

Petrosal Vein Sacrifice During Microvascular Decompression: Perioperative Complication Rates and Comparison to Venous Preservation

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Introduction

The superior petrosal vein (SPV) drains the superolateral part of the ipsilateral cerebellar hemisphere and pons and empties into the superior petrosal sinus. This vein is situated near the rostral cerebellopontine angle and is frequently encountered during microvascular decompression (MVD) of the trigeminal nerve. The SPV may block access to the trigeminal nerve during MVD or may rarely be the offending vessel. Complications arising from sacrifice of the SPV have been previously reported in 9.5-30% of patients.

Methods

98 consecutive patients undergoing microvascular decompression of cranial nerve 5 or 7 between the dates of January 2006 and November 2014 were retrospectively reviewed. All patients underwent surgery at the same hospital. Division of the superior petrosal vein during surgery was recorded and statistical analysis was performed to determine if sacrifice was associated with higher complication rates.

Table 1

Complication	Number
CSF leak/hydrocephalus	5 (6.7%)
pseudomeningocele	3 (4.0%)
altered mental status	3 (4.0%)
sigmoid sinus thrombosis	1 (1.3%)
cerebellar/brainstem edema	3 (4.0%)
midbrain/pons infarct	1 (1.3%)

Summary of complications

Figure 1



Cerebellar and pontine edema following SPV sacrifice

Results

Of 98 patients undergoing MVD, 75 (76.5%) had sacrifice of the SPV at the time of surgery, 19 (19.4%) had SPV preserved, and 3 (3.1%) were revision operations. In total, 12 patients (12.2%) of patients had symptoms potentially attributable to SPV sacrifice (confusion, hydrocephalus, venous infarct, sinus thrombosis, or cerebellar edema). All 12 of these patients had the SPV taken at the time of surgery, constituting a 16% symptomatic rate. Ten of these patients had corresponding imaging findings of cerebellar or brainstem edema. None of the patients with preserved SPV were symptomatic nor had imaging changes of venous congestion.

Discussion

During exposure for microvascular decompression of the trigeminal nerve, the SPV is typically encountered and often limits the view of the trigeminal nerve. Some surgeons routinely take the vein when performing microvascular decompression while others sacrifice the vein only if absolutely necessary to ensure a successful decompression. In our series, 12 patients experienced complications potentially attributable to sacrifice of the SPV. This accounts for a 16% complication rate of what many perceive to be a benign step in surgery. The most frequent complication was of hydrocephalus or leakage of cerebrospinal fluid (CSF) in 6.7% of patients. One of these patients necessitated a shunt while the others required re-exploration of the wound. An additional patient had a pseudomeningocele that did not leak. Three patients (4%) experienced radiographic signs of edema in the middle cerebellar peduncle or cerebellum after sacrifice of the SPV. This 4% were symptomatic patients as routine postoperative imaging was not performed in asymptomatic patients indicating this finding may actually be more prevalent. This does appear to be causal to petrosal vein sacrifice as the vein of the middle cerebellar peduncle typically drains into the SPV.

Conclusions

Sacrifice of the SPV is often performed during MVD. However, this is associated with a significant complication rate when compared with preserving the vein. SPV sacrifice should be limited to cases where it is deemed absolutely necessary for successful cranial nerve decompression.

References

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