

# Endoscopic Skull Base Surgery for Sinonasal Malignancy

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## KEYWORDS

- Esthesioneuroblastoma • Olfactory neuroblastoma
- Adenocarcinoma • SCC • Adenocystic • Mucosal melanoma
- Sinonasal • Skull base

| EBM Question  | Level of Evidence | Grade of Recommendation |
|---|-------------------|-------------------------|
| Are oncological outcomes the same with EES compared to open craniofacial surgery? | 4                 | C                       |

Many of the surgical techniques described endoscopically within the skull base can be applied to malignant sinonasal disease. However, it is the oncological principles of such treatment that must be adhered to when undertaking endoscopic tumor surgery. A focus should be maintained on a surgical philosophy that is driven by the disorder and its staging rather than the available surgical expertise and equipment. The endoscopic tumor surgeon should be equally comfortable in managing the patient by an open craniofacial as well as an endoscopic approach.

There are 3 foundations for successful endoscopic surgery. First, the resection should be defined with frozen section control of surgical margins. Few endoscopic tumor removals are en bloc and thus margin control is essential. Surgical mapping of such margins are advised (**Fig. 1**). This mapping also aids postoperative adjuvant

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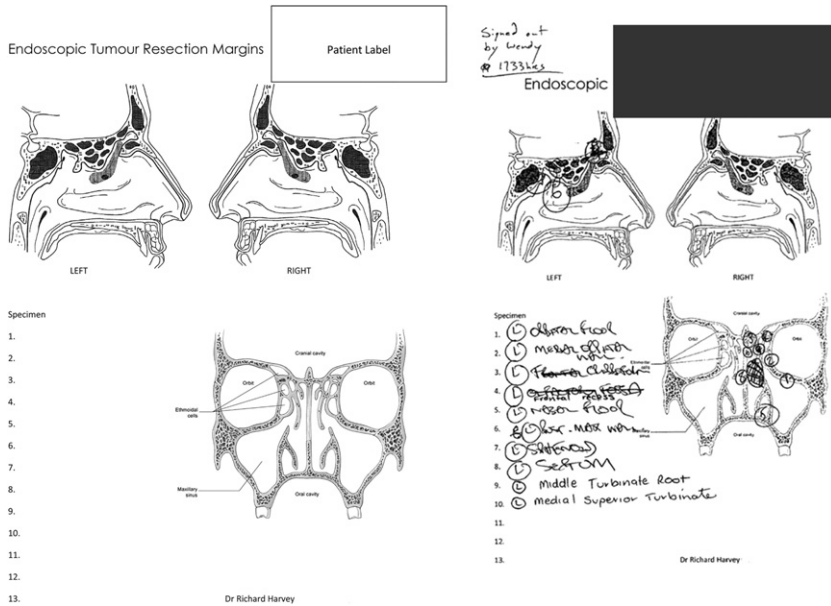
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**Fig. 1.** Surgical margin mapping in the removal of a small adenocystic carcinoma is useful both to ensure orientation, chase follow-up margins that might return unexpected formal positive findings, and aid adjuvant radiotherapy planning.

therapy planning. The access required should be predetermined by the tumor and preoperative imaging (**Table 1**). There should be minimal attempts to be conservative at the expense of gaining adequate access for tumor removal. Functional cavity techniques are a secondary concern. In addition, there should be no hesitancy in removing macroscopically involved tissue, such as dura, periorbital, and other important structures. Although the biology of some tumors may afford an approach of gross removal from dura, carotid, and orbital structures with successful adjuvant therapy, this is not standard care and has yet to be proved as effective therapy for malignancy. This shortcoming should not prevent the surgeon from removing obviously involved anatomic barriers at the time surgery (**Fig. 2**). Much of this is related to surgeon skill and expertise. It differs greatly from managing benign conditions, such as inverted papilloma, in which preserving anatomic barriers to spread is paramount.

Proponents of the traditional craniofacial approach (tCFR) argue that an en bloc resection possible with the tCFR is impossible with endoscopic approaches that, at best, are “piecemeal resection” of the tumor. Proponents of the endoscopic approach are of the opinion that, in resecting tumors involving the anterior skull base an en bloc resection is rarely possible whatever approach is used. Optimum endoscopic visualization enables a wide-field, three-dimensional resection close to an en bloc resection in most cases and a better term is tumor disassembly. Proponents of both approaches agree that the resection is intended to achieve negative margins. An endoscopic approach offers several other advantages.<sup>1</sup> The operation time is shorter, and is associated with less morbidity and shorter hospital stay.<sup>2</sup> Patients do not experience the serious complications that can be associated with the approach in tCFR, nor are they likely to be subject to the reduction in quality of life. Nicolai and colleagues<sup>3</sup> reported a complication rate of 6% following endoscopic resection of malignant tumor

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