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Case Report

Creeping through the cranium: A rare and interesting presentation of a meningioma ☆

Jayanthraj Gone, DO[a,*], *Brittany Kennedy, DO*[b], *Tyler Fontaine, DO*[b], *Sandor Szilagyi, MD*[b]

[a] *HCA Florida Bayonet Point Hospital, 14000 Fivay Rd, Hudson, FL 34667 USA*
[b] *HCA Florida Trinity Hospital, 9330 State Rd 54, Trinity, FL 34655 USA*

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ABSTRACT

A meningioma is a rare primary CNS tumor that tends to present more so in females in a slowly progressive fashion. The cavernous sinus and cerebellopontine angle are uncommon locations for meningiomas. We present a case of a meningioma in a 60-year-old female presenting to the emergency department for a sudden onset headache, vertigo, facial paresthesias, and chest pain. Inpatient workup revealed orthostatic hypotension, a meningioma spanning from the left cavernous sinus to the left cerebellopontine angle encasing the left cavernous internal carotid artery on MRI and CTA, and an incidental 12 mm calcified fibroadenoma on CT. Hospital course consisted of supportive treatment, physical rehabilitation, and review of previous imaging to determine need for intervention per consultants' recommendations. The patient was discharged with an antiplatelet, an antihistamine, appropriate additional medications, a vestibular therapy script, and outpatient referrals for a decision regarding surveillance and intervention. Overall, this case describes some key points. It demonstrates that cavernous sinus and cerebellopontine angle meningiomas can occur simultaneously, especially as a continuous mass, which very few cases have done so far. It also highlights an acute clinical presentation of a meningioma, contrary to the gradually progressive one observed in most instances. Last, but not least, it shows how nonspecific symptoms can lead to unique findings at times.

Introduction

A meningioma is the most common primary CNS tumor with a female predilection that arises from the arachnoid layer of the leptomeninges [1,2]. A cavernous sinus meningioma is extremely rare and lies close to cranial nerves III, IV, V_1, V_2, VI and the internal carotid artery (ICA) [3]. A cerebellopontine angle (CPA) meningioma is also rare and potentially lethal since it lies close to the brainstem, cerebellum, and cranial nerves III-XII [4,5]. Tumor etiologies include idiopathy (most cases), ionizing radiation, and genetic conditions (i.e. neurofi-

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* Corresponding author.
E-mail address: jayanthraj.gone@hcahealthcare.com (J. Gone).

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bromatosis type II) [6]. Classification can be made by histology or location [1]. Meningiomas progress slowly, extending into nearby structures and causing symptoms that develop chronically [7]. Clinical features include asymptomatic presentation (incidental on imaging) or any combination of headache, seizures, vertigo, ataxia, sensory deficits, and motor deficits [6,8]. CT shows a hyper- or isodense, extra-axial, well-demarcated mass with possible osseous or calcific changes [6]. MRI can further appreciate homogeneous enhancement, vasogenic edema, mass effect, increased vascularity, and specific signs [9]. PET and tissue biopsy confirms diagnosis [3]. Management includes surgical resection (with optional embolization), radiotherapy (i.e. stereotactic radiosurgery), or active surveillance depending on patient demographics [10,11]. Cavernous sinus and CPA meningiomas are more difficult to remove given their sensitive locations [12,13]. Tumor recurrence is common with incomplete resection, especially near the basilar skull [14,15].

Case presentation

A 60-year-old Hispanic female with a past medical history of pulmonary embolism previously on anticoagulation, cavernous sinus meningioma status post radiosurgery, chronic abducens nerve palsy (secondary to radiosurgery), simple breast cyst, and simple ovarian cyst presented to the emergency department for complaints of sudden onset headache, dizziness, left facial paresthesias, and reproducible chest pain. The patient had normal baseline mentation until the onset of symptoms 13 hours prior to arrival, when she woke up complaining of a bilateral headache with dizziness (described as the “room spinning continuously”) and subsequently experienced a ground level fall onto her chest without syncope. Her meningioma has been confirmed via histopathological examination in the past, but no records of histological or preoperative radiological images were available at the time. She reported that her abducens nerve palsy has not changed since her radiosurgery and her current symptoms are new. Initial vitals showed hypertension. Initial labs, EKG, chest radiograph, CT brain, carotid artery duplex ultrasound, and TTE were insignificant. The CTA chest showed a 12 mm calcified right lateral breast nodule, resembling a fibroadenoma. The MRI brain with and without contrast showed a lesion occupying the left lateral cavernous sinus and CPA surrounding the left cavernous ICA associated with mass effect (Figs. 1-3). The CTA head and neck showed the left proximal cavernous ICA segment with a smaller diameter than the right (Fig. 4). A meningioma was highest on our list of differential diagnoses given the imaging features. A schwannoma was next on the list given that it has similar signal intensity and enhancement patterns on imaging and that it is also a common tumor appearing in the cavernous sinus and CPA. Other general conditions lower on the list included CVA, infection, thrombosis, and vertigo. However, imaging helped rule out most conditions and meningioma was preferred over schwannoma given the patient’s history and imaging characteristics. The Dix-Hallpike maneuver revealed no significant findings and the orthostatic vitals were positive. Telemetry, intravenous fluids, meclizine as needed, physical and occupational therapy, appropriate additional

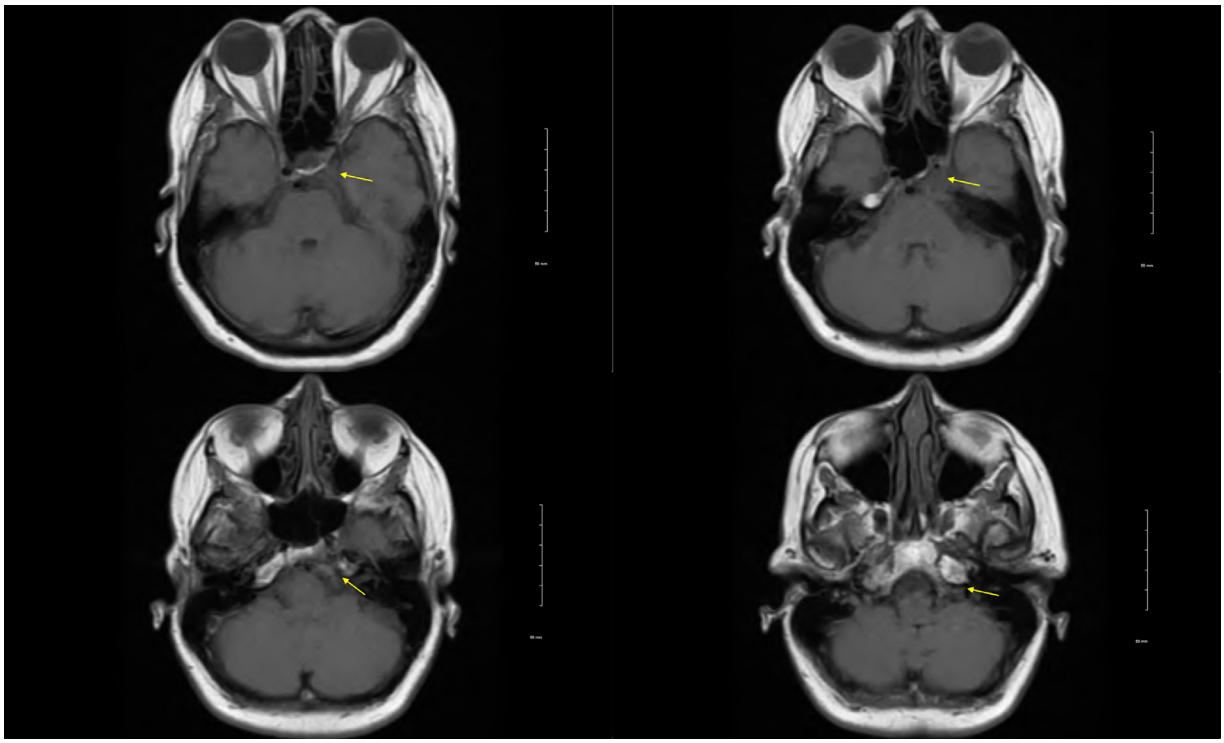

Fig. 1 – Axial T1-weighted sequence MRI brain without contrast in a 60-year-old female showing relatively hypointense, continuous, extra-axial lesion along meningeal lining from left lateral cavernous sinus anteriorly (image A) to left CPA posteriorly (image D) encasing left cavernous ICA, consistent with meningioma.

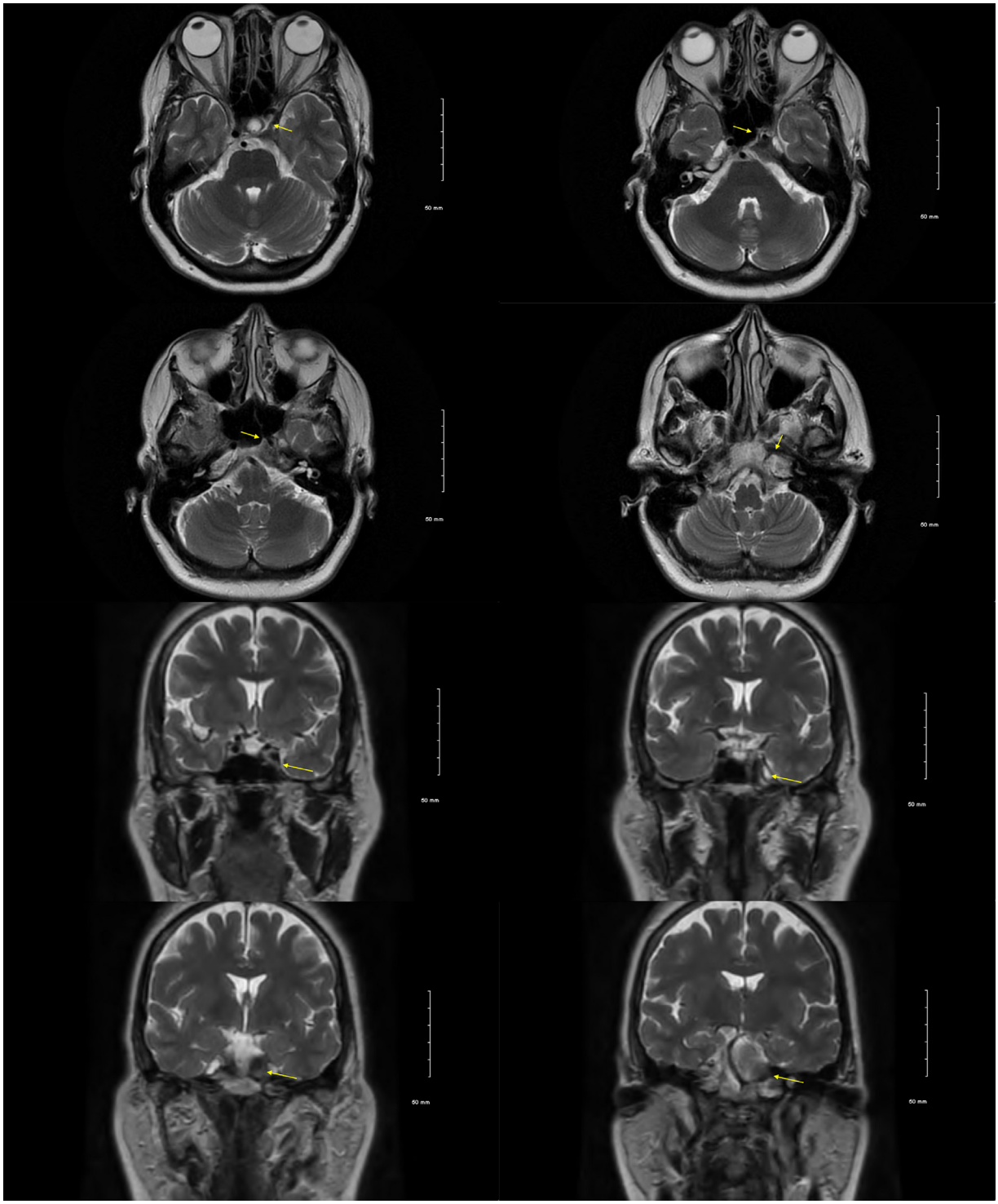

Fig. 2 – Axial (images A-D) and coronal (images E-H) T2-weighted sequence MRI brain without contrast in a 60-year-old female showing relatively hyperintense, continuous, extra-axial lesion along meningeal lining from left lateral cavernous sinus anteriorly (images A and E) to left CPA posteriorly (images D and H) encasing left cavernous ICA, consistent with meningioma.

medications, electrolyte repletion as needed, and venous thromboembolism prophylaxis were given. Neurology and neurosurgery recommended review of prior imaging studies to assess for growth but no urgent intervention. ENT recommended vestibular rehabilitation and no urgent intervention as well. The patient was discharged with an antihypertensive, an antiplatelet, an antihistamine as needed, and a script for vestibular therapy. Patient was advised to follow up outpatient with primary care, neurology, neurosurgery, and ENT.

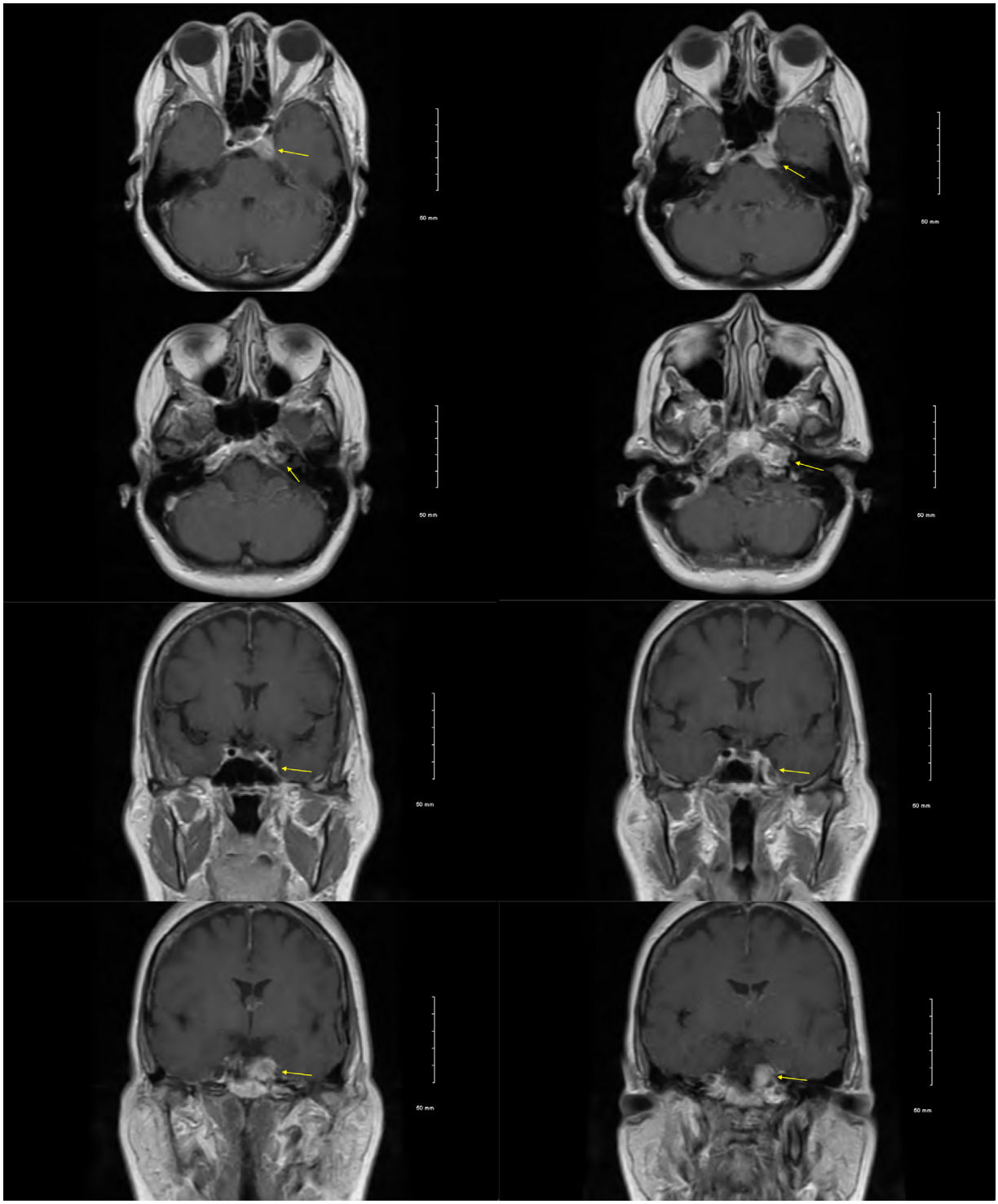

Fig. 3 – Post-contrast axial (images A-D) and coronal (images E-H) T1-weighted sequence MRI brain in a 60-year-old female showing extra-axial, continuously enhancing lesion along meningeal lining from left lateral cavernous sinus anteriorly (images A and E) to left CPA posteriorly (images D and H) encasing left cavernous ICA, consistent with meningioma.

Discussion

We have presented a rare case of a meningioma manifesting in a patient with relatively nonspecific symptoms. Despite the complaints of headache, dizziness, and left facial sensory deficits (in the V_1, V_2, and V_3 distribution), no additional neurological deficits such as dysmetria, dysphagia, dysarthria, hearing loss, vision loss, ophthalmoplegia, tinnitus, nystagmus, nausea, and vomiting were noted [6]. The T1-weighted

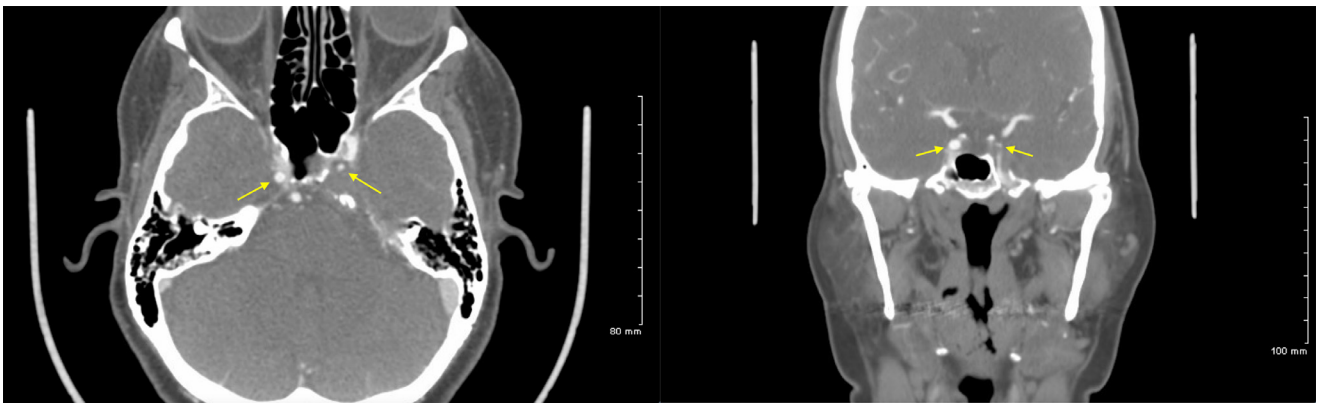

Fig. 4 – Axial (image A) and coronal (image B) CTA head in a 60-year-old female showing approximately 50% luminal stenosis of left proximal cavernous ICA segment, due to external compression by meningioma occupying left cavernous sinus.

sequence of the brain MRI with gadolinium contrast shows a continuously enhancing meningioma extending from the left lateral cavernous sinus to the left CPA (Fig. 3). Most cases of meningiomas are relatively hypo- and hyperintense on T1- and T2-weighted MRI without contrast, respectively, which is echoed by this case as well (Figs. 1 and 2) [9]. The headache can partly be explained by the mass effect seen on imaging, given that a common reason for it is the stretching of the meningeal layers despite the acute onset in this case [8]. The left facial sensory abnormalities can be due to the proximity of the meningioma to cranial nerves V_1 and V_2 in the cavernous sinus and to the trigeminal ganglion, though not explicitly noted on imaging [3]. No evidence of vasogenic edema, increased vascularity (i.e. "sunburst" or "spoke wheel" appearance), or key signs (i.e. "dural tail" or "ginkgo leaf") is shown, but these findings are common in meningiomas superior to this location [9]. Moreover, the head and neck CTA indicates left ICA luminal stenosis (~50%) due to extrinsic encasement and compression by the meningioma (Fig. 4). Overall, the meningioma had some features typical of all meningiomas, such as its extra-axial nature, continuous enhancement, and meningeal adherence. On the contrary, the lesion captured in this patient displays neither a homogeneous appearance nor any specific signs (i.e. "dural tail", "gingko leaf", "sunburst", or "spoke wheel") [9]. Nevertheless, these signs are classically seen with cortical or spinal meningiomas and not as much with subcortical ones [9]. Given the patient's history of undergoing radiosurgery for her cavernous sinus meningioma over a decade ago, it is reasonable to infer that the meningioma originated from the cavernous sinus and possibly migrated posteriorly into the CPA. In other words, it may indicate a recurrence due to suspected incomplete intervention. However, if no such specification in the patient's history was provided, it cannot be determined for sure. The extent of change in the cavernous sinus meningioma cannot be determined either given that prior imaging records were not obtained during this hospitalization. Despite numerous cases of each separate phenomenon, only a few cases have captured the simultaneous occurrence of cavernous sinus and CPA meningiomas, especially as a contiguous mass. For example, only 3 other cases of meningiomas originating only from the cavernous sinus lateral wall have been reported [16]. Considerably more cases of meningiomas in the CPA with various comorbidities (i.e. management complications, additional masses) have been described [14]. Most cases of meningiomas have clinical features that manifest in a slowly progressive manner whereas this case highlights a rather acute presentation on a chronic condition. In addition, it also sheds light on how nonspecific symptoms can lead to unexpected observations, which makes them crucial to consider when forming differential diagnoses.

Conclusion

Meningiomas, particularly cavernous sinus or CPA meningiomas, are individually very rare tumors that may be asymptomatic or symptomatic. In addition, the occurrence of both phenomena in 1 patient, as either separate masses or a contiguous entity, is even more rare. This case demonstrates such an instance in a middle-aged female, possibly due to incomplete intervention. Our patient had an acute yet nonspecific clinical presentation, which is worth noting given that most meningiomas tend to present with gradually progressive symptoms. Not all classic imaging characteristics associated with meningiomas are observed in this case. However, that may be due to the subcortical location of the tumor in our patient. Though very uncommon, such conditions ought to be considered when formulating differential diagnoses. Only a handful of cases describe a meningioma extending from the cavernous sinus to the ipsilateral CPA. The advances in interventional techniques and stereotactic radiotherapy have considerably improved outcomes, which may be of use in this case in spite of differing individual opinions.

Patient consent

Written informed consent for publication was obtained from the patient.

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