

Discussion: green angiography 35 could be useful

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Discussion: Endoscopic procedures are increasingly used in spine and brain surgeries in recent time such as brain abscess, hydrocephalus, arachnoid cyst, hematoma, 44 tuberculous meningitis with hydrocephalus, pituitary surgery, cranio-vertebral region lesions, 36, 43 lumbar spines, colloid cyst, cervical spine, 42 craniopharyngioma, 37 deep-seated brain tumors, 29 CSF Rhinorrhea, spine tumors, 25 and in Arnold Chiari malformation 28 etc.

Endoscopic vascular decompression has been reported to be a safe and efficient method in present study, similar results were reported by authors. 20, 31, 38 Offending vessels were found in the majority of cases in present series. Preoperative imaging 9, 12 and intraoperative Indocyanine Green angiography 35 could be useful to detect offending vessel. Although we did not use intraoperative Indocyanine Green angiography. Although knowledge about the site of the offending vessel with the help of preoperative MRI could be useful in reducing dissection, culprit vessels are usually seen medial to TN for neuralgia due to second division whereas it is on the lateral side for third division neuralgia. 45Although single vessel compression was observed in the majority of cases, double vessels were also seen in 23% cases. This stress the need for the thorough search of an additional vessel to reduce recurrence. Anterior compression was observed in about 17% patients in the present study.

Such lesions are difficult to be visualized with the help of a microscope. Endoscope being a better visualizing tool allows identification of such vascular lesions hidden anterior to the trigeminal nerve without retraction of brain and nerve. Although prominent suprameatal tubercle was observed in

6 patients, entire nerve from the pons to the ganglion could be visualized very well without any brain retraction or additional bony drilling.

This was possible with the help of endoscope which may not be possible with the help of microscope without bone drilling or excessive brain retraction.

The average duration of surgery was comparable to microscopic technique.

Whole surgery can be done with the help of an endoscope, which helps in avoiding time wastage in changing from microscope to endoscope and back to microscope. Both immediate post-op and long-term complete, or satisfactory relief of pain was reported in over 94% and 89% patients respectively in the present study. EVD was also found to be a safe procedure in the present study. Re-surgery if needed was also safe and effective.

Although we had some temporary trigeminal dysesthesia, facial paresis, CSF leak, vertigo and decreased hearing, most of them improved without any significant morbidity on conservative management.

Monitoring of brainstem auditory evoked potential in endoscopic vascular decompression could be useful in preserving hearing. Coupling endoscope with this monitoring is especially useful in difficult cases 21 to prevent hearing loss. Good results in the present study could be contributed to using of an endoscope, and due to experienced endoscopic neurosurgeon performing over 95% surgeries. Utilization of proper microsurgical technique such as stabilizing hand and use of pen type of hand grip 40, 41 helps in preventing complications and improves results of surgery.

Although we used interposition technique with good results, the transposition technique was found to be safe and effective 19 which can prevent

granuloma formation and adhesion. Interposition material, when used, should be placed in subarachnoid space and the material should not be in contact with dura or tentorium to avoid granuloma or adhesion formation which can result in recurrence. Endoscopic vascular decompression is an effective and safe alternative 39 to endoscopic assisted microvascular decompression in trigeminal neuralgia. The endoscope is a useful tool in confirming vascular conflict identified by the microscope, finding additional conflicts missed by the microscope and in verifying the adequacy of nerve decompression. 6 Endoscopic assistance is very effective and helpful to identify the site of compression and to confirm the position 32 of interposition material in MVD. Endoscopic vascular decompression offers superb visualization. 5, 10 Use of endoscope in vascular decompression for trigeminal neuralgia allows panoramic views in addition to good visualization of the neurovascular contact which may be missed by microscope. 26 An endoscope is a valuable tool, especially when the bony ridge is hiding the direct microscopic view.

30 An angled endoscope is better for diagnosis of the offending vessel at the root entry zone. 34 The endoscope is helpful in detecting the responsible blood vessel without retracting brain tissue and nerve. 10, 22 In spite of all above advantages, a steep learning curve is a limitation of the procedure. Conclusion: Endoscopic vascular decompression is a safe and effective alternative technique for trigeminal neuralgia. It is helpful in identification of all offending vessels including double vessel.

Anterior compression can be easily identified which could be missed by microscope. It provides the panoramic view, improved visualization without brain and nerve retraction. It helps in better identification of completeness of decompression.