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Case Report

Hemorrhagic Brainstem Cavernous Malformation : An Uncommon Cause of Multiple Cranial Nerve Palsies in an ENT Evaluation

Le Cavernome Hémorragique du Tronc Cérébral : Une Cause Rare de Paralysie Multiple des Nerfs Crâniens en Consultation ORL

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Mots clés : Paralysie multiple, nerfs crâniens, cavernome cérébral-consultation ORL- Cameroun
Key words: Multiple palsy, cranial nerves, cerebral cavernous malformations, ENT consultation, Cameroon

Article history
Submitted: 10 November 2024
Revisions requested: 7 December 2024
Accepted: 20 December 2024
Published: 27 December 2024

ABSTRACT

Multiple cranial nerve palsies represent a diagnostic challenge in ENT consultations due to the diversity of possible etiologies. We describe an extremely rare cause of multiple cranial nerve lesions: cerebral cavernous malformation (CCM) hemorrhage of the brain stem, a capillary-type vascular malformation whose prevalence in the world population is less than 0.5%. To our knowledge, no cases have yet been reported in Cameroon. A 33-year-old female presented with paresthesias of the right hemiface, disabling complete dysphagia, and rapidly progressing left ptosis. Clinical examination revealed severe swallowing disorders with aspiration, paralysis of cranial nerves III, IV, V, VI, IX and X, hypoesthesia of the right hemiface and upper limb, and cerebellar syndrome. Brain MRI revealed a recent hemorrhagic left lateral pontine CCM, 2.5 cm in diameter, associated with other multiple cavernous lesions in the left frontal, right occipital, right and left cerebellar hemispheres. Cranial nerve palsies are frequent findings in ENT consultations. When they are multiple, they call for meticulous clinical evaluation of all cranial nerves during ENT and cervicofacial examinations, and a complete cerebral imaging work-up. Cerebral cavernous malformations, which are rare and potentially fatal vascular malformations, can be one etiology. Joint follow-up and collaboration between management teams (neurology, ENT, and neurosurgery) for this type of patient is essential.

RÉSUMÉ

Les paralysies multiples des nerfs crâniens représentent un défi diagnostique en consultation ORL du fait de la diversité des étiologies possibles. Nous décrivons une cause extrêmement rare d'atteinte multiple des nerfs crâniens : le cavernome hémorragique du tronc cérébral qui est une malformation vasculaire de type capillaire dont la prévalence dans la population mondiale est inférieure à 0,5%. Au Cameroun, aucun cas n'a encore été rapporté à notre connaissance. Patiente de 33 ans présentant des paresthésies de l'hémiface droite, une dysphagie complète invalidante et un ptosis gauche d'installation rapidement progressive. L'examen clinique a mis en évidence des troubles sévères de la déglutition avec des fausses routes, une paralysie des nerfs III, IV, V, VI, IX et X, une hypoesthésie de l'hémiface et du membre supérieur droit ainsi qu'un syndrome cérébelleux. L'IRM cérébrale a révélé la présence d'un cavernome hémorragique récent pontique latéral gauche de 2,5 cm de diamètre associé à de multiples autres lésions cavernomateuses au niveau frontal gauche, occipital droit, hémisphériques cérébelleux droit et gauche. Les paralysies des nerfs crâniens sont fréquentes en consultation Oto-rhino-laryngologique, lorsqu'elles sont multiples, elles doivent obliger à une évaluation clinique minutieuse de tous les nerfs crâniens lors de l'examen ORL et cervico facial et à un bilan imagerique cérébral complet. Les cavernomes cérébraux qui sont des malformations vasculaires rares et potentiellement mortelles peuvent en être une étiologie. Le suivi conjoint et la collaboration entre les équipes de prise en charge (neurologie, ORL-CCF et neurochirurgie) de ce type de patients est primordiale.

INTRODUCTION

The cranial nerves originate in the brain and exit through the holes in the base of the skull to innervate most of the structures in the head and neck. Damage to these nerves is a frequent finding in outpatient ENT clinics. Lesions can occur at any point along the nerve pathway, from the brain to the peripheral nerve ending. Thus, many pathological processes can manifest as multiple cranial nerve palsies (MCNPs), representing a real diagnostic challenge (1,2). The largest study of MCNPs involving 979 patients by Keane et al. showed that the most frequent etiology was tumor, accounting for 30% of cases. Only 3 cases were hemorrhagic cavernous angiomas in this large series (0.3%) (3). Cerebral cavernous malformations (also known as cavernomas, cavernous angiomas or hemangiomas) of the central nervous system, are capillary-type vascular malformations with no interposition of nerve tissue. Their prevalence in the world population is less than 0.5% (4-6). These malformations manifest as hemorrhagic strokes (30-40%), seizures (40-70%), headaches (10-30%), and focal neurological deficits (35-50%) (4,5). Diagnosis is made radiologically by magnetic resonance imaging. Careful clinical assessment of the cranial nerves during ENT and cervicofacial examinations is essential for this type of multiple lesions. In Cameroon, no case has yet been reported to our knowledge. We describe this case of multiple cranial nerve palsy due to a rare cause of hemorrhagic brainstem cavernoma.

OBSERVATION

A 33-year-old single black female patient with a history of left Bell's palsy healed without sequelae 2 years before our consultation. She had flu-like syndrome 10 days prior and was referred by the neurology unit to our ENT outpatient clinic for clinical evaluation of disabling complete dysphagia. This dysphagia, which set in rapidly within 3 days, was oropharyngeal and permanent. Initially, it was for solids then for liquids. It was associated with a permanent "wet voice" vocal quality change accentuated during meals, and hypersalivation. She also presented with nasal regurgitation.

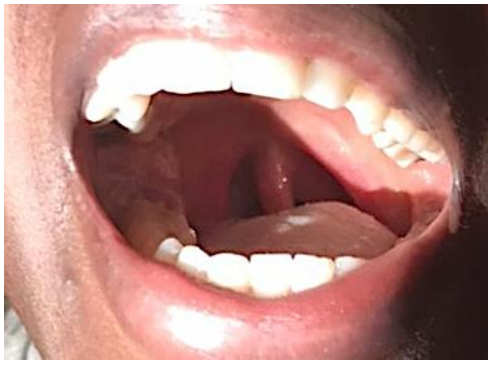

Figure 1. Image showing deviation of the soft palate to the right in our 33-year-old patient (curtain sign).

Figure 2. Image showing left ptosis

On physical examination, the patient was emaciated and asthenic. Left velar immobility on phonation, left curtain sign with rightward deviation (Figure 1), and absence of gag reflex were noted. Laryngeal endoscopic examination revealed left cord hypomobility. Examination of salivary swallowing showed good lip occlusion without incontinence, but with muscular synkinesis of the orofacial sphere. Multiple, prolonged swallowing with significant muscular effort and reduced ascension of the larynx on swallowing were observed. The Dynamic Swallowing Test with clear water showed blockage at the oral phase, repeated swallowing attempts, nasal regurgitation, and aspiration with penetration syndrome.

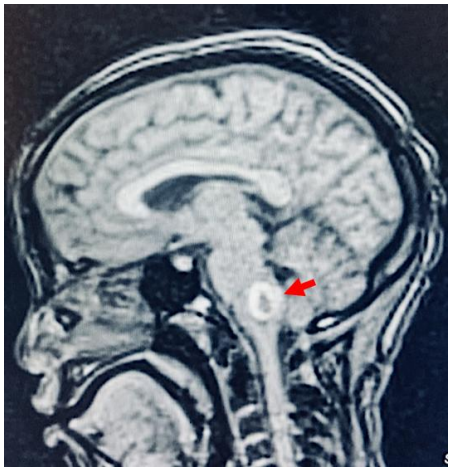

Figure 3. Sagittal section of T1-weighted brain MRI showing our patient's 2.5 cm pontine hemorrhagic cavernoma (red arrow).

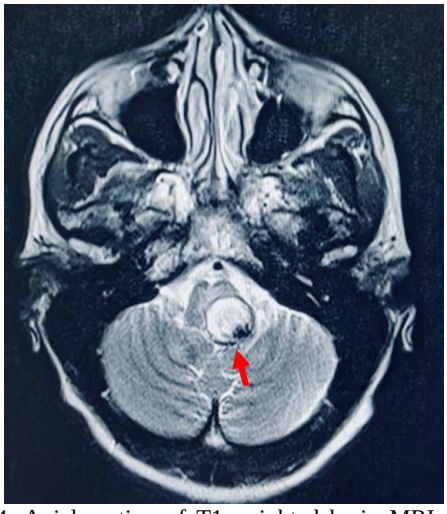

Figure 4. Axial section of T1-weighted brain MRI showing 2.5 cm left pontine hemorrhagic cavernoma (red arrow).

At the end of the test, the "wet voice" remained, and permanent oropharyngeal gurgles were heard. The rest of his cervicofacial examination revealed paresthesia and hypoesthesia of the right hemiface and right upper limb, which had been present for 5 days before the consultation, and left palpebral ptosis (Figure 2), with left horizontal and right vertical diplopia. Summarily, nerves III, VI, IX, X on the left and IV, V on the right were affected. The rest of the ENT examination was normal. A central neurological examination revealed a static-kinetic cerebellar syndrome. Given this symptomatology, we ordered a cerebral Magnetic Resonance Imaging (MRI) scan, which revealed a T1 hypo hyperintense heterogeneous 2.5 cm lesion, a hypo iso hyperintense lesion on T2, FLAIR and diffusion-weighted imaging without ADC restriction, of left lateral pontine topography suggesting a hemorrhagic cavernoma (Figure 3) associated with multiple other cavernous lesions in the left frontal, right occipital, right and left cerebellar hemispheres. A COVID-19 RT-PCR test came back positive. HIV serology was negative. Blood serum electrolytes, kidney function tests, and full blood count were normal. The diagnosis of symptomatic pontine hemorrhagic cavernoma was made. The patient's care was taken over by the neurosurgical team, who concluded on the surgical indication.

DISCUSSION

Multiple cranial nerve palsy is defined as the lesion of two or more non-homologous cranial nerves (2,3). It can involve any of these nerves at different levels of their course, resulting in a multitude of possible etiologies with variable prognoses. The average age of MCNP patients was 39.93 ± 14.24 years, with a sex ratio of 1.07 in favor of women (2). Our 33-year-old patient perfectly corroborates this trend. The most frequently affected nerves were VI, III, VII and V in 57%, 47%, 47% and 36% of cases respectively (2,3,7). The sixth pair of cranial nerves, the most frequently involved, shows frequent involvement in lesions of the cavernous sinus and meningeal processes. Our case presented with involvement of pairs VI, III, V, IV due to massive pontine hemorrhage. She also had mixed nerves lesion (IX, X) from regions adjacent to the pons, probably as a result of compression. Keane et al in 2005, in a study of 979 patients, described a single case of unilateral involvement of all cranial nerves in a patient with nasopharyngeal carcinoma. (3). He also found that the average number of affected cranial nerves per patient was 2.7. In our case, 6 of the 12 cranial nerves were affected. Concerning the location of the lesion causing multiple cranial nerve deficits, it is most often found in the cavernous sinus (25%), and in the brain stem (21%). In 3% of cases, the lesion is located in the neck and may go unnoticed during the radiological workup, which is generally focused on the brain. (3). This buttresses the vital importance of a thorough clinical examination of the cervicofacial region, including examination of all pairs of cranial nerves during the ENT consultation of patients with a deficit in one pair of cranial nerves, and even more so in cases of multiple involvement. This examination is important for diagnosing a specific neurological syndrome, localizing the lesion clinically, and better orienting complementary imaging. The etiologies of MCNPs are dominated by tumors (30%), vascular disease (12%), and trauma (12%). Of the 12% vascular causes, cerebral cavernoma accounts for 0.3% (3). To our knowledge, no case of hemorrhagic cavernoma has yet been published in Cameroon. Hence the interest of this case, which highlights a rare pathology with significant life-threatening clinical manifestations of cranial nerve impairment. The age of diagnosis mainly concerns adult subjects like our patient with a 1:1 sex ratio (10,11). Localization varies: for Lena et al. in a series of 301 patients, 239 cavernomas (79.4%) were located supratentorially and 62 (20.6%) in the posterior fossa including 39 in the brainstem (8). These are usually asymptomatic lesions. Clinical manifestations are linked either to the cavernoma itself, or to hemorrhagic events resulting from rupture of the cavernoma wall compressing surrounding cerebral structures. The frequency of haemorrhage is significantly higher in women. Endocrine factors are suggested to influence this tendency (10–12). Brainstem CCM most often manifests as neurological deficits of the cranial nerves, as in this patient. Indeed, the cranial nerves have their nuclei in the brainstem, which explains the deficient symptomatology seen in patients with lesions of this part of the central nervous system. Given the potentially evolving nature of this lesion, longitudinal follow-up is essential. The average annual rate of clinical manifestations is estimated at 1% per year for epilepsy, and 2% per year for symptomatic hemorrhage. A history of previous clinical hemorrhage, and location in the brain stem multiply the subsequent hemorrhagic risk by 2. Certain factors are considered potentially aggravating: age < 20 years, female gender, lesion size > 1 cm in diameter, anticoagulant treatments, pregnancy (7,10,12-14). Recent studies have suggested that patients with COVID-19-infected cerebral cavernomas have a potentially higher risk of hemorrhagic events (16,17). The pathophysiological mechanism suggested here is a possible venous thrombosis due to the hypercoagulability observed in COVID-19, destabilizing the cavernoma and thus causing hemorrhage. In our case, the aggravating factors appeared to be gender, location in the brain stem and COVID-19 infection. MRI is the key examination for diagnosis without need for histopathology (4,5,18). The typical presentation is diagnostic in 80-100% of cases. It is represented by a "popcorn/pepper and salt" appearance, associating hyper- and hypointense lesions on T2-weighted sequences. The hypointensity corresponds to hemosiderin deposits (old bleeds), the hyperintensity to recent bleeds or calcifications (4,5,18).
When the malformation has been responsible for symptomatic hemorrhage, the indication for surgery is retained. Surgery is rarely performed immediately after the hemorrhage. In most cases, it is performed 1 to 3 months after the event, to allow the volume of bleeding to diminish and the surgery to be as functional as possible (9,19). Our patient was selected for this indication and referred to a vascular neurosurgery unit for therapeutic management. For the time being,

radiation treatment (Gamma-Unit) seems to be reserved for clinically evolving forms (hemorrhages, refractory epilepsy) and non-operable forms, particularly in subthalamic localizations (12). A recent study demonstrated the efficacy of propranolol in the treatment of symptomatic cerebral cavernomas, with regression of lesions and no recurrence of hemorrhagic events (18). The value of certain molecules (simvastatin, fasudil, sorafenib) in stabilizing lesions remains controversial. Anti-agregant and anticoagulant treatments should be avoided (9,20).

CONCLUSION

Cranial nerve palsies are common in ENT consultations, and when they occur in multiples, it is imperative to suspect a tumoral, vascular, traumatic or systemic cause. Cerebral cavernomas, rare and potentially fatal vascular malformations, are one such etiology. We would like to draw attention to the importance of careful clinical assessment of the cranial nerves during ENT and cervicofacial examinations. Also, the need for a complete cerebral imaging workup in the event of multiple nerve damage in the ENT consultation, and the importance of joint follow-up and collaboration between the management teams (neurology, ENT-MFS and neurosurgery) for this type of patient.

DÉCLARATIONS

Conflits d'intérêts

Les auteurs ne déclarent aucun conflit d'intérêts

Financements

Le travail a été effectué sur fonds propres

Considérations éthiques

Toutes les étapes du travail ont été effectuées en conformité avec la déclaration d'Helsinki

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