ISSN: 3049-7361

Research Article

Journal of Clinical Surgery and Anesthesia

First Report of Meningiomas Frequency in Mozambique

Mircya Mitha Hamide Mandawa Maocha[1,2,3*], Enoque Langa[1,2], Sara Massuangane[1,2], Adilson de Oliveira[4], Eva Timoteo[1,2] and Sergio Salvador[1,3]

[1]Neurosurgery service, Hospital Central de Maputo - Mozambique, East Africa
[2]Associação dos Neurocirurgiões dos PALOPS - Mozambique , East Africa
[3]Neurosurgery Department, Maputo Private Hospital,- Mozambique, East Africa
[4]Neurosurgery Service, Neuroscience center, Clinica Girassol- Angola, Central Africa

[*]Corresponding author
Mircya Mitha Hamide Mandawa Maocha, Neurosurgery service, Hospital Central de Maputo - Mozambique, East Africa.

Received: August 20, 2025; **Accepted:** August 28, 2025; **Published:** September 09, 2025

ABSTRACT

The main objective of this work is to determine the frequency of meningiomas diagnosed at the Maputo Central Hospital, in the Pathological Anatomy service and Neurosurgery service. Meningiomas represent the most common primary brain tumors, representing around 33.8% to 36.6% of all brain tumors. Around 26,000 cases arise per year, and risk factors include, in addition to age, sex, and exposure to radiation. A retrospective, descriptive cross-sectional study was carried out and data collection was carried out retrospectively from January 1, 2013, to December 31, 2017.

Methods: A retrospective cohort study was performed, Inclusion criteria were all ages, histological comparison of the diagnosis. Only surgical cases were included.

Results: Between 2013 and 2017, 62 intracranial tumors were diagnosed at Maputo Central Hospital, with meningiomas comprising 70% of cases, followed by astrocytomas (18%) and oligodendrogliomas (3%). Meningiomas were more common in females (51.1%) and most frequent in patients aged 35–54 years. Histologically, psammomatous (36%), transitional (32%), and meningothelial (28%) subtypes predominated, while other variants were rare (4%). The annual proportion of meningiomas varied from 40% to 100% of all brain tumors. This represents the first epidemiological and histopathological profile of meningiomas reported in Mozambique.

Conclusion: This first report on meningiomas in Mozambique reveals a high proportion of benign subtypes, with peak incidence occurring at a younger age than internationally reported. Findings highlight the central role of surgery in a resource-limited setting and the need to improve postoperative documentation. Multicenter, prospective studies with molecular profiling are recommended to optimize management and outcomes. There are no specific publications on the frequency of meningiomas in Mozambique, which highlights the importance of the study carried out.

Keywords: Neurosurgery, Brain Tumor, Meningioma, Mozambique

Introduction

The main objective of this study is to determine the frequency of meningiomas diagnosed at the Maputo Central Hospital, in the Neurosurgery service. In adults, meningiomas are the most common primary brain tumors worldwide representing around de 33,8 to 36,4% of all primary tumors, according to boetto, 2021 Meningiomas represent more than 30% of all primary tumors of the central nervous system, about 26,000 new cases are registered annually [1-3]. A retrospective, descriptive, cross-sectional study was conducted, and data collection was performed retrospectively from January 1, 2013, to December 31, 2017. There are no specific publications on the frequency of meningiomas in Mozambique, which highlights the importance of this study.

Literature review

The emergence of meningiomas increases with the patient's age, being more frequent around 65 years of age, and more common in women. They are related to exposure to certain hormones and for patients who received radiation doses to the head and neck for the treatment of tinea capitis or lymphoblastic leukemia

Citation: Mircya Mitha Hamide Mandawa Maocha, Enoque Langa, Sara Massuangane, Adilson de Oliveira, Eva Timoteo, et al. First Report of Meningiomas Frequency in Mozambique. J Clin Surg Anesth. 2025. 3(3): 1-5. DOI: doi.org/10.61440/JCSA.2025.v3.36

[2,4]. They can originate anywhere where the arachnoid cells of the central nervous system, such as the cerebral convexity, parasagittal region, and the sphenoid wing, also arise within the ventricles or even brain parenchyma. Only 12% of meningiomas are spinal and comprise the most common intradural tumors of the spinal cord and cauda equina in adults [2].

According to the 2016 revised classification of the World Health Organization (WHO), meningiomas can be divided into grade 1 (WHO grade I, including meningothelial, fibrous, or mixed), atypical (WHO grade II, including clear cell and choroid), and anaplastic/malignant (WHO grade III), with the majority of meningiomas falling into the benign subtype, Grade III malignant meningiomas represent about 1% [1,2,5]. see table 1. There is an association between intracranial location and histological subtype: meningothelial meningiomas are often found at the base of the skull, while fibroblastic meningiomas are mainly present in the convexities. Grades II and III tend to occupy the convexity or parasagittal surfaces. The diagnosis of atypical meningioma is made based on a mitotic count; spontaneous necrosis, mitotic envelope, prominent nucleoli, high cellularity, and small cells can be used to define atypical meningiomas [1].

Table 1: 2016 WHO classification of meningiomas [2].

WHO grade	Frequency	Pathological features	Histological subtypes	Rate of recurrence
I	80-90%		Meningothelial Fibrous Transitional Psammomatous Angiomatous Microcystic Secretory Lymphoplasmacyte-rich Metaplastic	7-25%
II	20-25%	Increased mitotic activity Or Brain invasion Or Three or more of the following: Increased cellularity Small cells with high nuclear to-cytoplasmic ratio Prominent nucleoli Sheeting Foci of spontaneous necrosis	Chordoid Clear cell Atypical	29-52%
III	1-3%	Markedly elevated mitotic activity Malignant cytological features Extensive necrosis K_i-67 > 20%"	Papillary Rhabdoid Anaplastic	50-94%

Germline and somatic mutations have been observed associated with meningiomas, with germline mutation in the NF2 gene being the most identified genetic risk factor for multiple meningiomas. For non-NF2 meningiomas, genomic alterations such as TRAF7, KLF4, AKT1, and SMO may arise and tend to be less aggressive than NF2. Epigenetic modifications, DNA methylation, histone modifications, and microRNA (miRNA) expression may be related to the malignancy of meningiomas [1,3]. see figure 1

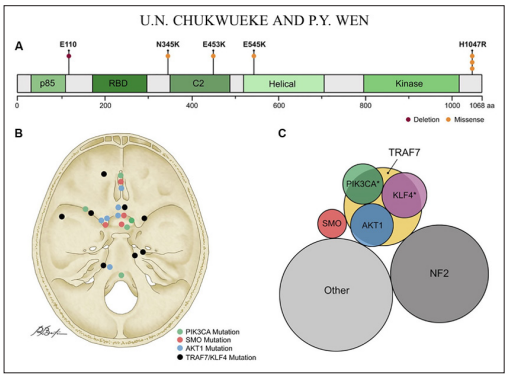

Figure 1: Meningiomas Mutation [1].

The initial clinical presentation may be subtle and depends on the tumor location. Compression of adjacent brain and vascular structures can lead to focal neurological deficits (including cranial nerve deficits), as well as nonspecific symptoms such as headache and seizures [2]. On CT images, meningiomas appear hyperdense, hypo- to isointense on T1-weighted magnetic resonance imaging (MRI), iso- to hyperintense on T2-weighted MRI, and homogeneous contrast enhancement. The presence of a dural tail is considered a significant sign of meningiomas. (2) well-circumscribed margins, (3) an inward displacement of cortical gray matter, and (4) the presence of cerebrospinal fluid cleavage between the lesion and the adjacent brain center are other important features that can be observed on meningioma images Hyperostosis in the adjacent skull and intratumoral calcification may be present and are best visualized on CT. Differential diagnoses can be made with other neoplasms such as gliomas, infectious diseases, or granulomatous diseases, depending on the location [2,6]. See figure 3.

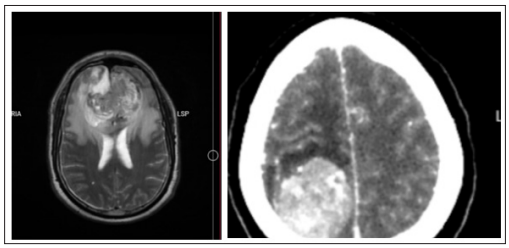

Figure 3: Types of Meningiomas

RM T2 axial with Frontal falcine Meningioma. (Neurosurgery PACS, HCM)
CT CEaxial with Parietal Menigioma. (Neurosurgery PACS, HCM)

Treatment
For asymptomatic tumors, it is sensible to observe and monitor over the time, until there are related symptoms. Medical therapy is generally reserved for recurrent, progressive, or unresectable meningiomas that have not responded to surgery and radiotherapy. Conventional cytotoxic chemotherapy has demonstrated equivocal and controversial benefits. Hormone therapy, particularly antiprogesterone agents, has shown promise in some studies due to the frequent expression of progesterone receptors in meningiomas, but subsequent trials have yielded inconsistent results [6]. Current therapies aim to target molecular alterations (e.g., inactivating NF2, AKT1, and SMO mutations) and angiogenesis inhibitors, with trials in early stages [1]. Immune checkpoint inhibitors also represent a potential future avenue. The ideal treatment for meningiomas is surgical resection, when feasible, with adjuvant radiotherapy for high-grade lesions or incomplete resections [5,6]. It is important to classify the tumor after resection as to the resection, this may help predict the patient's prognosis and also what conduct to take after surgery, whether to undergo radiotherapy for example [6].

Methodology
A retrospective, descriptive, cross-sectional study was conducted on the frequency of meningiomas admitted to Maputo Central Hospital from January 2013 to December 2017.

Study Design and Setting
This was a cross-sectional, retrospective, descriptive study conducted in the Neurosurgery Department of Maputo Central Hospital, the largest quaternary referral center in Mozambique. The study covered a two-year period, from January 1, 2013, to December 31, 2017, and included adult patients diagnosed with and operated with meningiomas.

Study Population
All patients with radiologically confirmed meningiomas during the study period and admitted to the Neurosurgery Department were included. The study comprised patients transferred from the Emergency Department, Intensive Care Unit (ICU), and Intermediate Care Unit (ICU) of Maputo Central Hospital.

Data Collection
Data were collected retrospectively from hospital admission records, imaging reports, operative notes, and mortality databases.

Variables Collected
Demographics: age, sex
Meningioma classification: Histological classification of meningiomas
Surgical intervention: type and indication

Data Analysis
Data was entered into Microsoft Excel and analyzed using descriptive statistics. Frequencies and percentages were used for categorical variables.

Objectives
- To determine the proportion of meningiomas among all intracranial tumors diagnosed in the Neurosurgery Department of Maputo Central Hospital from 2013 to 2017.
- To describe the demographic characteristics (age and sex distribution) of patients diagnosed with meningiomas during the study period.
- To classify the histopathological subtypes of meningiomas according to the 2016 WHO Classification of Tumors of the Central Nervous System.
- To classify the postoperative mortality rate according to the Simpson scale.
- To determine the mortality rate of meningiomas.

Inclusion Criteria
- All patients, both children and adults, with meningiomas admitted to the Neurosurgery Department of Maputo Central Hospital during the study period will be included in the study period.
- All patients with brain tumors undergoing imaging and surgery will be included.
- All patients with meningiomas associated with other pathologies will be included.
- Patients who underwent surgery.

Exclusion Criteria
- Patients who did not undergo surgery.
- Patients without imaging studies with a diagnosis of meningiomas.

Results
It can be observed that among brain tumors with anatomopathological results from 2013 to 2017, meningiomas represented 70% of all tumors during the study period. Astrocytomas came in second, representing 18% of all tumors. Oligodendrogliomas came in third, representing 3%. Other tumors, such as ependymomas, hemagyoblastomas, medulloblastomas, glioblastomas, and adenocarcinoma metastases, each represented 1%. it can also observe that meningiomas represented 80% of tumors in 2013, 100% in 2014 and 2016, and the remaining years varied between 40 and 50%.

Table 2. Annual distribution of intracranial tumor diagnoses (2013–2017). (Neurosurgery registry book, 2013-2017)

Diagnosis	2013	2014	2015	2016	2017	Total
Meningiomas	8 (80%)	5 (100%)	8 (42%)	17 (100%)	6 (54%)	44 (70%)
Astrocytomas	0	0	9	0	2	11
Ependymomas	0	0	0	0	1	1
Oligodendrogliomas	1	0	0	0	1	2
Hemangioblastoma	0	0	1	0	0	1
Medulloblastoma	0	0	0	0	1	1
Glioblastoma	1	0	0	0	0	1
Adenocarcinoma metastases	0	0	1	0	0	1
Total	10	5	19	17	11	62

Table 3 shows the relationship between sex and meningiomas during the study period, and females represented 23 cases and males 22, which is equivalent to 51.1% of meningioma cases for females.

Table 4 shows that the age most frequently affected in this study period was 35 to 44 years of age, followed by 45 to 54 years of age.

Table 3: Sex distribution of Meningiomas, 2013-2017. (Neurosurgery registry book, 2013-2017)

Sex	2013	2014	2015	2016	2017	Total
F	5	3	3	9	3	23
M	4	2	4	8	4	22

Table 4: Age distribution of Meningiomas, 2013-2017. (Neurosurgery registry book, 2013-2017)

Age (years)	Number
<20	1
20-34	7
35-44	13
45-54	10
55-64	6
>=65	1

Table 5: Histology of meningiomas, 2013-2017, (Neurosurgery registry book, 2013-2017)

Diagnosis	2013	2014	2015	2016	2017
Meningiomas	2 (25%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
M. Meningothelial	3 (38%)	2 (40%)	1 (12%)	2 (12%)	0 (0%)
M. Psammomatous	3 (38%)	1 (20%)	1 (12%)	2 (12%)	3 (50%)
M. Angiomatous	0 (0%)	1 (20%)	0 (0%)	1 (6%)	0 (0%)
M. Anaplastic	0 (0%)	1 (20%)	0 (0%)	0 (0%)	0 (0%)
M. Atypical	0 (0%)	0 (0%)	0 (0%)	3 (18%)	0 (0%)
M. Fibroblastic	0 (0%)	0 (0%)	0 (0%)	4 (24%)	0 (0%)
M. Transitional	0 (0%)	0 (0%)	3 (38%)	3 (18%)	3 (50%)
M. with Schwannoma bodies	0 (0%)	0 (0%)	1 (12%)	0 (0%)	0 (0%)
M. Meningothelial and Psammomatous	0 (0%)	0 (0%)	2 (25%)	0 (0%)	0 (0%)
M. Meningothelial and Fibroblastic	0 (0%)	0 (0%)	0 (0%)	2 (12%)	0 (0%)
Total	8	5	8	17	6

According to this representation in table 5, it can be verified that all histologies of meningiomas were obtained, however psammomatous meningiomas were the most frequent representing 36% of all cases, followed by transitional meningiomas which represented 32%, and meningotheliomatous meningiomas representing 28% of cases, with another 4% being used for other meningiomas such as angiomatous, anaplastic, atypical, etc.

Discussion

All patients included in the study underwent surgery and excision of the lesion. No Simpson's scale results were found, possibly due to poor records at the time. Mortality was also not properly identified in the study because the data were incomplete. Between 2013 and 2017, according to records from the Neurosurgery Department of Maputo Central Hospital, 62 brain tumors were diagnosed, of which 44 were meningiomas, representing 70% of cases, 11 were astrocytomas, representing 18%, and 2 oligodendrogliomas, representing 3%, and other tumors, according to, meningiomas represent more than 30% of all primary tumors of the central nervous system, showing that Mozambique has a relatively high incidence, but the comparison cannot be established since this study was a study of a single center in the country (although the main one), but data would be missing from 3 other provinces that probably have statistics on other tumors [7].

According to the study results, females represent 51.1% of meningioma cases, according to the literature, meningioma is also more frequent in women [2,4]. It was more prevalent in patients aged between 35 and 54 years old, according to the consulted bibliography, it appears in patients with an average age of 65 years or in their 5th decade of life [1]. The results of Mozambique show that meningiomas appear earlier, which may indicate that there is some other factor that is increasing the appearance of meningiomas, or diagnosis may simply be because the diagnosis was made earlier and and not leaving aside the fact that most of the population is young. Psammomatous meningiomas represented 36% of cases, transitional meningiomas 32% and meningotheliomatous meningiomas 26%. The other less frequent types in this study were mixed, anaplastic and angiomatous meningiomas. In the literature consulted, grade I meningiomas, which include transitional, psammomatous and meningotheliomatous meningiomas, represent 80 to 90% of prevalence, and grade III anaplastic meningiomas have a prevalence of 1 to 3% [2].

Conclusion

This study represents the first documented report on the frequency and histopathology of meningiomas in Mozambique, providing important information for neurosurgical practice in the country. The findings reveal a remarkably high proportion of meningiomas among intracranial tumors at the Maputo Central Hospital, with a greater emphasis on benign histological subtypes, particularly psammomatoid, transitional, and meningothelial variants. Surprisingly, the peak incidence occurred in a younger age group than typically reported in international literature, raising the possibility of other factors, including environmental, genetic, or regionally specific diagnostic factors, that warrant further investigation. The nearly equal gender distribution, although slightly favoring women, is in line with internationally established epidemiological patterns [8].

Given the surgical nature of all included cases, our data also highlights the central role of operational management in resource-constrained settings, where adjuvant treatment options are quite limited. The absence of a standardized postoperative classification, such as the Simpson Resection Score, in patient records highlights a critical gap in outcome documentation and assessment that must be addressed to improve prognostic accuracy and guide decisions about adjuvant therapy. Future multicenter (including all units that operate on meningiomas, which currently number four) and prospective studies, incorporating molecular profiling and long-term follow-up, are essential to better understand etiopathogenesis, optimize treatment strategies, and improve patient outcomes. By establishing this initial dataset, we hope to stimulate research collaboration in Mozambique and throughout sub-Saharan Africa, contributing to the design of evidence-based neurosurgical care protocols adapted to the Mozambican reality, which overcomes serious challenges in the availability of diagnostic and adjuvant treatment resources [9,10].

References

1. Chukwueke UN, Wen PY. Medical management of meningiomas. In: McDermott MW, editor. Meningiomas, Part II. Handbook of Clinical Neurology. 2020. 170: 277-292.
2. Wang N, Osswald M. Meningiomas: overview and new directions in therapy. Semin Neurol. 2018. 38: 112-120.
3. Chen R, Aghi MK. Atypical meningiomas. In: McDermott MW, editor. Meningiomas, Part II. Handbook of Clinical Neurology. 2020. 170: 233-245.
4. Black PM. Meningiomas. Neurosurgery. 1993. 32: 643-657.
5. Fountain DM, Young AMH, Santarius T. Malignant meningiomas. In: McDermott MW, editor. Meningiomas, Part II. Handbook of Clinical Neurology. 2020. 170: 247-261.
6. Buerki RA, Horbinski CM, Kruser T, Horowitz PM, James CD, et al. An overview of meningiomas. Future Oncol. 2018.
7. Boetto J, Birzu C, Kalamarides M, Peyre M, Sanson M. Les méningiomes: mise au point sur les connaissances actuelles. Rev Med Interne. 2021. 42: 689-697.
8. Greene S, Nair N, Ojemann JG, Ellenbogen RG, Avellino AM. Meningiomas in children. Pediatr Neurosurg. 2008. 44: 9-13.
9. Alexiou GA, Gogou P, Markoula S, Kyritsis AP. Management of meningiomas. Clin Neurol Neurosurg. 2010. 112: 177-182.
10. Goldbrunner R, Stavrinou P, Jenkinson MD, Sahm F, Mawrin C, et al. EANO guideline on the diagnosis and management of meningiomas. Neuro Oncol. 2021. 23: 1821-1834.