ENDOSCOPY-ASSISTED MICROSURGERY IN THE RESECTION OF EPIDERMOID TUMOR OF THE PONTOCEREBELLAR ANGLE

Microcirugía asistida con endoscopía en la resección de tumor epidermoide del ángulo pontocerebeloso

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ABSTRAC

Introduction: Intracranial epidermoid tumors are rare, slow-growing, and histologically benign congenital neoplasms. The microsurgical approach with endoscopic assistance is described as a minimally invasive technique that facilitates the work of the neurosurgeon in the complete resection of an epidermoid tumor located in the cerebellopontine angle.
Clinical Case: 62-year-old woman, with a 3-year disease characterized by pain on the right side of the face. Symptoms increase in the following 2 years, becoming disabling and only partially improving with pregabalin and oxcarbazepine. Brain MRI showed a hypointense lesion with a cystic appearance at the level of the prepontine cistern with expansion to the right cerebellopontine angle that compressed the right trigeminal nerve (V). Retromastoid craniotomy and a right cerebellopontine angle approach were performed. Under the microscopic vision, the trigeminal nerve was identified which was pulled by the tumor, the cranial nerve complex VII-VIII, and vessels such as the superior petrous vein and the anteroinferior cerebellar artery. With the support of the endoscope, the tumor was better visualized in inaccessible areas, the prepontine cistern was accessed and total resection of the tumor was achieved. The patient evolved favorably with remission of pain on the right side.
Conclusion: The microsurgical technique assisted by endoscopy allows safe removal of the tumor, and it is immensely helpful in the resection of tumors from regions not visible under the microscope.

Keywords: *Brain Neoplasms, Trigeminal Nerve, Endoscopy, Cerebellopontine Angle. (source: MeSH NLM*

RESUMEN

Introducción: Los tumores epidermoides intracraneales son neoplasias congénitas raras, de crecimiento lento e histológicamente benignas. El abordaje microquirúrgico con asistencia endoscópica se describe como una técnica mínimamente invasiva que facilitan el trabajo del neurocirujano en la resección completa de un tumor epidermoide ubicado en el ángulo pontocerebeloso.
Caso Clínico: Mujer de 62 años, con enfermedad de 3 años caracterizada por dolor en hemicara derecha. Los síntomas se incrementan en los 2 años siguientes llegando a ser incapacitante y mejorando sólo parcialmente con pregabalina y oxcarbazepina. La RMN cerebral mostró una lesión hipointensa, de apariencia quística a nivel de cisterna prepontina con expansión a ángulo pontocerebeloso derecho que comprimía el nervio trigémino derecho. Se realizó una craneotomía retromastoidea y un abordaje del ángulo pontocerebeloso derecho. Bajo visión microscópica, se identificó el nervio trigémino el cual se encontraba traccionado por el tumor, el complejo del VII-VIII par craneal y vasos como la vena petrosa superior y la arteria cerebelosa anteroinferior. Con apoyo del endoscopio se visualizó mejor el tumor de áreas poco accesibles, se accedió a la cisterna prepontina y se logró la resección total del tumor La paciente evolucionó favorablemente con remisión de dolor de la hemicara derecha.
Conclusión: La técnica microquirúrgica asistida por endoscopía permite una eliminación segura del tumor siendo de gran ayuda en la resección de tumor de regiones no visibles con microscopio.

Palabras clave: *Neoplasias Encefálicas, Nervio Trigémino, Endoscopía, Ángulo Pontocerebeloso (fuente: DeCS Bireme)*

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Intracranial epidermoid tumors are rare, histologically benign, slow-growing congenital neoplasms of the central nervous system (CNS), which may originate embryologically from some retained ectodermal implants. Squamous cell tumors can cause irritation of a cranial nerve resulting in hyperactive dysfunction or neuralgia, as in the case of the trigeminal or glossopharyngeal, and muscle spasm as in the case of the facial nerve. [1]

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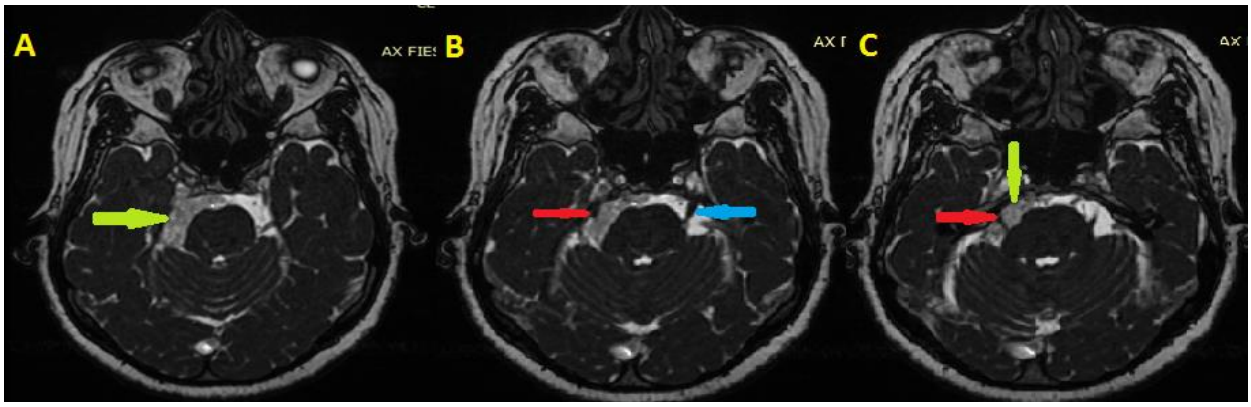

Fig 1. FIESTA brain MRI sequence, in different axial sections at the level of the pons (**A, B, C**) showing the tumor (green arrow), the right trigeminal nerve compressed by the tumor (red arrow) and the left trigeminal nerve (light blue arrow).

The neuroendoscopic approach to support microsurgery is a minimally invasive technique that facilitates the work of the neurosurgeon in the deep visualization of tumor lesions. [2]

Total microsurgical removal is considered the therapy of choice for these pathologies.[3] The objective of this study is to demonstrate the benefits of the use of endoscopy in the complete microsurgical resection of epidermoid tumors located in the cerebellopontine angle.

CLINICAL CASE

Historia y examen: 62-year-old female patient with a history of arterial hypertension on regular treatment with amlodipine and losartan for approximately 10 years, with a 3-year history of disease characterized by pain in the right side of the face of intensity 7/10, electricity type. The symptoms increased in the last 2 years, becoming disabling and making it difficult for her to eat food, for which she went to a neurologist who indicated treatment with pregabalin 150 mg every 12 h and oxcarbazepine 600 mg every 12 h with which she obtained partial remission of your symptoms. A brain magnetic resonance imaging (MRI) was performed, which showed the presence of a hypointense lesion with a cystic appearance at the level of the prepontine cistern with expansion to the right cerebellopontine angle. The tumor compressed the right trigeminal nerve which was thinned in relation to the left trigeminal nerve (CN V). This latest had an adequate diameter *(Figure 1)*

Treatment: A right retromastoid craniotomy was performed (*Figure 2*), and a cerebellopontine approach was continued. The microdissection was performed through the right cerebellopontine angle *(Figure 3)* and important structures were identified such as the trigeminal nerve (V), the cranial nerve complex VII and VIII, and important vessels such as the superior petrous vein, the vein of the cerebellum fissure, the pontine transverse vein and anteroinferior cerebellar artery. The tumor was resected, which was soft, white, and non-bleeding, initially under microscopic vision and then under endoscopic vision *(Figure 4)*. *R*emnants of the tumor were visualized in all directions and in depth by advancing the endoscope through of the space between the superior petrosal vein and the trigeminal nerve, as well as between the trigeminal nerve and cranial nerve complex VII-VIII, achieving access to the prepontine cistern. This combined technique made it possible to resect tumor fragments from regions not visible under the microscope and thus obtain a total resection of the tumor.

Clinical evolution: The patient evolved favorably in the postoperative period, presenting remission of pain in the right side. A brain MRI was performed one year after surgery, which showed no evidence of tumor recurrence. *(Figure 5)*.

Fig 2. Intraoperative images showing **(A)** the incision, **(B)** the retromastoid craniotomy and **(C)** the opening of the dura mater.

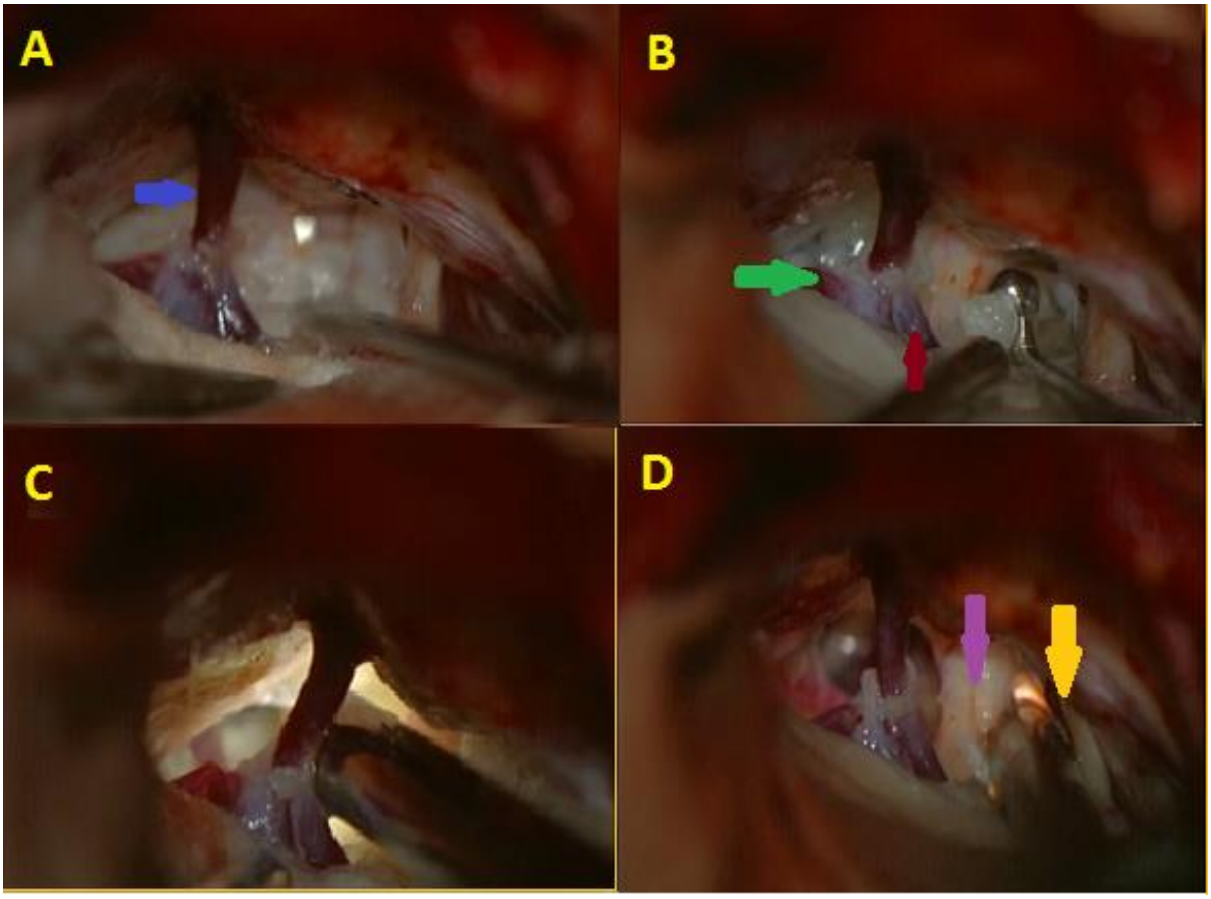

Fig 3. Intraoperative microsurgical view showing: **(A)** The superior petrous vein that drains into the superior petrosal sinus (blue arrow). **(B)** The cerebellopontine fissure vein (green arrow) and the transverse pontine vein (red arrow). **(C)** Endoscope between vein and cranial nerve V. **(D)** Endoscope between cranial nerves V (purple arrow) and VII-VIII complex (yellow arrow).

DISCUSSION

According to Obrador and Lopez-Zafra, due to the irregular nodular surface and the pearly luster, the epidermoid tumors were referred to as the "pearl tumor" by Cruveilhier. Epidermoid tumor is made up of a thin capsule filled with soft white material that is the result of progressive desquamation of the epithelial lining and the breakdown of keratin.

This material is rich in cholesterol, has a waxy consistency and forms concentric lamellae. Removal of the contents of the cyst is easy due to its consistency and avascular nature. [3]

These differentiated dystogenetic cysts have no sexual predilection and their distribution is similar in all age groups. [4]

The primary surgical objective is to decompress the mass by evacuating the contents of the cyst and removing non-adherent portions of the tumor capsule; the parts of the capsule that adhere to vital structures should be left unaltered. [5]

The preferred approach is the retrosigmoid. The use of the translaberintic approach is not recommended, even in cases where the 8th cranial nerve is affected, since hearing can improve or even recover after tumor decompression. Tumor resection is performed in a lateral to medial direction. [4]

In our patient, a retromastoid craniotomy and a cerebellopontine approach were performed as also recommended by other authors, achieving total resection. [6]

You must have a good knowledge of the anatomy of the cerebellopontine fissure, since it is necessary to recognize structures of great importance such as venous drainage, the arteries present in this area and their variants, as well as the direction and location of the cranial nerves V and VII-VIII. [7]

The endoscope is an extremely useful tool. Experts recommend straight (0º) and angled endoscopes, generally 30 ° and 45 °. [4]

Compared to the microscope, endoscopes provide a wide angle of view with excellent illumination in the depth of the operating field and a greater depth of focus even at high magnification. In several reports, researchers have suggested a beneficial effect of using endoscopes while performing intracranial microsurgery. [3]

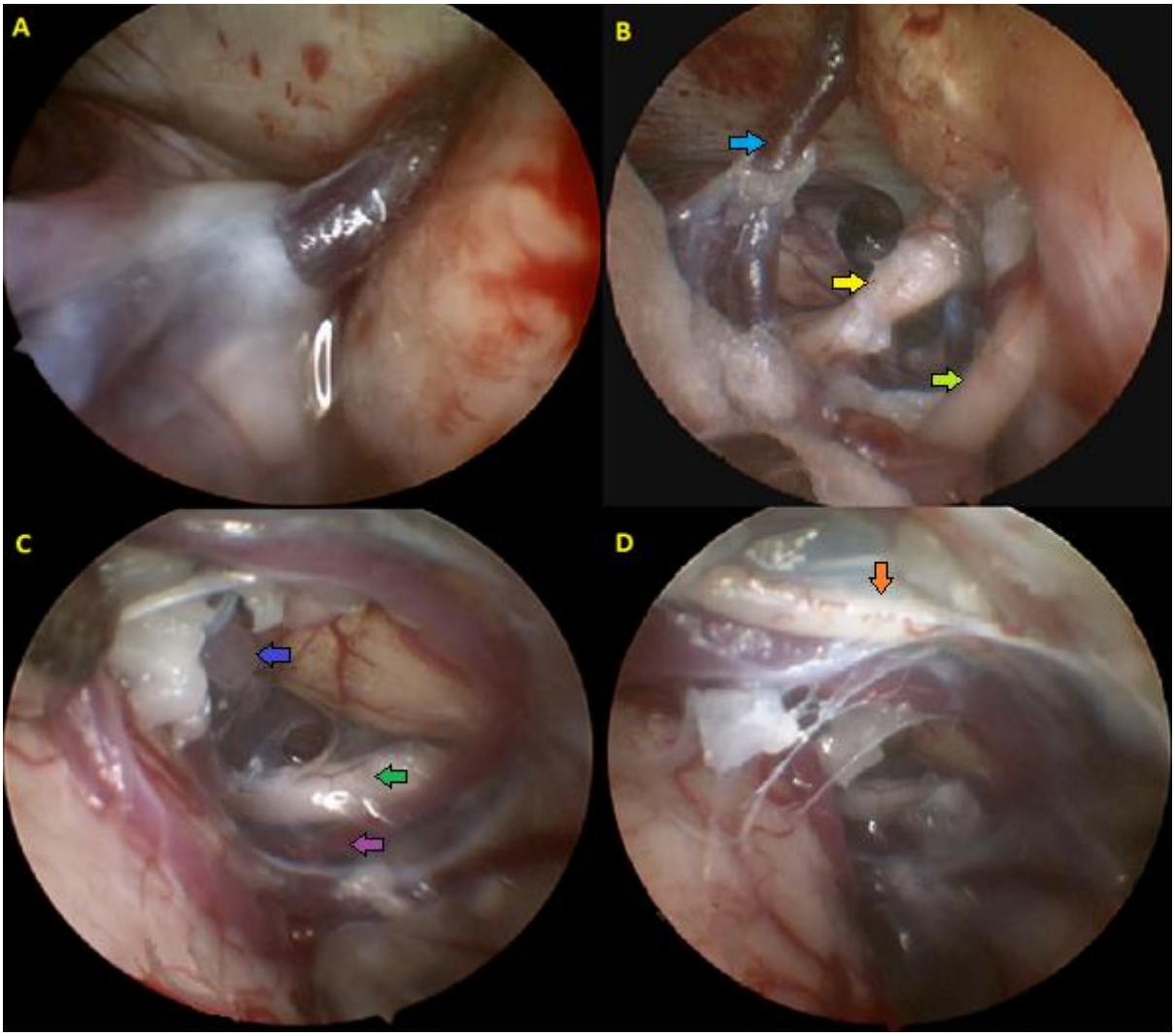

Fig 4. Intraoperative endoscopic view showing: **(A)** The tumor at the beginning of the resection. **(B)** Right cerebellopontine fissure where the cranial nerve V (yellow arrow), CN VIII (light green arrow) and the superior petrous vein (light blue arrow) are visualized with remnants of white tumor attached to these structures. **(C)** View of the prepontine cistern showing the CN III (dark green arrow), the posterior cerebral artery (blue arrow) and the anterosuperior cerebellar artery (purple arrow). **(D)** Panoramic view of the deep region where the CN IV (orange arrow) and last fragments of the squamous tumor can be seen.

CONCLUSION

The endoscopy-assisted microsurgical technique allows a safe and total resection of an epidermoid tumor of the cerebellopontine angle, being of particular importance in the resection of tumor portions not normally visible under the straight field of view of the microscope.

Tumor extensions in the adjacent compartments can be resected using this technique without further retraction, which is why it constitutes a less damaging approach to neurovascular structures, avoiding the need for larger craniotomies.

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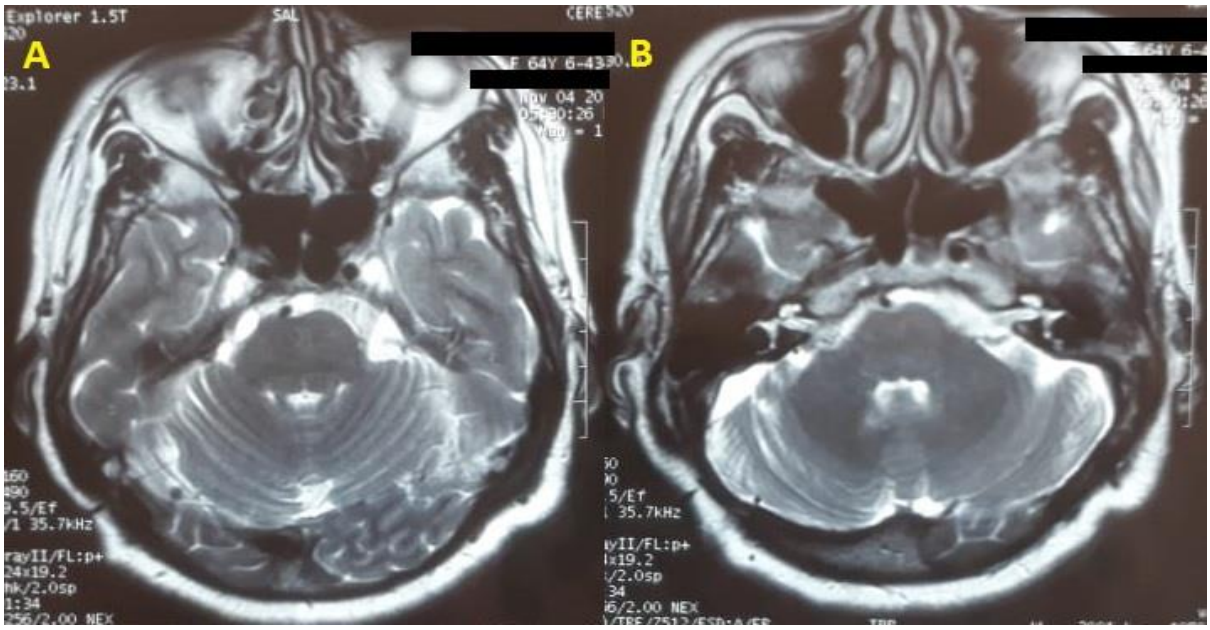

Fig 5. Postoperative brain MRI in T2 sequence showing the absence of tumor in the cerebellopontine angle.

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Disclosures
The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

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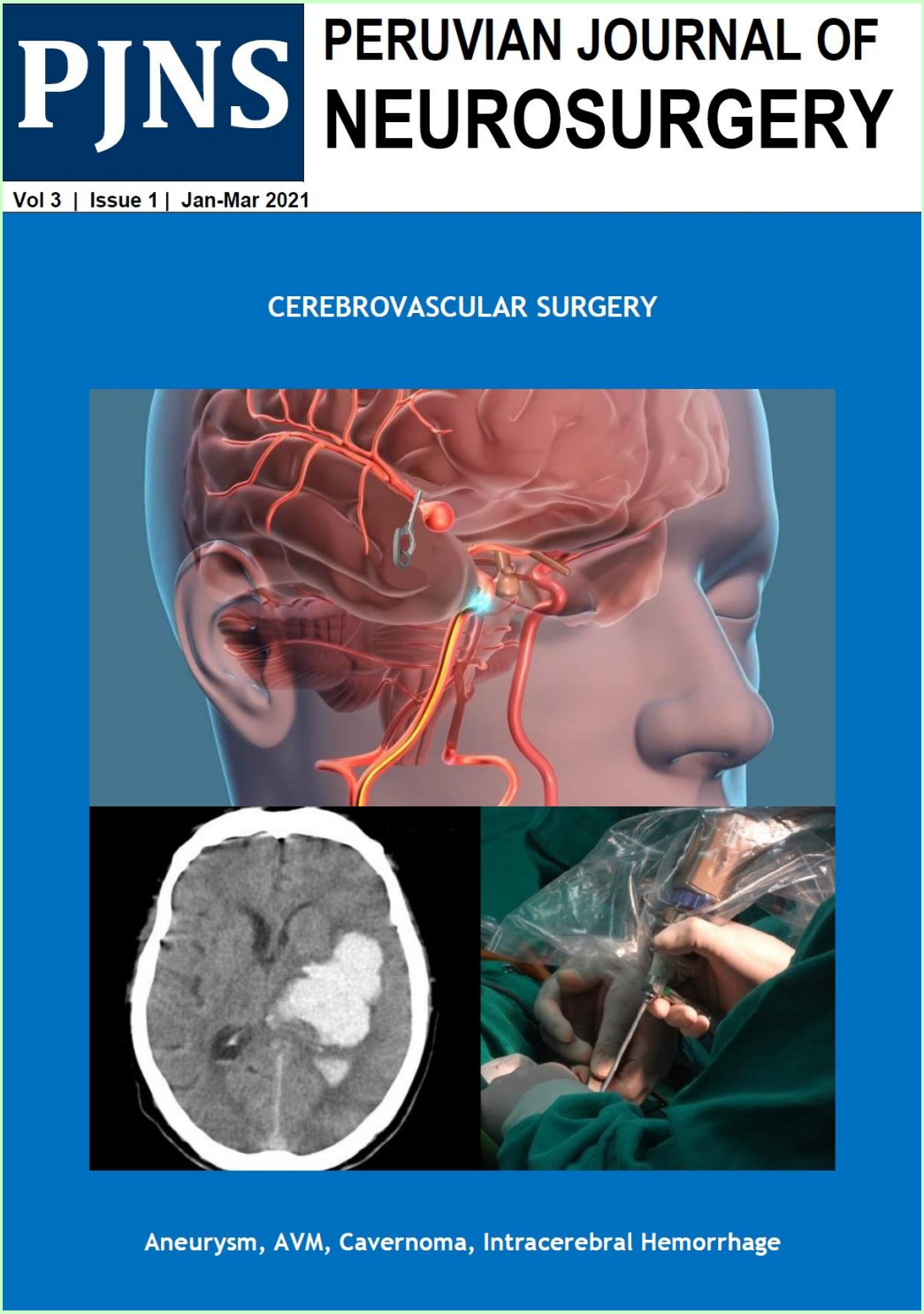
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