A Case Report: Progressive Headache in a Rare Case of Meningioma

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ABSTRACT

The most prevalent primary tumor of the central nervous system is meningioma, and the incidence increases with age. This tumour can be detected through radiological examination and can be classified based on the results of anatomical pathology examination. A 48-year-old woman presented to the hospital with complaints of left-sided progressive headache since several years ago without any other complaints. Imaging examination showed a lesion in the falx cerebri of the sinistra aspect that suggested atypical meningioma. The woman decided to undergo craniotomy resection surgery and histopathological analysis. Based on the WHO classification, the histopathology results revealed that it was a micro and chordoidal meningioma. The patient had significant improvement in her symptoms postoperatively and the tumour size decreased on follow-up imaging. This case report demonstrates the importance of education about dangerous tumour headaches.

Keyword : Atipycal meningioma; chordoid; brain tumor; microcytc

Introduction

Meningiomas are a diverse group of tumours that originate from the meninges, the protective layer surrounding the brain and spinal cord[1]. They represent approximately 30% of all primary brain tumours and are thus notable for their diverse clinical presentations and outcomes[2]. These tumours are classified based on their histopathological features, ranging from benign (Grade I), atypical (Grade II) and malignant (Grade III). While many meningiomas are asymptomatic and found incidentally, others can cause specific complaints

such as significant neurological deficits depending on their location and size[3].

In Europe, the UK, and the USA, there are 5 to 12 cases of meningiomas for every 100,000 patients. Less than 5% of meningiomas are malignant or anaplastic, 15%–20% are atypical, and 80%–90% are typical[4]. Five to fifteen percent of meningiomas are atypical, meaning they are aggressive in a way that falls somewhere between benign and malignant. It falls into the WHO Grade 2 classification with a recurrence rate of 29-52%[5]. In another epidemiological study, 17 to 18% of meningiomas were classified as atypical or grade 21.

Headaches, convulsions, and localized neurological impairments brought on by tumor suppression are typical symptoms. Diagnosis is made by imaging and pathology of biopsy or resection specimens[4]. These tumours are characterised by prominent increased mitotic activity of the nucleoli, and a higher likelihood of recurrence. Despite their relatively rare occurrence, atypical meningiomas pose significant challenges in diagnosis, treatment and long-term management[6].

Case Illustration

A woman, 48 years old, came to the hospital with complaints of headache since more than 2 years ago. Initially, the headache was intermittent and would go away on its own. However, in recent months, the patient felt that the headache was getting worse and interfered with her activities such as lifting heavy weights or going up and down stairs repeatedly. When the patient could not bear it, the patient used to take painkillers bought at stalls or pharmacies. Other complaints such as nausea, vomiting, visual disturbances. hearing loss, and other motoric disorders were denied. Additionally, the patient did not report any memory loss or personality changes. The patient had no history of high blood pressure, diabetes mellitus. There is no genetic disorder or history of meningioma in the family. Patient has no history of radiation exposure, using control birth and head trauma.

The results of the physical examination showed that GCS 15 (E4M6V5), blood pressure 116/69 mmHg, pulse frequency 67x/minute, respiratory rate 20x/minute, temperature 36, oxygen saturation 98% on room air. Patient weighs 65 kg with a height of 150 cm which means belong to class of obese. Head to toe physical examination found no abnormalities in the patient. Neurological examination found that round pupil isochores 2 mm/2 mm, direct and indirect light reflexes of the right and left eyes are positive. Examination of the cranial nerve cannot be assessed, physiological reflexes are within normal limits, and there are no pathological reflexes. Blood test results showed no abnormalities.

Head CT-Scan with contrast obtained an extra-axial isodense lesion in the falx cerebri of the sinistra aspect, oval shape, size 40x52x70 mm, pre-contrast density 27 HU, post-contrast 84 HU perifocal edema around it. The midline was deviated to dextra by 12 mm. These results suggest an atypical meningioma of the sinistra aspect of the falx cerebri with perifocal edema causing midline shifting towards dextra in **Figure 1**.

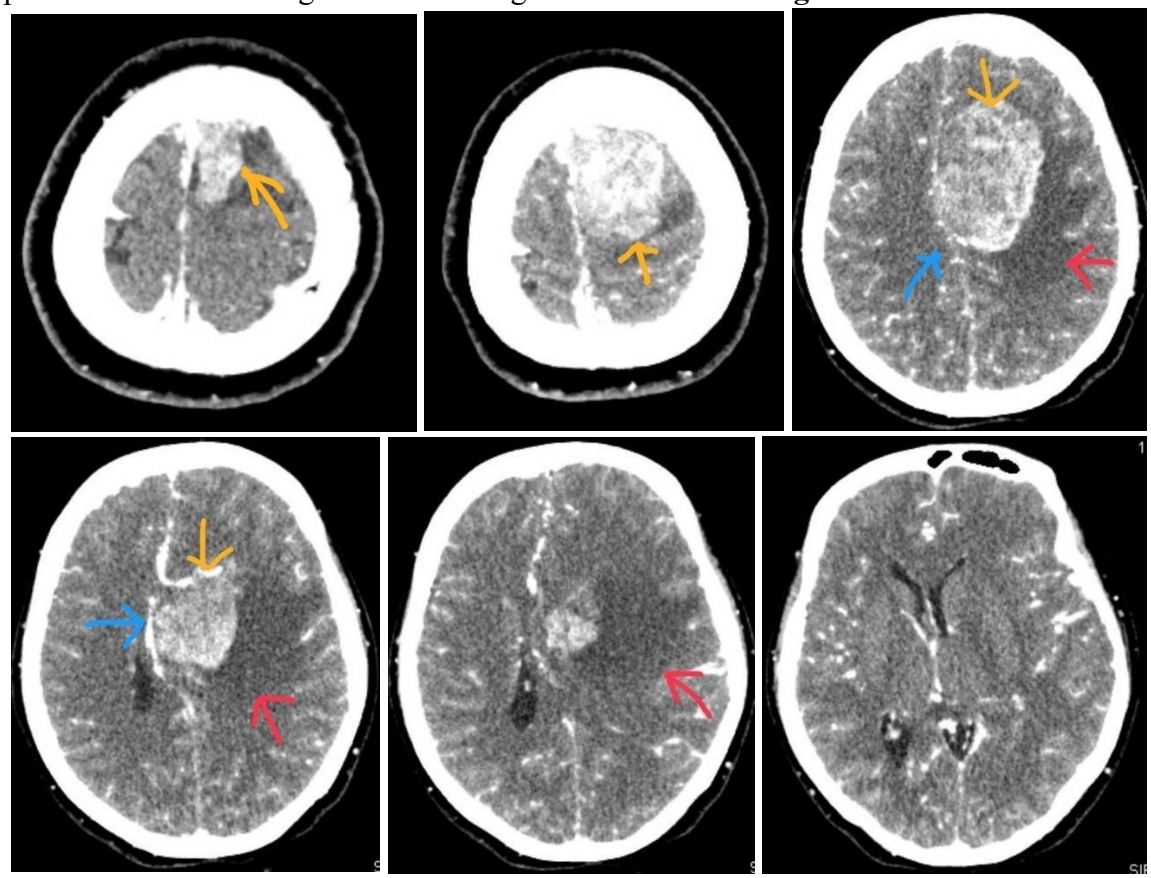

Figure 1. Head CT-Scan with contrast pre-craniotomy (Blue arrow = deviated midline shift, yellow arrow =tumor lesion, red arrow = perifocal edema).

After consultation and examination, the patient was given paracetamol, folic acid and vitamin c. Paracetamol is an analgesic that is often used to reduce pain, including headache pain. In meningioma patients, paracetamol may help relieve pain caused by tumour pressure on brain tissue or inflammation. Folic acid may be given as some studies suggest that folic acid deficiency may be associated with an increased risk of some cancers. vitamin C may help protect cells from oxidative damage which plays a role in supporting nervous system health.

After the results of the head CT scan with contrast came out, a craniotomy was performed on the patient. The stages of surgery were carried out in accordance with proper procedures, starting with septic and antiseptic measures, incision of the surgical wound layer by layer until the bone was obtained, then the bone was drilled in 6 places. Tumor was

evacuated and treated with spongostan, surgicell, and bone wax. The procedure ended with suturing the surgical wound layer by layer. The findings at the time of surgery were soft tumor tissue in the frontal region.

An anatomical pathology examination was carried out using tissue taken from the left frontal region. Macroscopic results in the form of irregular tissue received with a volume of 15 cc, some of which looked like a blood clot, some of which looked like jelly. Ash-brown color, partly rubbery, partly brittle. Then the microscopic results obtained are preparations from the left frontal region consisting of pieces of tumor mass tissue arranged solid and microcystic. Tumor cells with round/oval nuclei, spindle, fine and partially coarse chromatin, eosinophilic cytoplasm and visible "intranuclear pseudoinclusions". The stroma is fibrotic and there are large areas of myxoids. Blood vessels were congested and hyperemic. The conclusion of anatomical pathology is microcytic and chordoid variant meningioma (WHO grade 1 and 2) in **Figure 2**.

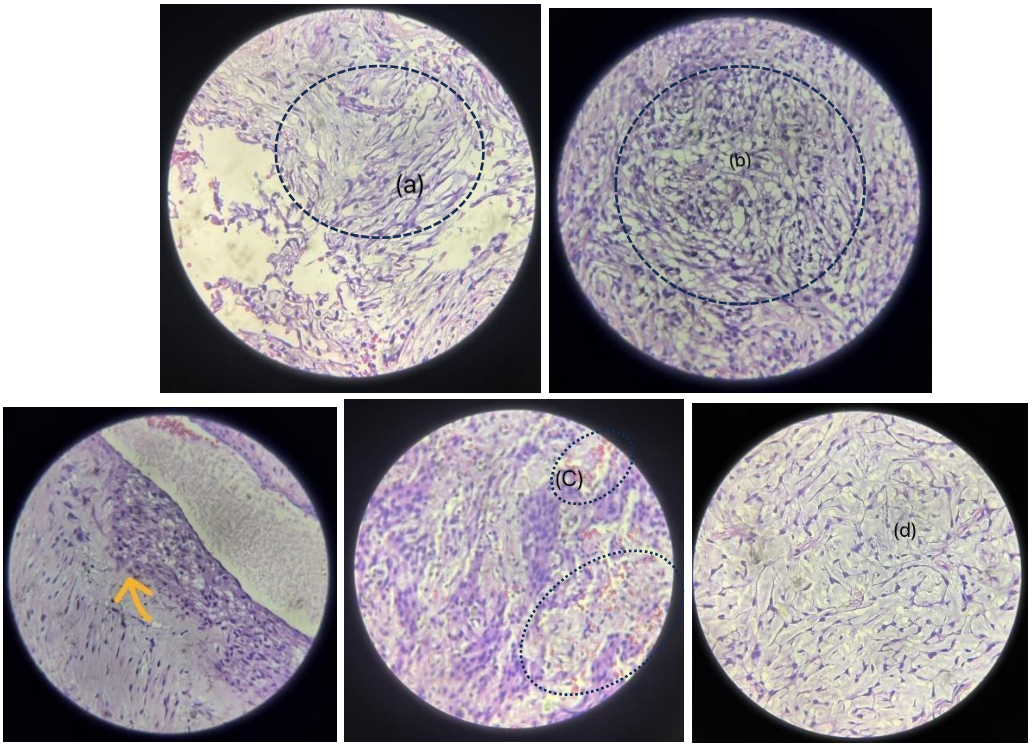

Figure 2. Microscopic appearance of meningioma (a=spindle eosinophilic cells, b=vacuolated cytosplasm separated with mitotic figure, c=stroma fibrotic, d=myxoid background, yellow arrow=intranuclear pseudoinclusions).

Two months after the procedure, the patient was re-evaluated through radiologic examination. The head CT scan showed a residual extra-axial lesion on the sinistra aspect of falx cerebri, oval shape, size 13x32x39 mm, pre-contrast density 33 HU, post-contrast 77

HU, surrounding perifocal oedema. When compared with the previous results, a residual atypical meningioma was found on the left of the falx cerebri with surrounding perifocal oedema in **Figure 3**.

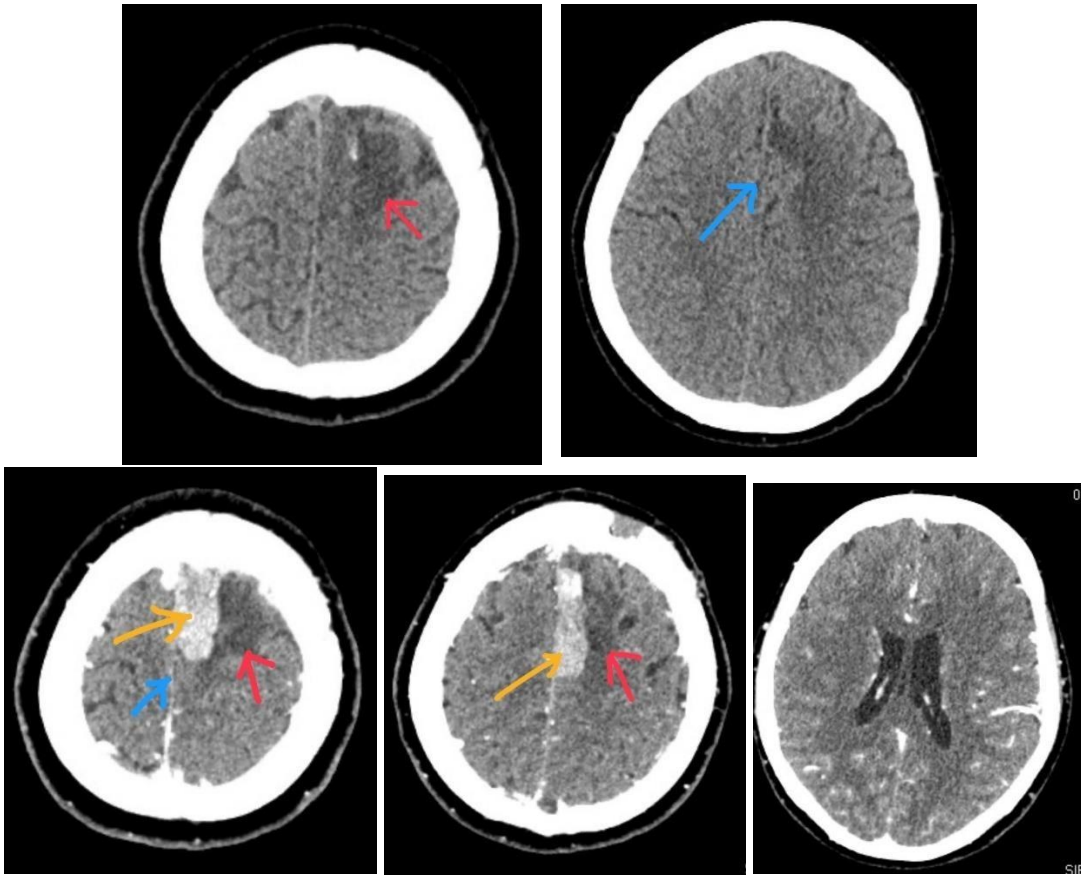

Figure 3. Head CT-Scan with contrast post-craniotomy (Blue arrow = midline in the center, yellow arrow = tumor lesion, red arrow = perifocal edema).

Discussion

Authors should discuss the results and how they can be interpreted from the perspective of previous studies and of the working hypotheses. The findings and their implications should be discussed in the broadest context possible. Future research directions may also be high-lighted. End the discussion by giving a conclusion and future research in that particular topic. Meningiomas are tumors originating from the meninges, the protective layers covering the brain and spinal cord. Meningiomas can be classified into three grades based on the World Health Organization (WHO) grading. Grade I (Benign) that the most common, accounting for about 80-85% of meningiomas. These tumors typically have a low recurrence rate and a good prognosis after surgical resection. Grade II (Atypical) is representing 15-20% of cases these tumors exhibit increased cellularity, a higher mitotic index, and sometimes atypical features, leading to a greater risk of recurrences. Grade III

(Anaplastic/Malignant) is the rarest form, with the highest risk of aggressive behavior and poor prognosis[3]. Atypical meningiomas are characterized by specific histopathological and molecular features[6].

The patient in this case is a 48-year-old woman. As people age, the incidence rate of meningiomas rises. Based on data, 43.6% of patients suffering from meningioma are over 40 years old[7]. Then the incidence of meningioma is higher in women than men with a ratio of 3:13. That is why these patients have a high-risk factor for meningioma. In addition to age, hormonal variables, ionizing radiation exposure, and genetic predisposition are risk factors for meningiomas[4]. Basically, there are risk factors that can increase the possibility of meningioma such as radiation exposure which can cause 6-10 times more risk. In addition to having a larger percentage of atypical or anaplastic meningiomas and a higher recurrence rate, patients with radiation-induced meningiomas (RIM) usually present with numerous tumors5. Occupational exposure to pesticides, allergies and diet may also be risk factors[7].

In addition, obesity is also a risk factor that can increase chronic inflammation and stimulate insulin-like growth factor. Both obesity and meningiomas have higher levels of IGF- 1, which may play a part in the development of both cancers[1]. This patient had a body mass index that fell into the obese class. Obesity is often associated with altered levels of hormones such as insulin and estrogen. Elevated levels of insulin and insulin-like growth factors (IGFs) have been implicated in the promotion of cell proliferation and tumor growth. Since some meningiomas are sensitive to hormonal changes, these factors might play a role in their development. Obesity is linked to a state of chronic low-grade inflammation, which can contribute to tumor progression. Inflammatory cytokines produced in obese individuals could potentially influence the growth and behavior of meningiomas[7].

Clinical symptoms in patients with meningiomas vary depending on the location of the tumour. In atypical meningiomas located in the frontal part, patients often complain of headache, movement disorders, and motor disorders. Approximately 30-36% of meningioma patients complain of headache; therefore, headache is a very common symptom[7]. Our patient in this case complained of progressive headache where the pain has been going on for a long time and getting worse continuously. She had no other complaints. Headache pain can have many causes, not always tumours. Everyday headache complaints are usually migraines or tension headaches that can last for hours to days. What distinguishes headache pain from brain tumours is the origin and nature of the pain, accompanying symptoms, triggers and duration. Headaches caused by tumours are dull and non-specific at first. Later, the pain persists and worsens as the tumour grows[8]. It is usually not triggered by stress but may

worsen with activity as it increases pressure within the head. Most tumour headaches are also accompanied by other symptoms such as nausea, vomiting, blurred vision, motor impairment, balance, body weakness and more, depending on the location of the tumour. Looking at the patient's headache complaints in this case, it is clear that the headache is progressive and caused by a tumour.

Meningiomas, as extra-axial tumors, usually arise from the meningen and exert pressure on adjacent brain structures, including the brain parenchyma and cranial nerves. This mass effect may lead to increased intracranial pressure (ICP)[2]. A growing tumor creates a local increase in pressure, which can stretch the surrounding brain tissue and dura, leading to headaches. It may displace or compress nearby brain structures, including the cortex and vascular structures. This shifting can cause stretching and irritation of the dura mater and surrounding brain tissue, resulting in headaches. The presence of a tumor often causes peritumoral edema [3]. Edema can exacerbate the effects of the tumor mass, leading to increased ICP and irritation of the dura, both of which contribute to headache pain. The presence of both edema and deviation can be evidenced on a head CT scan[9].

Depending on the grade and histologic subtype, meningiomas exhibit a wide range of characteristics when examined under a microscope. In addition, many meningiomas exhibit a variety of morphologic characteristics. Some exhibit primarily mesenchymal characteristics, such as a noticeable spindle cell component, substantial collagen deposition between cells, and sporadic metaplastic alterations such osseous or cartilaginous metaplasia[5]. The anatomical pathology of this patient showed signs of meningioma in the form of microcytic features, fibrotic stroma and intranuclear pseudoinclusions. This patient was classified as an atypical meningioma. This was characterised by microscopic findings dominated by the presence of spandles and myxoids which are characteristic of chordoids[10].

Atypical tumors have a higher tendency to recur due to their increased mitotic activity and more aggressive behavior. Complete resection is the primary goal. However, due to the infiltrative nature of atypical meningiomas, achieving total resection may be challenging[11]. The best method to prevent a recurrence is to remove the meningioma and dura completely. Five years following complete resection, the recurrence rate for WHO grade I meningiomas is 7–23%, WHO grade II meningiomas is 50–55%, and WHO grade III meningiomas is 72–78%[2]. Even if the initial tumor was removed entirely, there is still a 24 to 32 percent probability that a meningioma may return within 15 years. The new meningioma forms in the same location as the original in around 95% of recurrences. Regular monitoring for tumor recurrence and management of any residual effects is important for long-term headache

control[12].

Early detection of meningioma is crucial for improving treatment outcomes and patient quality of life. Meningiomas often grow slowly and can be asymptomatic, so early symptoms may not be apparent. Recurrence of meningioma poses a major challenge in managing this tumor, particularly for atypical and malignant variants. Patients who have undergone surgery or radiation therapy need regular monitoring with CT scans or MRIs. This monitoring enables early detection of recurrence or residual tumor growth[9].

Conclusion

Atypical meningioma is a rare meningioma with up to 20% reccurences after tumor resection. In this patient, the diagnosis was made from complaints of progressive headache with a risk factor such as age, gender, and obesity. This diagnosis is established through the appearance of tumour lesion on head CT scan with contrast. Histopathological results give typical results of atypical meningioma in the form of the presence of microcytic scales, intranuclear pseudoinclusions and myxoids. Medications that can be given are painkillers. craniotomy is essential to perform with the aim of tumour resection. With an integrated approach to detection, management, and follow-up, the prognosis for patients with meningioma can be significantly enhanced. Thus, when the patient was re-evaluated after the procedure, the tumor size was reduced.

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