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ORIGINAL ARTICLE

Posterior fossa meningioma (surgical experiences)

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KEYWORDS

Meningioma;
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Abstract *Introduction:* Meningioma is a common tumor that represents about 30% of all intracranial tumors. Posterior fossa location of the tumor is uncommon. It can be classified according to the location in the posterior fossa into cerebellopontine angle, clival, petroclival, convexity, tentorial and foramen magnum. Different surgical approaches are used to excise these tumors.
Aim of the study: Was to study different aspects of posterior fossa meningioma regarding location, histology, surgical approaches and outcome.
Methods: Retrospective study including 20 patients diagnosed with posterior fossa meningioma was included in the study. Data were obtained from the files of the patients and were analyzed. All patients had preoperative complete general and neurological examination, MRI of the brain with and without Gadolinium. Different surgical approaches were utilized in the study depending on the tumor location and the surgeon's preference. Postoperatively, all patients had a postoperative CT scan of the brain with contrast. Some patients had also MRI of the brain with and without Gadolinium.
Results: Fifteen of the patients were females and 5 were males. The age ranged from 35 to 69. Symptoms included headache (75%), cerebellar manifestations (60%), cranial nerve affection (40%) and hearing disturbances (15%). Most of the cases (50%) were cerebellopontine angle meningioma while the least (5%) were foramen magnum meningioma. Surgical approaches used included retrosigmoid approach (50%), transpetrosal approach (30%) and transcondylar approach (20%). Tumor removal was total in 60% of cases and partial in 40%. Postoperative mortality was present in 5% of cases. Morbidity included decreased level of consciousness, cranial nerve palsy and wound infection.
Conclusion: Retrosigmoid approach is effectively and safely used for cerebellopontine angle meningioma, convexity menigioma and lateral tentorial meningioma extending inferiorly to the posterior fossa. Suboccipital approach can be used safely for posterior foramen magnum meningioma. Clival and petroclival meningioma carry a high morbidity incidence.

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1. Introduction

Meningioma is a diverse set of tumors arising from the meninges, the membranous layers surrounding the central nervous system. They are the second most common primary neoplasm of the CNS, representing about a third of brain tumors. They arise from the arachnoid ''cap'' cells of the arachnoid villi in the meninges. Meningiomas are usually benign but they can be malignant. The term of ''meningioma'' was first used by Harvey Cushing in 1922. Charles Oberling then separated these into subtypes based on cell structure.[1–4] In 1979, the World Health Organization (WHO) classified seven subtypes, upgraded in 2000 to a classification system with nine low-grade variants (grade I tumors) and three variants each of grade II and grade III meningiomas.[5–7] The most common subtypes of meningiomas are Meningotheliomatous (63%), transitional or mixed-type (19%), fibrous (13%), and psammomatous (2%).[8,9]

Meningiomas are classified based on the WHO classification system.[10]

- Benign (Grade I) – (90%) – meningothelial, fibrous, transitional, psammomatous, angioblastic (most aggressive).
- Atypical (Grade II) – (7%) – chordoid, clear cell, atypical (includes brain invasion).
- Anaplastic/malignant (Grade III) – (2%) – papillary, rhabdoid, anaplastic.

In the posterior fossa, most meningiomas are found in the cerebellopontine angle.[11–13] Women are affected twice as often as men. Meningiomas are encapsulated lesions that indent the brain as they enlarge. They grow slowly and may be present for many years before producing symptoms. They often have high vascularity, receiving their blood supply predominantly from dural vessels. Posterior fossa meningioma was classified according to their location in the posterior fossa into cerebellopontine angle, convexity, clival, petroclival, tentorial and foramen magnum.[14–16] Clinical manifestations of posterior fossa meningioma vary according to their location. Different surgical approaches were used to excise these tumors including retrosigmoid, transpetrosal, translabyrinthine and transcondylar approaches.[17–19]

2. Aim of the study

The aim of this study was to study different aspects of posterior fossa meningioma regarding location, histology, surgical approaches and outcome.

3. Patients and methods

A retrospective study including 40 patients diagnosed with posterior fossa meningioma was included in the study. Data were obtained from the files of the patients and were analyzed. All patients had preoperative complete general and neurological examination, MRI of the brain with and without Gadolinium. Some of the patients had CT scan of the brain with contrast. Different surgical approaches were utilized in the study depending on the tumor location and the surgeon's preference. These approaches included retrosigmoid approach, different transpetrosal approaches, suboccipital approach and transcondylar approach. Postoperatively, all patients had a postoperative CT scan done for the brain with contrast. Some patients had also MRI of the brain with and without Gadolinium. All patients had tumor biopsy sent for pathological analysis.

3.1. Statistical analysis

Numbers and percentages were used to describe the results.

4. Results

Table 1 shows that females were much more predominant than males (62.5% versus 37.5% respectively).

The age of the patients ranged from 35 to 69 with a mean age of 51 years. Table 2 shows that the age category of 55 to less than 65 years represented the majority of cases (40%) while the least was the age category of 65 years and more.

Table 3 shows that the most common clinical manifestation of the patients was headache (75% of cases), while the least was hearing disturbances (15%).

Table 4 shows the tumor location in cases under study. Cerebellopontine angle meningioma was the most common (40%) followed by petroclival meningioma (25%), while the least meningioma location was the clival and foramen magnum meningioma (5% of cases each), (Figs. 1–3,5 and 6,).

Table 5 shows the histological subtypes of meningioma cases under study. It shows that fibrous type represented the most predominant type (25%), followed by psamommatous and meningothelial types (20% of cases each) and the least was the malignant type (5% of cases).

Table 6 shows the surgical approaches used in the study. In the majority of patients (75%), the retrosigmoid approach was used, followed by the transpetrosal approach (20%). The least used approach was the transcondylar approach (5% of cases), (Fig. 4).

Table 7 shows the extent of tumor excision related to the location of the tumor. Tumors that had partial removal were equal to those that had complete excision (50% each). All petroclival meningioma cases were only partially removed, while all tentorial, convexity and foramen magnum meningioma were totally excised.

Table 8 shows the postoperative complications. The most common postoperative morbidity was decreased level of consciousness in 25% of cases, followed by cranial nerve palsy (15% of cases) and infection in 10% of cases. Death occurred only in two patients (5% of cases).

Table 9 shows the relationship between the tumor location and the postoperative morbidity and mortality. Cerebellopontine angle meningioma as well as petroclival meningioma had postoperative cranial nerve palsy as a complication which was not present in other tumor location. Petroclival meningioma

Table 1 Shows the gender of patients under study.

Gender	Number of patients	%
Males	5	25
Females	15	75
Total	20	