Letter: Postoperative Hearing Preservation in Patients Undergoing Retrosigmoid Craniotomy for Resection of Vestibular Schwannomas: A Systematic Review of 2034 Patients

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Conflict of interest:

None.

Dear Editor,

We have read with great interest the recent article published in Neurosurgery, related to postoperative hearing preservation in patients undergoing retrosigmoid craniotomy for resection of vestibular schwannomas (VSs)[1]. Tumor size data were stratified to compare hearing after surgery for intracanalicular, small (0-20 mm) and large (>20 mm) tumors. Aggregate hearing preservation was 31% and 35% under a fixed and random effect, respectively. Depending on the tumor size the rate was 57%, 37% and 12%, respectively, for intracanalicular, small and large tumors. There was a high heterogeneity, with hearing preservation rates ranging form 0-100%.

Vestibular schwannoma management has been of constant neurosurgical debate during the past 20 years[2]. Current treatment possibilities include observation, stereotactic radiosurgery (SRS) and microsurgery (MS)[3]. For intracanalicular tumors, the "wait-and-scan" approach has been further challenged by the proactive SRS treatment[4], as the former had been suggested to better preserve hearing on long-term basis, especially in patients with high-level of hearing pretherapeutically, absence of subjective hearing loss in patients with Garner-Robertson 1[5] or younger age[6]. In general, small to medium size tumors can be offered SRS. The recent International Stereotactic Radiosurgery Society (ISRS) guidelines have stated that for marginal doses between 12-14 Gy, in single fraction, SRS and particularly Gamma Knife allows facial nerve House-Brackmann grade I in 95-100% and hearing preservation rates between 41-79% at 5 years[7]. Large VS with symptomatic mass effect are common MS indication[8]. Samii et al.[9] reported hearing preservation of 11% after total excision of large VS. In the present systematic review, hearing preservation rates for large tumors was 12%.

An open question is whether new type of approaches, in particular subtotal resection followed by SRS[10] could be of help in improving hearing outcome in large VS. However, the definition of subtotal, gross total or near-gross total resection suffers from a heterogeneity definition in the current literature. A recent systematic review[11] suggested functional nerve preservation of 91.6% (95% CI 93.7%-98.5%) and serviceable hearing preserved in 59.9% (95% CI 36.5%-83.2%) after planned subtotal resection followed by SRS. Moreover, it is now well acknowledged that the risk of cancerogenesis after SRS remains extremely rare[12] and similar to the risk of development of such tumor even in the absence of prior radiation. However, there is currently no consensus whether SRS should be applied at a latter time in case of remnant tumor growth[13] or shortly after MS, without further « wait-and-scan »

strategy[14], shall a subtotal resection be applied. « Optimal resection »[13] has been suggested, which can be perceived differently from one center to another[15]. How optimal is optimal remains so a matter of additional debate.

A supplementary aspect is whether large tumors should be considered those greater than 20 mm, or greater than 30 mm etc. The results might vary also in terms of outcome, although globally larger tumors are known to be associated with poorer outcomes. In a series of 54 patients with preserved hearing at the time of surgery and VS ≥ 20 mm of extrameatal diameter, hearing preservation was achieved in 53.7%, but only 31% had maintenance (or improvement) of hearing at the same level as before surgery[16]. Furthermore, Ansari et al.[17] reported on 127 patients with VS ≥ 30 mm with postoperative hearing preservation in only 28.3% [17], while Di Maio et al. only 21.4%[18]. In series performing combined approaches, hearing preservation rates after MS and GK have been reported to be as high as 82%[19].

Recently, intraoperative adjunctive with cochlear mapping with the mobile cochlear nerve compound action potential tracer in VS surgery has been also suggested[20]. While this device might be useful in cochlear nerve mapping and consequently help in hearing preservation, it has also several limitations. Nevertheless, in this small series, among 8 patients with large tumors (Koos grade III or IV), the rate of successful mapping was 62.5% (5 patients) and the rate of hearing preservation in patients with large tumors was 50% (4 patients).

Current strategies for VS have significantly evolved during the past decades. A major challenge is to offer patients with large VS where MS is needed a clinical outcome compared to that of the small to medium size tumors treated usually by SRS. This challenge is reflected in the appearance of new paradigm shifts, such as the subtotal resection followed by SRS. Whether this type of approach would become the “Holy Grail” of this particular skull-base challenging pathology remains to be elucidated by further series, including with long-term follow-up.

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