

EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER
DEPARTMENT OF EMERGENCY MEDICINE



Care Warriors

Author: Anita Singh | Editor: Ajith Susai D.O.

| Vol 3 | Issue 1

Meningioma Presenting as Altered Mental Status

A 42-year-old Caucasian female with no significant PMH presented to the ED at after being found confused and laying on the floor of her hotel bathroom by a friend. It is unknown if the patient fainted or had a seizure. The patient is afebrile and vitals are within normal limits. The patient is unable to recall this event upon interview in the ED. She is noted to have slurred speech. There is no facial asymmetry, weakness, visual disturbances, or headaches present. Remainder of the neurological exam is within normal limits. Of note, the patient does report a 6-8-month history of losing consciousness, of which, one episode was accompanied urinary incontinence 2-3 weeks ago.

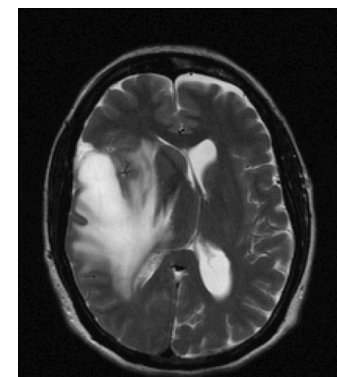
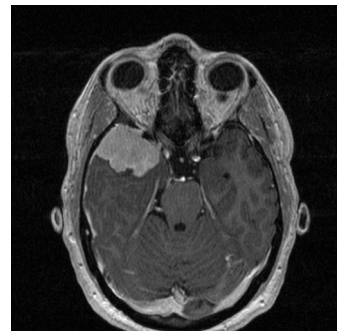
Laboratory studies are unremarkable, however, CT scan of the Brain without contrast showed a mass involving the right hemisphere with extensive vasogenic edema and near-complete effacement of the right lateral ventricle. MRI of the brain confirmed an extra-axial mass anterior to the right temporal lobe appearing as a malignant meningioma given the severe degree of edema and a subfalcine herniation with right to left midline shift.

Which of the following is true about meningiomas?

- A. This type of tumor occurs more frequently in people with a hereditary type of disorder called neurofibromatosis type 2 (NF-2).
- B. Surgical intervention is the most common treatment for a meningioma.
- C. Meningiomas are more common in middle aged women.
- D. D. All the above.

***The correct answer is D.**

Preoperative MRI Brain



EM Case of the Week is a weekly "pop quiz" for ED staff.

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

BROWARD HEALTH MEDICAL CENTER

Department of Emergency Medicine
1625 SE 3rd Avenue
Fort Lauderdale, FL 33316

Introduction

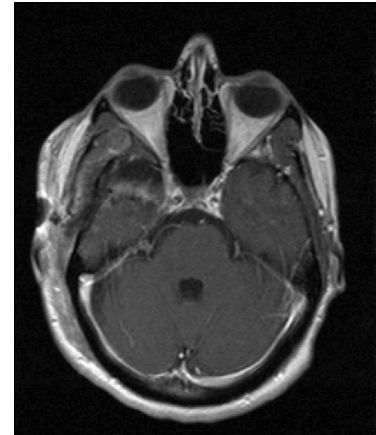
Meningiomas are tumors that originate in the meninges, which are the outer three layers of tissue between the skull and the brain that cover and protect the brain. The middle layer of the meninges, called the arachnoid, is where meningiomas form. Meningiomas are the most common type of primary brain tumor, accounting for about 30 percent of all brain tumors. In addition, the estimated number of new cases per year in the United States is nearly 30,000. The incidence varies by race, with blacks having a 1.2-fold higher incidence than whites. Meningiomas are also more common in middle aged females with a female-to-male ratio of approximately two or three to one.

Exposure to ionizing radiation is the most important acquired risk factor for meningioma. This includes the therapeutic use of radiation for malignancy and incidental radiation exposure. In fact, radiation-induced meningiomas have a higher incidence of multiplicity and atypia compared with sporadic meningiomas. Genetic predisposition to meningioma is seen in patients with neurofibromatosis type 2 (NF2) and schwannomatosis. Approximately one-half of individuals with NF2 have meningiomas, and multiple meningiomas are often present. Patients with multiple endocrine neoplasia type 1 (MEN1) also have an increased risk of meningioma, although at lower rates compared with neurofibromatosis.

Discussion

There are many causes of altered mental status not limited to stroke, infectious, metabolic, and toxic ingestion. However, space occupying lesions must be considered and not forgotten in this setting. Although most meningiomas are asymptomatic or minimally symptomatic, they can induce altered mental status due to local brain invasion, severe edema, compression of adjacent structures, and increased intracranial pressure. In the emergent setting, glucocorticoids are commonly used to decrease peritumoral edema and elevated ICP in patients with severe symptoms or threatened herniation.

Postoperative MRI Brain



The most common symptoms of meningiomas include headaches, extremity weakness, paralysis, visual field abnormalities, and speech problems. However, specific focal neurological deficits depend on the location of the tumor. For example, seizures are most often present in non-skull base location (convexity, parasagittal, falxine tumors) and in tumors associated with tumoral edema.

Diagnostics

Most meningiomas are noncancerous, slow-growing tumors. Classifying a meningioma as atypical, benign, or malignant according to the World Health Organization (WHO) Grades I, II, and III respectively, requires histological confirmation. However, magnetic resonance imaging (MRI) is the most effective imaging in detecting meningiomas and the degree of brain involvement and is sufficient for empiric treatment when obtaining pathological sampling is too high risk or untimely.

For a list of educational lectures, grand rounds, workshops, and didactics please visit BrowardER.com and **click** on the **"Conference"** link.

All are welcome to attend!

Grade I tumors are the most common type of meningiomas (70-80%) and are considered benign. Grade II tumors are atypical, however, may become malignant at some point and these tumors tend to grow faster. Grade III is the most aggressive form and is considered malignant. These tumors make up approximately 1-4% of meningiomas. Moreover, the WHO grading system correlates with outcome, and therefore has a large impact on treatment planning. Grade II and III meningiomas are associated with invasive brain disease, higher rates of recurrence, and a shorter overall survival when compared to patients with Grade I disease.

Treatment

Determining the optimal treatment is dependent on various factors including the degree of neurologic impairment, age of the patient, comorbidities, size of the tumor, as well as the location of the tumor relative to critical brain structures. Essentially, not all meningiomas warrant treatment. Active surveillance with the use of periodic imaging is considered for asymptomatic meningiomas. However, the standard of care for meningiomas is complete surgical resection. Gamma knife surgery has also become a means of treating meningiomas and avoids the surgical complications of bleeding, infection, and neurological deficits. Radiation therapy may also play a role in inoperable tumors and in patients who are not surgical candidates by slowing the growth and shrinking the meningioma.

Differential Diagnosis for Altered Mental Status

AMS= AEIOU TIPS

A	Alcohol
E	Epilepsy, Electrolytes, Encephalopathy
I	Insulin
O	Opiates, Oxygen
U	Uremia
T	Trauma, Temperature
I	Infection
P	Poisons, Psychogenic
S	Stroke, Subarachnoid Hemorrhage, Space Occupying Lesions

Take Home Points

- There are many causes of altered mental status not limited to stroke, infectious, metabolic, and toxic ingestion. However, space occupying lesions must be considered and not forgotten in this setting.
- Brain tumors can produce symptoms and induce altered mental status due to local brain invasion, compression of adjacent structures, and increased intracranial pressure.
- Meningiomas are the most frequently diagnosed primary brain tumor.
- The standard of care for meningiomas is complete surgical resection, however, determining the optimal treatment is dependent on various factors including the degree of neurologic impairment, age of the patient, comorbidities, size of the tumor, as well as the location of the tumor relative to critical brain structures.



ABOUT THE AUTHOR

This month's case was written by Anita Singh. Anita is a 4th year medical student from NSU-COM. She did her emergency medicine rotation at North BHMC in April 2018. Anita is pursuing a career in Internal Medicine after graduation.

REFERENCES

- Cancer Treatment Centers of America. (2017, January 27). *Meningioma*. Retrieved from Cancer Treatment Centers of America: <https://www.cancercenter.com/brain-cancer/types/tab/meningioma/>
- Neurosurgical Medical Clinic, Inc. (2000). *Meningiomas*. Retrieved from Neurosurgical Medical Clinic: <http://www.sd-neurosurgeon.com/neurodiseases-meningiomas.php>
- Park, J. (2018, February 28). *Epidemiology, pathology, clinical features, and diagnosis of meningioma*. Retrieved from UptoDate: https://www.uptodate-com.ezproxylocal.library.nova.edu/contents/epidemiology-pathology-clinical-features-and-diagnosis-of-meningioma?search=meningioma&source=search_result&selectedTitle=1~99&usage_type=default&display_rank=1
- UCLA Health. (2017). *Meningioma Brain Tumor*. Retrieved from UCLA Neurosurgery: <http://neurosurgery.ucla.edu/meningioma-brain-tumor>