

## Optimal Surgical Resection of Intracranial Epidermoid Tumor: A Tailored Approach

It is an honor for having been invited to write a commentary/guest editorial to the published paper titled, "Analysis of giant intraventricular and extraventricular epidermoids, defining risk factors for recurrence, an institutional experience."<sup>[1]</sup> The current paper explicitly explains risk factors for recurrence in multi-compartment epidermoid tumors. The authors have provided a well-designed study and analysis to determine valuable preoperative information. Such information would clearly help surgeons to make timely decisions while attempting surgery on such critical cases. The patients were categorized into three groups including multi- and single-compartmental lesions. Tumors with preoperative capsular enhancement, multi-compartmental distribution in vertebrobasilar territory, large size, and presence of calcification have been cited as strong predictors for recurrence. It has also been claimed that endoscope-assisted surgery could reduce the risk of morbidity; however, the recurrence rate was not changed.<sup>[1]</sup>

According to the contemporary literature, there is no effective chemotherapy; moreover, radiotherapy has indication only in recurrent unresectable cases and furthermore carries the risk of malignant transformation of the residual tumor into squamous cell carcinoma. Therefore, surgical resection remains the mainstay of treatment.<sup>[2,3]</sup>

Epidermoid tumors typically occur and expand within cisterns and fissures, spreading through various corridors, often along the skull base.<sup>[2]</sup> The capsule is adherent to neurovascular structures in the majority of cases, which mandates conservative management. Therefore, the capsule would be left without manipulation to prevent major deficits and recurrence becomes inevitable. Sometimes, surgical resection of the recurrent tumor could be really challenging.<sup>[2,3]</sup>

Natural history plays a significant role. Considering the age of the patients is critical in decision-making and subtotal resection would be justified in old cases with severe comorbidities. Some claim that total removal of the capsule prevents or delays recurrence and minimizes complications and improves long-term outcomes.<sup>[2,4]</sup> Therefore, preoperative planning and intraoperative decision-making are valuable in such patients. Moreover, several factors would assist in the prediction of recurrence.

Mass reduction of cyst contents in most cases usually results in marked improvement of the symptoms. However, although the number of the cases is limited, the strangulation of the affected nerves by the tumor capsule, not the cyst pressure, causes distortion of the nerve axis and

nerve atrophy distal to the strangulation site, resulting in preoperative rapid and severe dysfunction. This mechanism has been reported with the sixth and seventh cranial nerves in cerebellopontine angle epidermoid cyst,<sup>[5]</sup> and young age and rapidly progressive neurological deficit might be the characteristics for strangulation of the affected nerves by the cyst capsule. A similar strangulation mechanism causing the trigeminal neuralgia as well has been reported.<sup>[6]</sup> In such cases, immediate decompression and release of the strangulating band of the epidermoid cyst wall might be essential to ameliorate the rapidly evolving deficit.

It is important to understand ways to optimize the extent of epidermoid tumor resection in an effort to prevent a recurrence. Some claim that total removal (gross total resection [GTR]) of epidermoid would decrease the overall rate of morbidity. Others believe that aggressive resection of tumor capsule challenges GTR.<sup>[2,3]</sup> It seems that the removal of proliferative capsules minimizes the risk of regrowth. This has been supported by the significant difference in recurrence rates between subtotal and GTRs.<sup>[3]</sup>

Moreover, there is a high risk of aseptic meningitis and cranial nerve injury which challenge modern microsurgical techniques and surgical expertise. Intraoperative monitoring and intraoperative magnetic resonance imaging are important adjuncts to improve the visualization of tumor and extent of surgical resection.<sup>[3,4]</sup> Furthermore, the use of the endoscope has been of tremendous help in visualizing the tumor along the skull base, especially in multi-compartmental lesions.<sup>[4]</sup>

On the other hand, scar tissue and adhesions increase the risk of recurrent surgery. The capsule could be totally removed in about 70% of primary cases, in comparison to 17% of reoperations.<sup>[3,4]</sup> Therefore, decision-making about the resection of capsule requires an individualized decision-making. GTR with capsule resection is achievable in the majority of patients; however, safe and maximal resection is always a justified and coveted goal.

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