcriptional and epigenetic reprogramming. *J Clin Invest* 2013;123(7):2783-5.
- Moskaluk CA. Adenoid cystic carcinoma: Clinical and molecular features. *Head Neck Pathol* 2013;7(1):17-22.