

# SURGICAL NEUROLOGY INTERNATIONAL

AN OPEN ACCESS, INTERNATIONAL JOURNAL  
OF NEUROSURGERY AND NEUROSCIENCE

Jan-Feb 2012 / Vol 3 / ISSUE 1

## Case Report

# Cranial nerve cavernous malformations causing trigeminal neuralgia and chiasmal apoplexy: Report of 2 cases and review of the literature

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Received: 13 July 12

Accepted: 16 August 12

Published: 13 September 12

**This article may be cited as:**

Pereira de Morais NM, Mascarenhas AR, Soares-Fernandes JP, Moreira da Costa JA. Cranial nerve cavernous malformations causing trigeminal neuralgia and chiasmal apoplexy: Report of 2 cases and review of the literature. *Surg Neurol Int* 2012;3:105.

Available FREE in open access from: <http://www.surgicalneurologyint.com/text.asp?2012/3/1/105/100864>

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## Abstract

**Background:** Cavernous malformations (CMs) confined to the cranial nerves (CN) are extremely rare lesions.

**Case Description:** The authors report 2 cases of CMs, one involving the trigeminal nerve presenting with a 3 years history of a refractory right trigeminal neuralgia that was microsurgically resected by a retromastoid approach with resolution of the neuralgia; and another CM involving the chiasma with an abrupt onset of vision loss with acute intralesional bleeding that was removed through a right pterional approach with vision improvement.

**Conclusion:** Surgical resection is recommended in the context of progressive significant neurological deficit, emergency decompression as a result of recent hemorrhage for symptomatic relief or increase in size on serial magnetic resonance imaging (MRI).

**Key Words:** Cavernous malformation, chiasma, chiasmal apoplexy, cranial nerve, trigeminal nerve, trigeminal neuralgia

**Access this article online****Website:**

[www.surgicalneurologyint.com](http://www.surgicalneurologyint.com)

**DOI:**

10.4103/2152-7806.100864

**Quick Response Code:**

## INTRODUCTION

Cavernous malformations (CMs) are vascular malformations that consist of thin hyalinized vascular channels without intervening brain parenchyma. CM constitute approximately 10–15% of all vascular malformations.<sup>[4]</sup> Their location is variable, with 70–80% having a supratentorial origin, followed by infratentorial location (15%), within the spinal cord (5%) and the cranial nerves (CNs).<sup>[14]</sup> Twenty-seven cases of CM arising from the

optic pathways<sup>[2,10,13,20-22,24,25,28,30,32,34,38,39,41,44]</sup> and four cases of trigeminal nerve CM have been reported.<sup>[11,15,17,35]</sup>

## CASE REPORTS

### Case 1

A 49-year-old female patient presented to our hospital with a 3 years history of right trigeminal neuralgia in the territory of the first division of the trigeminal nerve refractory to the best medical therapy. Neurological examination was normal. Magnetic resonance imaging

(MRI) showed multiple CMs, one of which located on the cisternal segment of the right trigeminal nerve [Figure 1]. We performed a right retrosigmoid craniotomy and total removal of the CM. Histopathological study was compatible with a CM. On the follow-up 28 months later the patient is pain and medication free.

### Case 2

A 40-year-old female patient came to our attention with complains of sudden headache and vision loss. Examination revealed bitemporal hemianopia, diminished visual acuity in both eyes and nuchal rigidity. MRI showed multiple CMs, one of which localized in the optic chiasm, revealing recent bleeding [Figure 2]. The patient had undergone four previous craniotomies at another institution for removal of bleeding CMs in different locations without sequelae. The senior author (JAMC) decided to perform emergent surgical exploration through a right pterional craniotomy, removing the clot and the lesion. Histopathological examination was reported as a CM. On the follow-up, the vision improved

and the patient is capable of reading and driving, but 11 years after the surgery a right homonymous hemianopsia persists.

## DISCUSSION

CM incidence is roughly 0.4–0.8%, they can be found in sporadic or familial form.<sup>[4]</sup> In 40–60% of cases CMs are multiple and a familial inheritance is suggested.<sup>[8]</sup> Three distinct gene foci on chromosomes 7p, 7q and three have been linked to familial CMs.<sup>[8]</sup>

Most CN CMs present with cranial nerve palsies, where others bleed resulting on subarachnoid hemorrhage.

Acute chiasmal syndrome or chiasmal apoplexy is a rare event, that can be caused by arteriovenous malformations and chiasmatic CMs and is characterized by abrupt vision loss and reduction of the visual field associated with a retroorbital headache.<sup>[31]</sup>

To the best of our knowledge, 69 cases of CN CMs

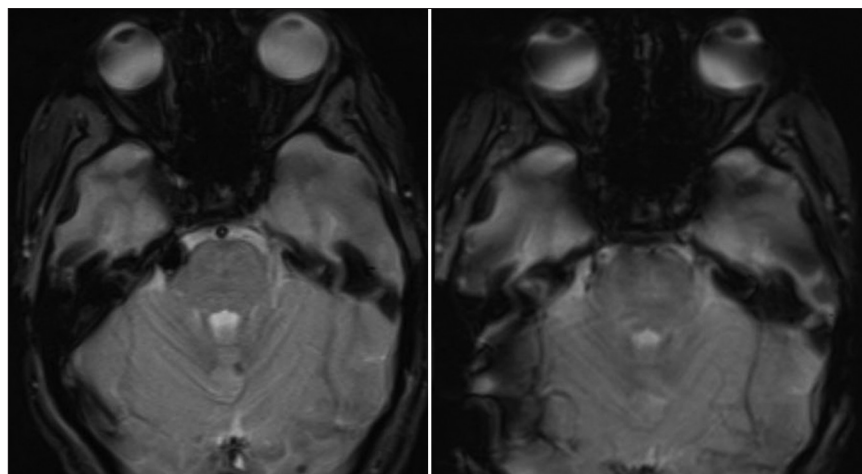


Figure 1: Cerebral MRI. Left image: Preoperative axial gradient echo scan. Right image: Postoperative axial gradient echo scan

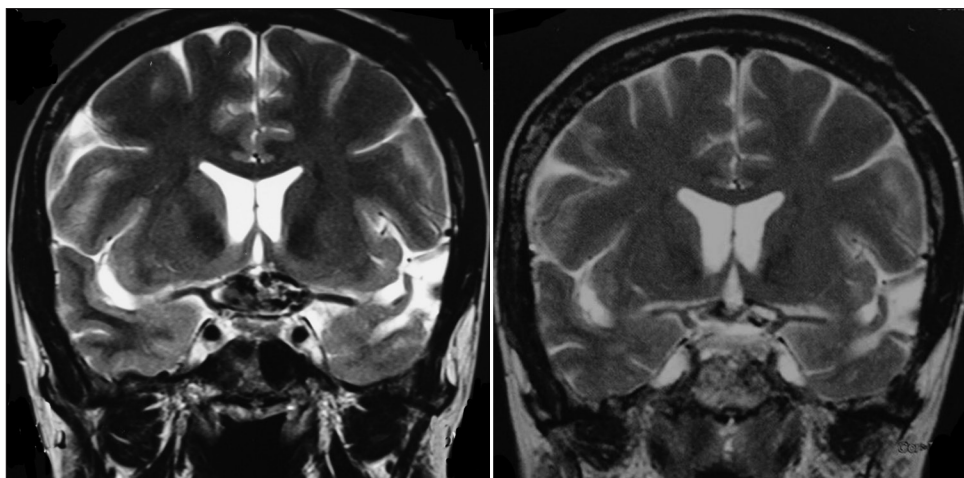


Figure 2: Cerebral MRI. Left image: Preoperative coronal T2-weighted scan. Right image: Postoperative coronal T2-weighted scan

have been reported to date, namely in the III nerve (5 cases),<sup>[27,40,43,47,48]</sup> IV nerve (3 cases),<sup>[33,45,46]</sup> VI nerve (1 case),<sup>[37]</sup> cerebellopontine angle (27 cases, involving VII/VIII complex and other nerves not specified),<sup>[1,3,5-7,9,16,18,19,26,29,36,42]</sup> XI nerve (1 case),<sup>[23]</sup> and XII nerve (1 case).<sup>[12]</sup>

Twenty-seven cases of CMs of the optic pathways have been described,<sup>[2,10,13,20-22,24,25,28,30,32,34,38,39,41,44]</sup> with some presenting with acute chiasmal syndrome or chiasmal apoplexy. The most used approach was pterional like the case presented. The chiasma CM case reminds us the urgency to decompress the chiasma to preserve and/or improve visual function.

Four cases of trigeminal CM<sup>[11,15,17,35]</sup> have been previously reported, making our case of the trigeminal CN CM the fifth to be reported in the literature.

The natural history of CMs is unknown, however surgery is recommended for decompression as a result of recent hemorrhage for symptomatic relief (e.g., chiasmal apoplexy), to obtain a histological diagnosis, if there is a progressive significant neurological deficit or an increase in size on serial MRI. Subtotal removal can lead to recurrence, therefore total resection with preservation of CN function is the gold standard.

## CONCLUSION

CMs are being increasingly detected as incidental lesions. Asymptomatic CN CMs should be managed conservatively and followed-up annually with MRI.<sup>[4]</sup> According to our literature review, we recommend treating CN CMs only in the following situations: in the context of progressive significant neurological deficit, emergency decompression as a result of recent hemorrhage for symptomatic relief (e.g., chiasmal apoplexy) or increase in size on serial MRI.

MRI can be highly suggestive of CM, but definitive diagnosis can only be made by histological examination.

At present, the best management of CN CMs relies on the surgeon's personal experience and clinical judgment.

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