

The Utility of Lateral Parotid Fascia in Localizing Deep versus Superficial Parotid Tumors

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Introduction

Accurate pre-operative localization of parotid tumors relative to the facial nerve has significant implications on the extent of and risks associated with surgery. The course of the facial nerve itself cannot be visualized via traditional imaging modalities. Anatomic landmarks, including the retromandibular vein and the parotid duct have been identified as surrogate markers to predict the course of the facial nerve. To date, there have been no studies evaluating the use of the lateral aspect of the superficial layer of the deep cervical fascia (lateral parotid fascia) for localization of parotid tumors. We attempted to determine whether contact with the lateral parotid fascia would differentiate deep versus superficial parotid tumors relative to the facial nerve on pre-operative CT imaging.

Methods

We performed a retrospective chart review of adult patients (>18 years) undergoing parotidectomy for benign or malignant disease between January 2016 and December 2019. Inpatient electronic medical records were reviewed to obtain information pertaining to demographics, operative notes and surgical pathology. Preoperative CT imaging was reviewed by a single neuroradiology fellow and neuroradiologist blinded to operative and pathology reports. If the tumor contacted the lateral parotid fascia, we hypothesized that the facial nerve would be deep to the tumor.

Results

Ninety-seven patients were identified as possible study candidates. Nineteen patients lacked preoperative CT imaging or had tumors isolated to the parotid tail alone. This has been shown to have a less predictable facial nerve course and were excluded. Seventy-eight patients were ultimately included in the study. Of these, 35 patients (45%) were male and the mean age was 53 years. Pleomorphic Adenoma was the most common neoplasm (44/78; 56%), followed by Warthin’s Tumor (9/78; 12%). The facial nerve was determined to traverse deep to the tumor in 44 cases (56%). The tumor was found adjacent to the lateral parotid fascia in 36 cases (46%). The lateral parotid fascia demonstrated a sensitivity of 56.8% and specificity of 70.6% in identifying tumors that were superficial to the plane of the facial nerve. This relayed a positive predictive value of 71.4%, and a negative predictive value of 55.8%.

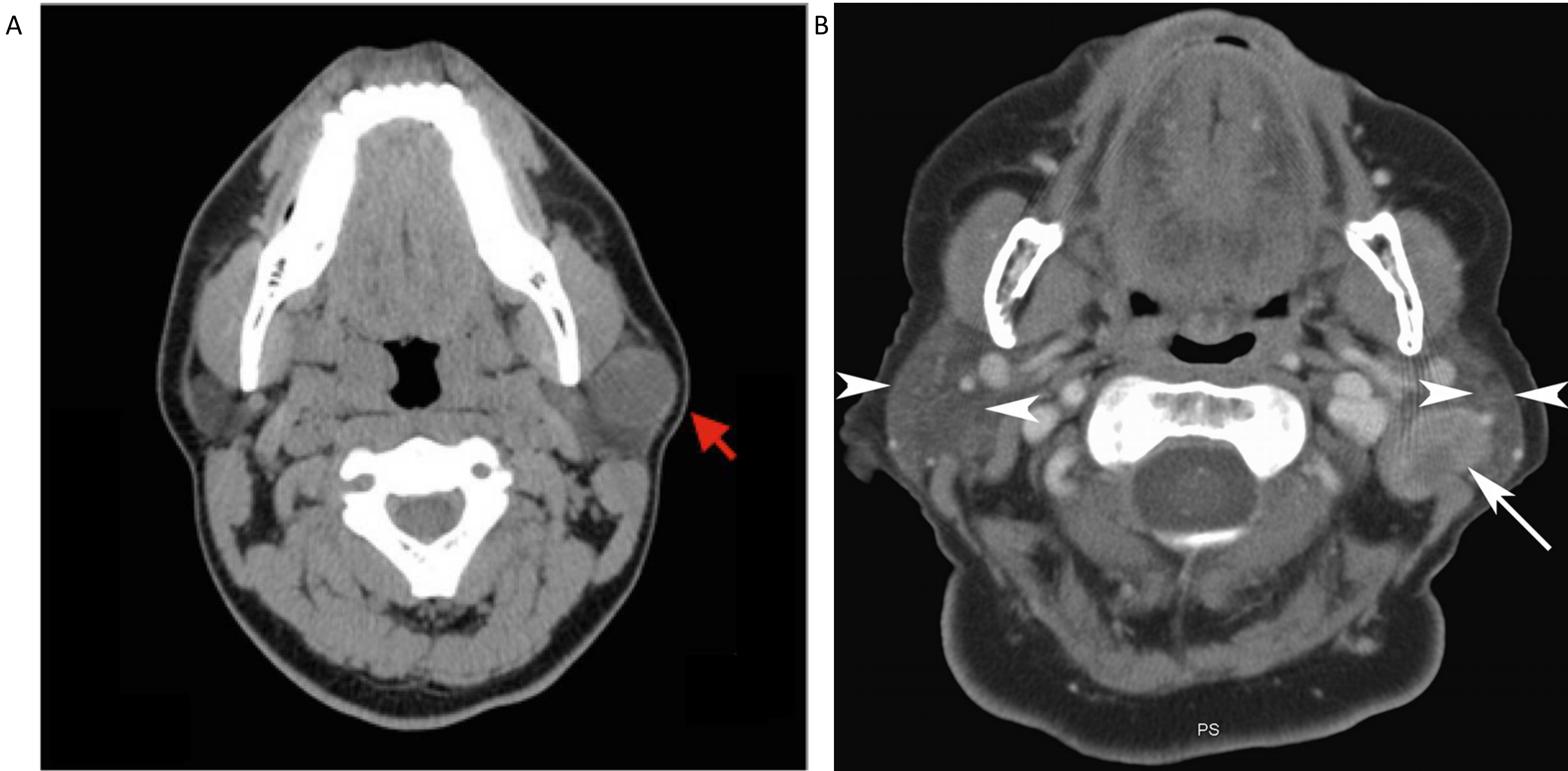


Figure 1. (A) This image shows a parotid neoplasm abutting the lateral parotid fascia. We hypothesized the facial nerve would be deep to the tumor in this situation. (B) This image shows a parotid neoplasm that does not abut the the lateral parotid fascia and therefore our hypothesis is that the facial nerve is superficial to the tumor.

Table 2: Predictability of Lateral Parotid Fascia of Tumor Depth

	Tumor Superficial to FN (n=44)	Tumor Deep to FN (n=34)
Tumor involves LPF (n = 35)	25	10
Tumor does not involve LPF (n=43)	19	24

Table 2: Utility of LPF in identification of tumors superficial to plane of Facial nerve. FN: Facial nerve. Tumor involvement of the lateral parotid fascia radiologically was interpreted as tumor superficial to the plane of the Facial nerve.

Conclusions

Tumors not adjacent to the lateral parotid fascia have been shown to be deep to the facial nerve, thereby increasing surgical time and increasing the risks of surgery. Further investigation is warranted to determine which anatomic markers have the highest positive and negative predictive values in potential preoperative facial nerve localization.