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Review article

Postoperative headache following treatment of vestibular schwannoma: A literature review

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ABSTRACT

Vestibular schwannoma (VS) is a brain tumour arising from Schwann cells that is typically closely associated with the vestibulocochlear nerve. Post-operative headaches (POH) are a potentially common complication of surgery for VS. Greatly differing rates of POH have previously been reported, particularly with different surgical approaches. The aim of this review is to identify and summarise the available peer-reviewed evidence on rates of POH following operative (or radiosurgery) treatment for VS, in addition to information about the treatment and prognosis of POH in these patients. A systematic search was conducted of Pubmed, Medline, Scopus and EMBASE in April 2017 using the medical subject headings (*acoustic neuroma OR vestibular schwannoma*) AND *headache*. Eligibility determination and data extraction were performed in duplicate with standardised forms. POH is common following surgery for VS. Differing rates of POH have been reported with different management approaches, patient age and tumour size. There are relatively few studies that have directly compared the rates of POH with different surgical approaches. The retrosigmoid approach with craniotomy appears to have lower rates of POH than when the retrosigmoid approach is performed with craniectomy. Patients under the age of 65 and with tumours <1.5 cm in size appear to have a higher risk of POH. The most commonly documented management of POH involves simple analgesia, although the majority of patients report this treatment is of only minimal benefit. Further prospective studies comparing rates of POH following different surgical approaches and radiosurgery are required.

1. Introduction

Vestibular schwannoma (VS) is a benign brain tumour of Schwann cell origin. These tumours are typically located in close proximity with the vestibulocochlear nerve. Accordingly, VS surgery can result in a range of complications including damage to the facial or vestibulocochlear nerve, vascular injury to basilar, labarynthine or brainstem perforator arteries, venous infarction of the cerebellum or brainstem, infection and post-operative headaches (POH) [1,2]. The three main approaches employed in the operative management of VS are the middle cranial fossa (MF) approach, translabyrinthine (TL) approach and retrosigmoid (RS) approach [3]. Radiosurgery (RdS) involves stereotactic-guided high-dose radiation, typically administered in a single dose, and can offer an alternative to operative approaches.

The incidence of POH has been reported to vary substantially with different surgical approaches [4,5]. Individual tumour and patient factors have also been investigated in relation to the varying rates of POH. This review was conducted to collate the available evidence regarding differing rates of POH following VS surgery or radiosurgery, as well as the treatment and prognosis of these headaches.

2. Method

This review was conducted in accordance with the PRISMA-P guidelines [6]. The databases Pubmed, Medline, EMBASE and Scopus were searched using the search terms (*acoustic neuroma* OR *vestibular schwannoma*) AND *headache*. The searches were conducted on 13/4/2017 and included results from the respective commencements of the databases. Following the initial searches an English language filter was applied.

The articles were reviewed in title and abstract to determine whether they fulfilled the inclusion criteria: (1) Primary clinical publication, (2) Involved patients with VS, who were treated surgi-

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cally or with radiosurgery, (3) Reported on ANY of: (a) frequency of POH, (b) patient or tumour or procedural factors that were associated with the development of POH, (c) treatment of POH or (d) prognosis of POH and (4) Available in full text. If it could not be determined whether an article fulfilled these criteria based on the title and abstract it was reviewed in full-text.

The primary outcome of the review was the effect of different surgical methods or radiosurgery on frequency of POH. The effect of patient or tumour factors on frequency of POH, evidence regarding treatment strategies of POH and information on the prognosis of POH following surgery for VS (such as quality of life scores and duration of POH) were considered secondary outcomes.

Eligibility determination, quality analysis and data extraction were performed in duplicate using standardised forms. Quality analysis was conducted using criteria adapted from the Cochrane Risk of Bias Assessment Tool and the Newcastle-Ottawa scale. Any discrepancies that arose were resolved with discussion. A formal meta-analysis was not conducted due to study heterogeneity.

3. Results

Initial searches returned a total of 873 articles, which ultimately resulted in the inclusion of 66 articles (see Fig. 1).

3.1. Effect of different surgical methods on the incidence of POH

3.1.1. Retrosigmoid approach

Studies assessing the frequency of POH following the RS approach found that rates of POH differed depending on whether craniectomy, craniotomy or cranioplasty was performed [4,7–19]. There were eight studies in which the RS approach with craniectomy, craniotomy or cranioplasty were directly compared (see Supplementary Information 1).

Four studies were located that addressed the effect of RS cranioplasty on POH [7–10]. The only statistically significant difference in these studies was in Catalano et al. [7] in which it was found that the addition of residue trapping significantly reduced the incidence of POH in cranioplasty (10.34%) ($p < 0.001$) [7]. This study also found that the RS approach alone yielded lower rates of POH than when combined with cranioplasty (69.29% vs 81.48%, statistical significance not provided). This finding was in contrast to other studies that found that the RS approach in combination with cranioplasty was associated with a trend towards lower incidence of POH relative to when cranioplasty was not performed (statistical significance not provided and $p = 0.158$ respectively) [8,10]. The study conducted by Ruckenstein et al. [9] assessed the incidence of POH after cranioplasty but had no control group (that underwent the RS approach without cranioplasty) with which to com-

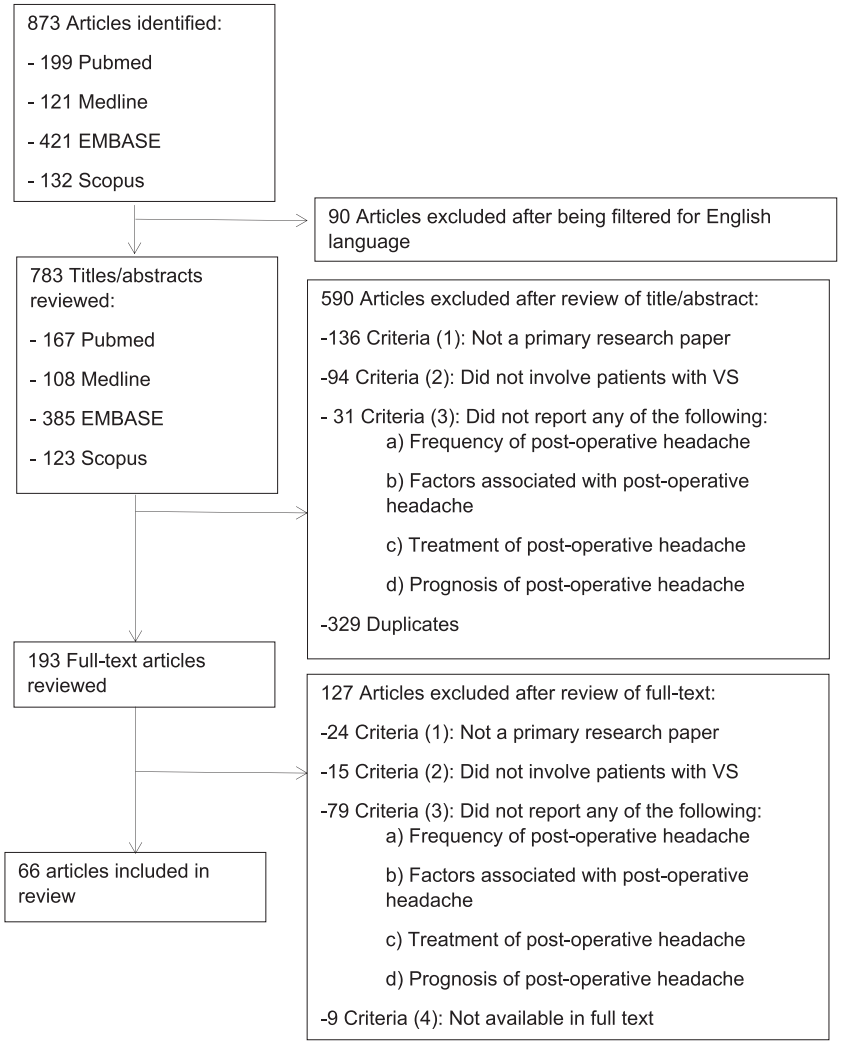

Fig. 1. Flowchart detailing results from the search strategy for a systematic review of articles assessing POH after surgery for VS.

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