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CASE REPORT

Resection of cerebellar fibrillary astrocytoma with endoscopic support. Case report

Resección de astrocitoma fibrilar cerebeloso con apoyo endoscópico. Presentación de un caso

Ressecção de astrocitoma fibrilar cerebelar com suporte endoscópico. Apresentação de um caso

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ABSTRACT

A seven years old female patient was evaluated at the Hospital Pediátrico Docente "Pedro Agustín Pérez", in Guantánamo, with a history of an apparent health situation. The patient´s mother referred a week with headache and vomiting. Patient underwent an analgesics and antiemetics treatment without resolution of symptoms. A magnetic resonance imaging study of the brain showed in T1 scan, in the axial section, a space-occupying, hypointense, and appearance of posterior fossa cystic lesion, in the right cerebellar hemisphere, which was compressing the IV ventricle, causing obstructive hydrocephalus secondary. Ventriculostomy routing ventriculoperitoneal shunt and macroscopic resection of lesion with endoscopic support included was performed. Cerebellar fibrillary astrocytoma was the diagnosis confirmed by histopathological study.

Keywords: cerebellar fibrillary astrocytoma; magnetic resonance imaging of the brain; neuroendoscopy

RESUMEN

Se presentó paciente femenina de 7 años de edad, con antecedentes de salud aparente, atendida en el Hospital Pediátrico Docente "Pedro Agustín Pérez", de provincia Guantánamo. Al interrogatorio, la madre refirió semana de evolución con cefalea y vómitos. Cumplió tratamiento con analgésicos y antieméticos sin resolución de dicho cuadro. El estudio de resonancia magnética nuclear de cráneo informó en T1, corte axial, una lesión ocupativa de espacio, hipointensa, de aspecto quístico de fosa posterior, en hemisferio cerebeloso derecho, que comprimía el IV ventrículo, lo que causó una hidrocefalia obstructiva secundaria. Se realizó ventriculostomía con derivación ventriculoperitoneal y resección macroscópica de lesión con apoyo endoscópico. Se confirmó por estudio histopatológico el diagnóstico de astrocitoma fibrilar cerebeloso.

Palabras clave: astrocitoma fibrilar cerebeloso; resonancia magnética nuclear de cráneo; neuroendoscopia

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RESUMO

Paciente do sexo feminino, 7 anos, com histórico aparente de saúde, atendida no Hospital Pediátrico Docente "Pedro Agustín Pérez", na província de Guantánamo. Ao ser questionada, a mãe relatou uma semana de evolução com cefaléia e vômitos. Efetuou tratamento com analgésicos e antieméticos sem resolução dos referidos sintomas. O estudo de ressonância magnética nuclear do crânio relatou em T1, corte axial, lesão hipointensa, expansiva, de aspecto cístico em fossa posterior, no hemisfério cerebelar direito, que comprimia o quarto ventrículo, causando hidrocefalia obstrutiva secundária. Foi realizada ventriculostomia com derivação ventriculoperitoneal e ressecção macroscópica da lesão com suporte endoscópico. O diagnóstico de astrocitoma fibrilar cerebelar foi confirmado pelo estudo histopatológico.

Palavras-chave: astrocitoma fibrilar cerebelar; ressonância magnética nuclear do crânio; neuroendoscopia

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INTRODUCTION

Intracranial tumors constitute 20% of all neoplasms and the second cause of malignant lesions in pediatric age. They are also the most frequent solid tumor lesion in childhood.[1,2,3]

Approximately 20% of these are astrocytomas and almost half are infratentorial. They constitute approximately 15%-25% of all central nervous system (CNS) tumors in children. Despite their occurrence in the adult population, 70% occur in children, at an average age of diagnosis of 7 years.[4]

In the area of oncology, when referring to astrocytomas, they are identified as any neoplasm or tumor formed mainly by astrocytes, one of the main types of glial cells that feed and support neurons. This tumor is a mass of astrocytes that is produced by an abnormal, pathological and uncontrolled growth and proliferation of one of the types of glial tissue present in the nervous system. [4,5]

They are classified according to the World Health Organization (WHO) into low-grade lesions (I and II) and high-grade lesions (III and IV); according to Kernohan's classification, low-grade lesions are more frequent than high-grade lesions in children.[5,6]

The most common histological type in children is pilocytic astrocytoma with a worldwide incidence of 4.8 x 100,000 per year and can be located anywhere in the CNS, but most commonly in the frontal and temporal lobe. These astrocytomas are low grade, with a growth of approximately 4.1 mm per year, so the symptoms will depend on the location.

In the world and Cuban pediatric population, tumors of the central nervous system represent the second cause of mortality due to cancer, after leukemia[7]

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In Cuba, the incidence rate of patients between 1 and 9 years of age diagnosed with cerebral astrocytoma is 12.6 per 100 thousand inhabitants of this age group.[8]

The importance of the presented case lies in the diagnostic novelty according to the location and the performance of a mini-craniectomy with endoscopic support as an advantage in the safe resection of these tumors. Therefore, this case report is presented with the aim of describing the main clinical manifestations, as well as the diagnostic and therapeutic methods of a patient diagnosed with cerebellar fibrillary astrocytoma.

CASE PRESENTATION

Female patient 7 years old, white complexion, from rural areas, right-handed, with apparent health history. She was seen in interconsultation at the Pediatric Teaching Hospital "Pedro Agustín Pérez", in Guantánamo, where she was admitted 8 months ago referring headache of moderate intensity accompanied by vomiting not preceded by nausea. He reported taking analgesics and antiemetics, which did not have the desired effect.

Physical examination of the CNS: nothing to note.

A conscious patient oriented in time, space and person. Memory preserved, Clear and coherent language. No signs of neurological localization.

Glasgow coma scale score: 15/15 points.

Complementary examinations:
Computerized axial tomography (CAT) scan of the skull: a lesion was observed in the right cerebellar hemisphere partially compressing the IV ventricle with ventricular dilatation secondary to this lesion and an Evans index at 0.45 in relation to obstructive hydrocephalus.

Cranial magnetic resonance imaging (MRI): showed hypointense image in T1 of cystic and nodular aspect in the right cerebellar hemisphere in relation to brain tumor (Figure 1).

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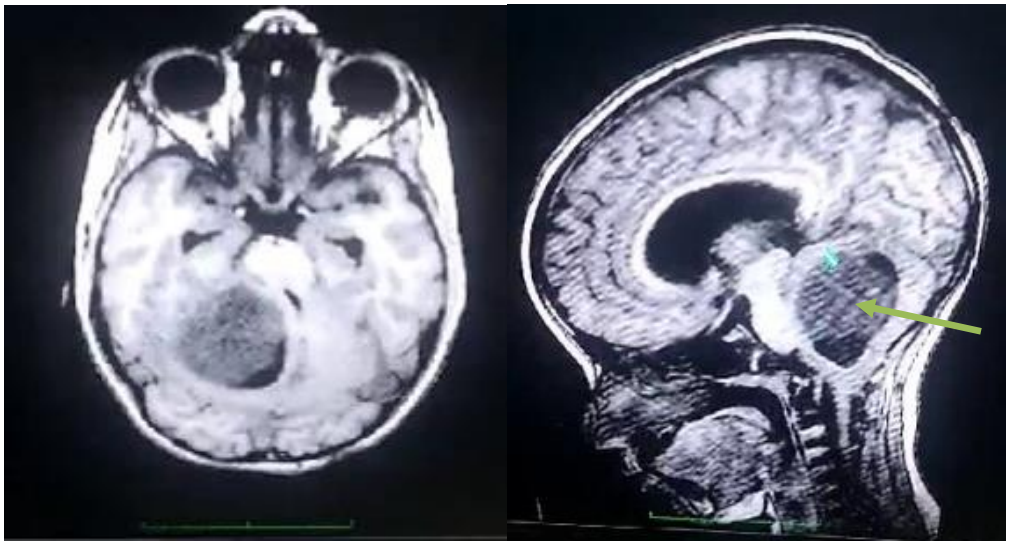

Fig. 1. MRI study of a simple pre-surgical skull shows a tumor image in the right cerebellar hemisphere partially obliterating the IV ventricle and the secondary hydrocephalus to compression.

After being examined and undergoing complementary examinations, it was decided in the group to perform surgical treatment, which consisted in performing two procedures in only one surgical time. These were: a ventricle peritoneal shunt to treat the hydrocephalus caused by the tumor lesion and a 3x3 cm craniectomy in the posterior fossa and durectomy.

During the surgical intervention, a cystic and nodular lesion was observed, and resection was performed with endoscopic support (endoscopic lens 0 Karl Storz) of the cystic content and then the nodular content. A sample was sent to the Anatomic Pathology service for histological characterization (Figure 2).

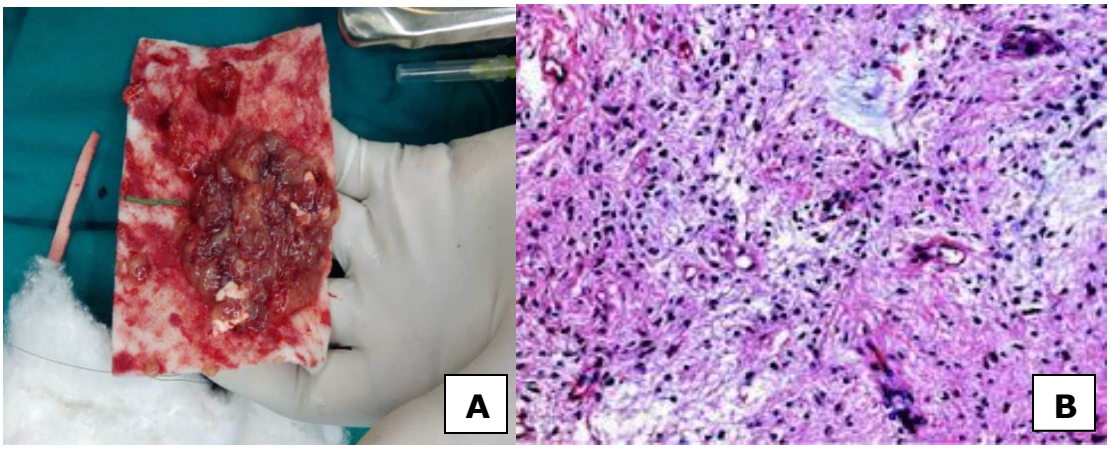

Fig. 2. It shows of the total macroscopic resection of the tumor lesion (A). It shows Histopathological study corresponding to fibrillary astrocytoma showing microcystic degeneration, hypercellularity and nuclear atypia (B).

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Diagnosis by histopathological study: cerebellar fibrillary astrocytoma grade II.

The patient presented residual diplopia after surgical treatment, which recovered in three weeks of rehabilitation, followed by adjuvant treatment and resolution of the initial clinical picture (Figure 3). She is currently incorporated to her social life without limitations or sequelae.

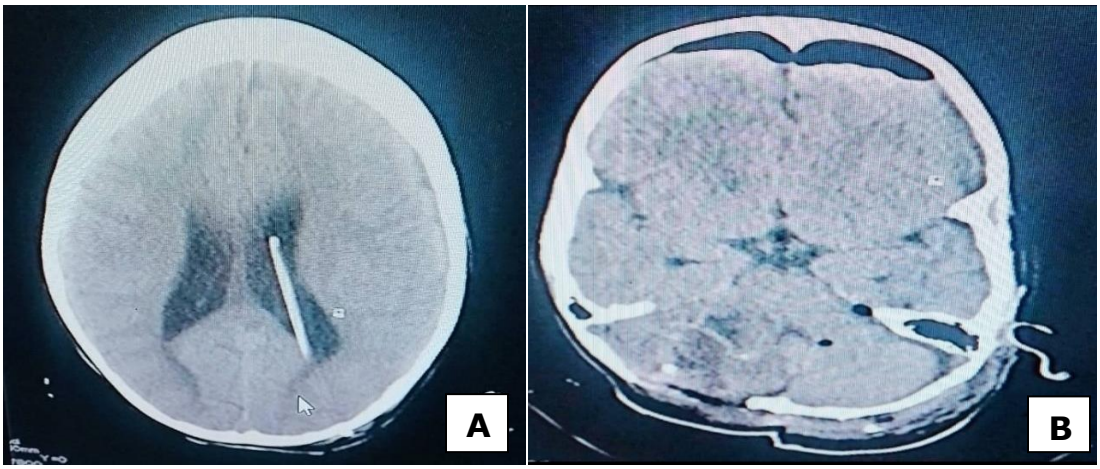

Fig 3. Figure (A) shows the first surgical time with the ventriculoperitoneal shunt system for hydrocephalus resolution and intracranial pressure relief. Figure (B) shows a simple cranial CT scan showing the absence of postoperative tumor image and the site of the minimally invasive craniectomy.

DISCUSSION OF THE CASE

As with other brain tumors, the causes of astrocytomas are mostly unknown; however, some hereditary disorders may facilitate their appearance, such as neurofibromatosis. Also infection with the Epstein-Barr virus or previous radiotherapy due to another tumor appear to be risk factors for developing them.[9]

Astrocytomas are tumors whose symptoms can vary greatly depending on the location(s) in which they appear, whether they compress other brain areas, their proliferative capacity or infiltrate other tissues, or whether they are self-limiting. However, most authors state that in general it is common to find headaches, nausea and vomiting, drowsiness, fatigue, altered consciousness and confusion.[10,11,12] This opinion is shared by the researchers in this study, since secondary to the increase in intracranial pressure a set of compensatory mechanisms is unleashed which, after failing, produce the clinical signs of endocranial hypertension syndrome.

On the other hand, it is also relatively frequent the appearance of alterations in personality, behavior, fever and dizziness; as well as weight alterations without reasons for it, perception and language problems, loss of sensitivity and mobility and even seizures. Similarly, when present in children, malformations are generated that alter the craniofacial anatomy both intracranially and extracranially.

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Early treatment often improves the chance of a good outcome. Treatment depends on the size, type of tumor and overall health. In this case, the location and use of the endoscopic support technique influenced the results of the therapeutic plan imposed on the patient to reduce the occurrence of disorders related to extensive microscopic recessions.

The goals of treatment may be to cure the tumor, relieve symptoms, and improve brain activity or well-being. Surgery is often required for most primary brain tumors. Some can be completely removed. In those cases, when tumors are very deep within the brain or have infiltrated brain tissue, surgical debulking may be performed, rather than removal.[13]

The use of magnification has been a great advantage in the resection of these types of lesions, especially the use of the endoscope, which allows the performance of a smaller craniectomy and a wide visualization of the lesion with the safe resection of the nodular and cystic component up to the infiltrative areas.

Endoscopic support has a leading role in minimal access surgery as it achieves large objectives through a small incision in the scalp. It is currently the technique of choice for multiple lesions of tumor aspect located at the base of the skull, as well as in deep brain locations. With this technique, the manipulation of the brain tissue avoids fewer lesions and, therefore, complications or post-surgical sequelae, as well as a greater differentiation between healthy and pathological tissue, so that the boundary between both tissues can be delimited. All of the above is a great advantage over conventional surgeries.

The brain, as the main structure responsible for the coordination and control of the organism, as well as in the other structures of the human body different diseases appear, cancer becomes one of the most important. It is because of this that a series of evaluations are carried out to estimate its location and, thus, plan the respective clinical approach.

In this case, reference was made to the cerebellar fibrillary astrocytoma grade II in a pediatric patient who underwent two procedures in a single surgical time, which had as a novelty a minicraniotomy with endoscopic support for the resection of the cystic and nodular content, which constituted an advantage in giving resolution of the clinical case presented initially, as well as the optimal recovery and a shorter hospital stay of the patient.

FINAL CONSIDERATIONS

The case presented was a reference in the evolution of pediatric patients with astrocytic tumors. It is necessary to continue with the efforts in order to improve the treatment of brain tumors in pediatric age, since the use of magnification means, mainly endoscopic, favors a better recession and minimizes the probability of the appearance of residual symptoms in the manipulation of the affected area.

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The authors declare that there are no conflicts of interest.

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