

Computed Tomography (CT) Sinus Image Guided Navigation for Intraoral Drainage of Pediatric Retropharyngeal Abscess

INTRODUCTION

Management of retropharyngeal abscesses (RPAs) includes treatment with intravenous (IV) antibiotics and/or surgical drainage. Intraoperative identification of an abscess pocket intraorally can be challenging especially those located at or near the skull base. Previous studies have described the use of computed tomography (CT) guided drainage of RPAs, but these approaches have required relatively large doses of radiation and are primarily performed via transcervical approach by interventional radiology.¹⁻² Ultrasound guided drainage has also been described, but this approach is not effective for collections near the skull base.³ We describe a case of using low radiation dose CT sinus image-guided navigation for the targeted intraoral drainage of an RPA with extension to the skull base.

PATIENT PRESENTATION

A 12-year-old patient, otherwise healthy, presented with two weeks of fever and right sided neck pain. Upon arrival, patient had elevation in inflammatory markers (ESR/CRP) and white blood cell count. Initial CT neck revealed a multifocal right sided RPA, with largest collection measuring 1.8 cm, with extension to the skull base. After failed medical management, repeat imaging done with standard sinus image guidance protocol (Medtronic TM) revealed an increase in size of the multi-loculated RPA with two abscesses measuring 2.3 cm and 2.1 cm respectively. The decision was made to proceed with operative drainage. Given the location near the skull base, very close approximation to the carotid arteries, and separate loculations, image guided navigation was utilized to improve accuracy.



Figure 1: Contrast enhanced CT scan demonstrating multiloculated abscess collection. The inferior collection (blue arrow) measured 2.3 cm, with an additional collection measuring 2.1 cm near the skull base. Both pockets were in close proximity to the carotid artery (blue arrowhead).

INTRAOPERATIVE SET UP



Figure 2: Set up- Patient is placed in standard tonsillectomy suspension with a McIver Mouth gag and red RobNet catheters to retract the palate. Image guided calibration performed in standard fashion. Metal from mouth gag did not interfere with navigation.

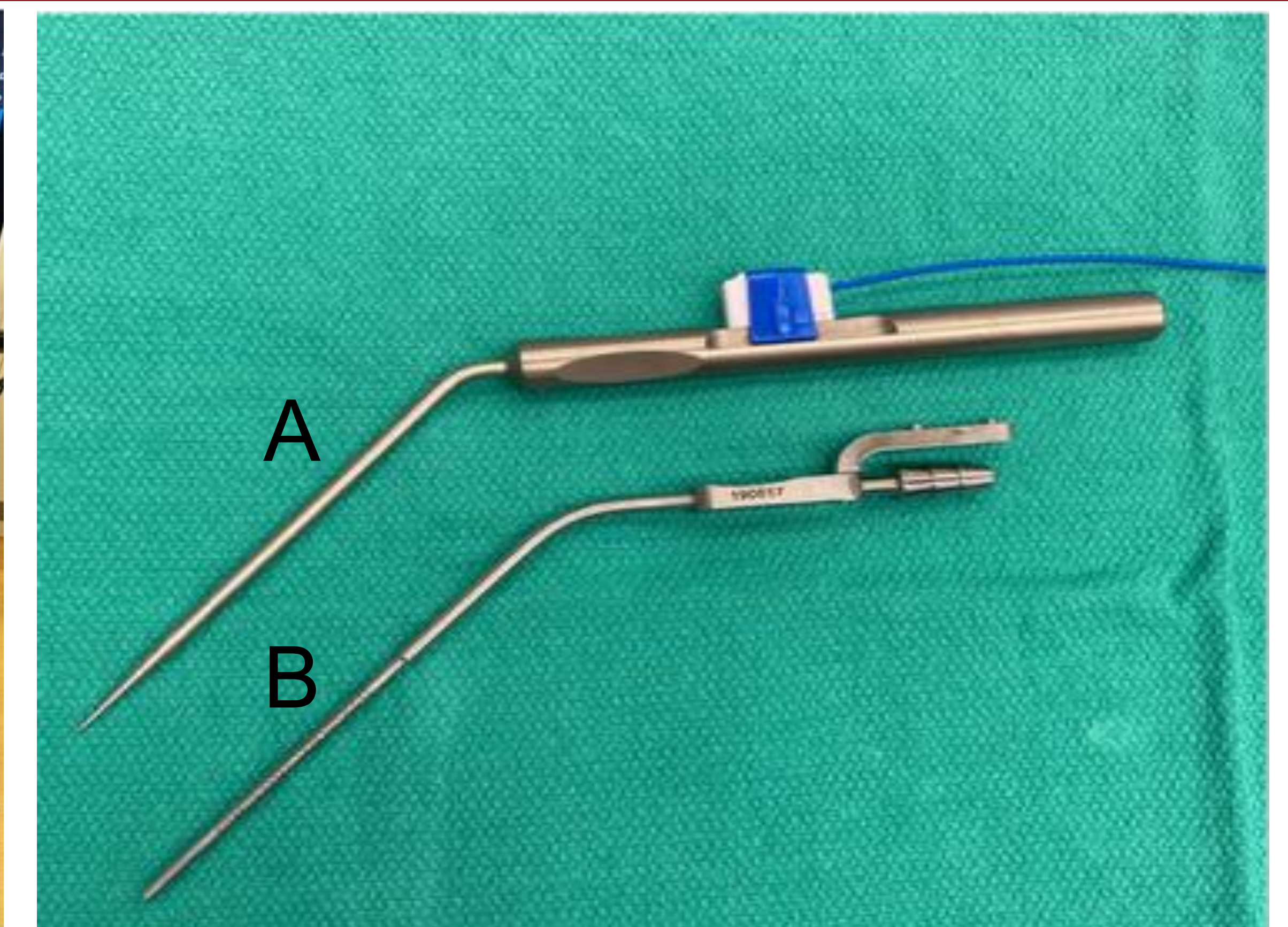


Figure 3: Instruments used for drainage include the navigation straight probe (A) to identify the trajectory of the needle insertion into the abscess pocket. The navigation Frazier tip suction (B) was introduced into the abscess pocket after I+D to confirm drainage.



Figure 4: Intraoperative combined use of endoscopic visualization and CT-guided navigation. Once the trajectory of the abscess was identified on axial and sagittal images with the probe, an 18-gauge needle was introduced into the oral cavity in parallel to the navigation probe. The abscess was aspirated, and a small incision was made to open the pocket further with a clamp.

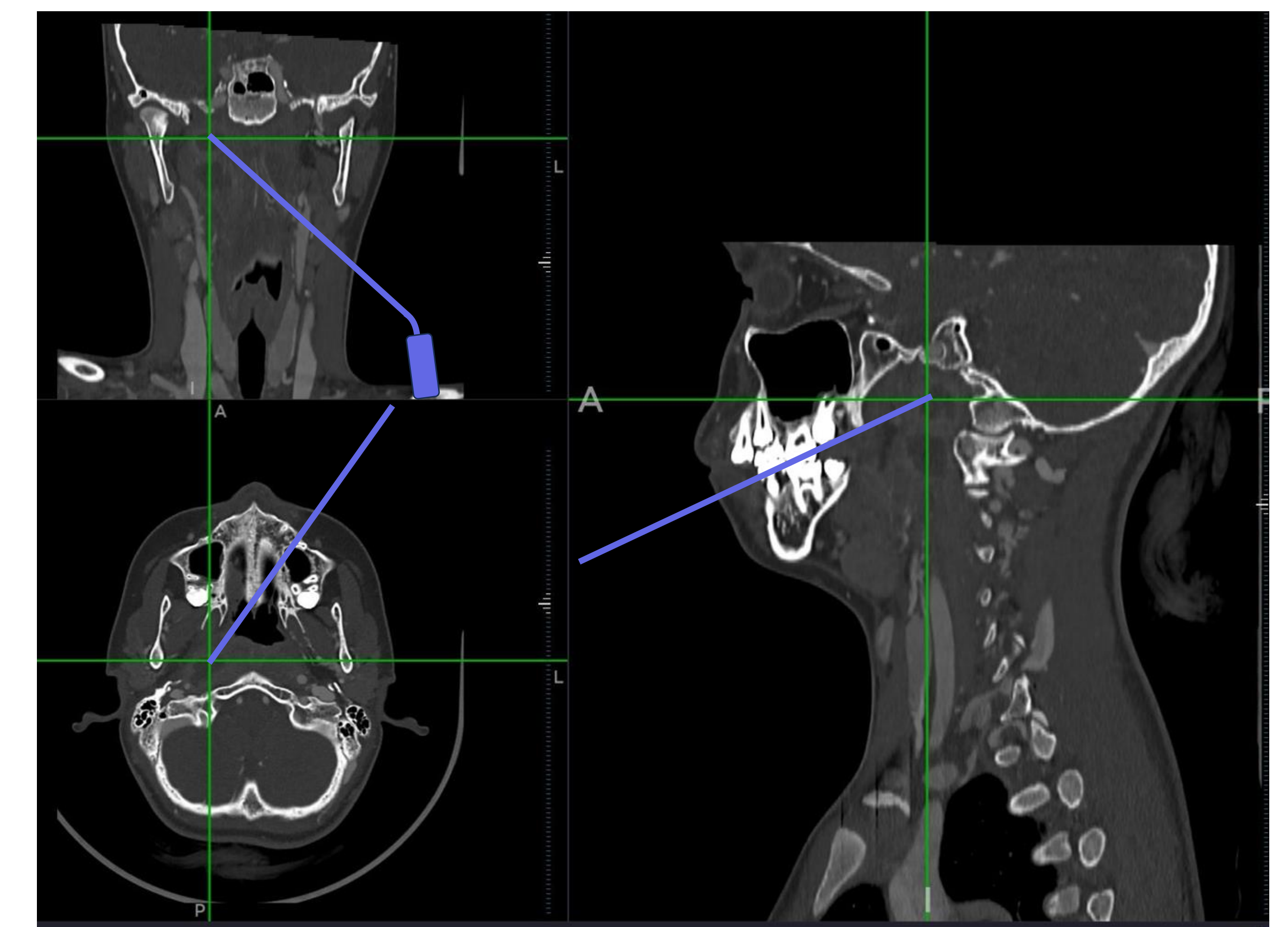


Figure 5: Neuronavigation confirming entry into abscess pockets with the navigation Frazier tip suction.

CONCLUSIONS

For RPAs with extension near the skull base, image guidance done in the standard sinus protocol can be a useful tool for targeted intraoral drainage by providing confirmation of entry into the abscess pockets. This may improve accuracy, provides intraoperative confirmation, and may decrease intraoperative time to find the abscess pocket. If all loculated pockets are identified, this may help to shorten the patient's hospital course. Future prospective studies are needed to further explore this.

References:

1. Martin CA, Gabrillagues J, Louvrier C, Saroul N, Mom T, Gilain L. Contribution of CT scan and CT-guided aspiration in the management of retropharyngeal abscess in children based on a series of 18 cases. *Eur Ann Otorhinolaryngol Head Neck Dis.* 2014 Nov;131(5):277-82. doi: 10.1016/j.anorl.2013.04.007.
2. Stevens C, Ladd P, Ghadersohi S, Gitomer SA. Minimally invasive transoral image-guided drainage of a retropharyngeal abscess with mediastinal extension. *Int J Pediatr Otorhinolaryngol.* 2020 Nov;138:110288. doi: 10.1016/j.ijporl.2020.110288.
3. Blaivas M, Adhikari S. Bedside transoral ultrasonographically guided drainage of a retropharyngeal abscess in the emergency department. *Ann Emerg Med.* 2011 Nov;58(5):497-8. doi: 10.1016/j.annemergmed.2011.05.017