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CASE STUDY

Meningiomas in Elderly Subjects: Retrospective Studies of 8 Cases and a Literature Review

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ABSTRACT

Aim: **Intracranial meningiomas in adults are mainly benign tumors that develop from the meninges. They are common, accounting for about 18% to 20% of primary intracranial tumors, and they are slow-growing, with a predominance in women. They can occur at any age but are most common after the age of 56. Symptoms vary depending on the location of the tumor, its size, and the anatomical structures it comes into contact with. Surgery is the main treatment modality for meningiomas. The objective of this study is to evaluate the cases of meningiomas in our series and to compare their different aspects, such as epidemiological, clinical, radiological, therapeutic, histological, evolutionary, and prognostic characteristics, with those reported in other series of the literature. We seek to highlight the similarities and differences between our series and previous studies, considering recent advances in this field.**

Materials and Measures: **In our series, the retrospective study of 8 cases of intracranial meningioma in elderly subjects diagnosed and operated on at the Neurosurgery Department of a hospital over a period of 4 years. Brain CT and MRI were the primary preoperative diagnostic means. The use of these imaging techniques was essential to establish the diagnosis and plan the surgical procedure. The histopathological study was performed to confirm the post-operative diagnosis and determine the histological type, as well as the grade of the meningiomas, referring to the WHO classification to plan an appropriate follow-up of the management.**

Results: **Meningiomas accounted for 2.33% of intracranial meningiomas in elderly subjects, and 22.22% were in subjects under 65 years of age out of 342 tumors operated on in the Department during the same period. The female predominance was clear, at 62%, compared to 38% for men. The average age of our patients was 69.9 years, with extremes of 65 and 74 years. The main clinical symptoms observed in our patients were headache, motor deficit (hemiparesis, hemiplegia), sensory deficit, convulsions, and cranial pair involvement (optic nerve and facial nerve).On CT, the tumor mass was spontaneously hyperdense in 100% of cases. After the injection of iodine product, there was a homogeneous intense contrast intake in all cases. Only 2 patients in our series performed CT scans, of which we found perilesional edema and mass effect in 100% of cases. No calcifications or bone abnormalities were detected. MRI was performed on all our patients, allowing us to better specify the topographical diagnosis of meningiomas. Overall, surgical excision was complete (Simpson's grade I and grade II) in 62.5% of cases. The most common histological types were meningothelioma-tous meningioma (4 cases), transitional meningioma (1 case), mucoid fibrous meningioma (1 case), and atypical meningioma (2 cases). The post-operative course was favorable in most patients, and the post-operative complications consisted mainly of wound infection (1 case), CSF leakage (1 case), and hemorrhage (1 case).**

Keywords: Epidemiology, histopathology, intracranial meningiomas, surgical excision.

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1. Introduction

Meningioma is a common condition accounting for more than one-third of all primary intracranial tumors. Usually benign, these are tumors originating from the arachnoid capillary cells located in the arachnoid villi at any location, most often on the cranial vault and the base of the skull [1].

The more frequent use of diagnostic brain imaging in recent years and the increase in average life expectancy have led to a very high proportion of meningiomas in elderly subjects [2]. Although more common in women, studies conducted in the United Kingdom [3] and the United States [4] have demonstrated an increasing incidence of intracranial meningiomas with age for both sexes. Therefore, elderly patients have a higher prevalence of this pathology [5].

The World Health Organization (WHO) classifies meningiomas into three grades: grade I (benign), more than 75%; grade II (atypical), 20% to 35%; and grade III (anaplastic), 1% to 3% [1].

Meningiomas are mainly characterized by neurological symptoms following compression of the surrounding structures rather than by their infiltration. The clinical picture is non-specific and is often marked by epileptic seizures, intracranial hypertension syndrome, and localization signs.

The contribution of advances in medical imaging has allowed for better semiological analysis, facilitating diagnosis and the planning of management strategies. Meningiomas are present on X-ray images as a well-defined spherical lobular outline or, very rarely, as a plaque outline, also known as a plaque meningioma [6]. Both forms have a substantial dural base. Meningioma often compresses the brain, and very rarely, it invades its parenchyma [7].

Treatment of meningiomas includes observation of obtaining and comparing sequential images at intervals of 3 months to 1 year; radiotherapy to stop the growth of intracranial lesions by providing targeted radiation to the tumor [8]; and surgical intervention consisting of craniectomy to achieve macroscopically (ideal) total resection or partial resection of the tumor [9]. As the radiological presentation of meningiomas is often very suggestive, in these conditions, many patients are treated with radiotherapy without histological confirmation [1].

Nevertheless, the optimal strategy for the management of incidental meningiomas is debated, with a fringe of doctors advocating a conservative approach while others recommend more aggressive methods [10].

According to the literature, the rates of post-operative complications and death vary between 3% and 23%, with a higher incidence in elderly patients. When you have a follow-up, prolonged recurrences of patients have been observed, even after an initially satisfactory excision, with delays exceeding 20 years [11].

We conducted a retrospective study of 8 cases of meningiomas in elderly subjects, collected from January 2018 to December 2021, to study the experience of the Neurosurgery Department of the Ibn Rochd University Hospital Center of Casablanca in the management of intracranial meningiomas in the latter.

2. Materials and Method

We performed a retrospective study of 8 cases of intracranial meningioma in elderly subjects, diagnosed and operated on at the Neurosurgery Department of the Ibn Rochd University Hospital Center in Casablanca. This study was carried out over four years, from January 2018 to December 2021.

From this study, we included all patients diagnosed with intracranial meningioma, whose age is greater than or equal to 65 years, and operated at the Service and period. However, we excluded patients under the age of 65 and those with clinically and radiologically incomplete records.

The patients' clinical files were extracted from the Department's archives using a pre-established sheet with parameters that favored our research. Monitoring the long-term course of most patients was difficult, as many patients were lost to follow-up. We searched MEDLINE and PubMed for the literature review.

3. Results

Our series includes 8 cases of meningioma-like tumors in elderly subjects collected during a period of 4 years from January 2018 to December 2021, with an average of 2 cases/per year.

Over the same study period, this department received 342 cases of intracranial space-occupying processes (SOP), of which 76 cases, or 22.22%, were intracranial meningiomas in subjects under 65 years of age, 8 cases, or 2.33% of intracranial meningiomas in subjects aged 65 years or older. The 8 cases of intracranial meningiomas in subjects 65 or older represent 9.5% of all intracranial meningiomas.

The mean age was 69.9, with age extremes of 65 and 74. 62.5% of our patients were between 70 and 74, and 37.5% were between 65 and 69.

In our series, women are predominant; 5 cases were female (62%), and 3 cases were male (38%), which presents a sex ratio of 1.66.

Most of our patients did not have a particular history that could represent a risk factor for meningioma. 1 patient had a head trauma as a history. The duration of the evolution before diagnosis was precise for all 8 patients; it varied between 3 months and 18 months, with a mean time of 9.9 months.

The main clinical symptoms revealed in our patients were the following: headache in 5 cases, or 62%. Motor deficit in 6 cases or 75%, sensory deficit found in 2 cases or 25%, cranial pair damage in 4 cases or 50% (3 cases of optic nerve damage and 1 case of facial nerve damage), convulsive seizures in 3 cases or 37.5%; and other symptoms such as phasic disorders 3 cases (37.5%), memory disorders 1 case (12.5%), frontal syndrome 1 case (12.5%) and bone swelling 1 case (12.5%).

TABLE I: Direct Signs of Intracranial Meningioma on Brain MRI

Weighted sequences	Aspect
T1	Hypo-intense (33.33%)
	Iso-intense (66.67%)
T2	Hyperintense (66.67%)
	Iso-intense
T1 after Gadolinium injection	All meningiomas are enhanced after intravenous Gadolinium injection

In our series, brain radiological exploration, computed tomography (CT), and magnetic resonance imaging (MRI) without and with contrast agent injection (PDC) were performed for the detection of the tumor preoperatively (see Table I).

2 patients (25%) underwent brain CT, which led to the diagnosis of meningioma. In both cases, the meningioma was spontaneously hyperdense, and after injection of PDC, we noted an enhancement of the tumor caused by the iodinated product. Brain MRI was performed in 6 patients (75% of cases) and was diagnosed in all 6 cases.

It should be noted that MRI remains the essential means in the preoperative assessment to obtain a detailed description and analysis of the tumor. On the other hand, CT is important in calcified tumors or tumors with bone invasion. Fig. 1 is a T1 axial slice of brain MRI showing extra-axial left fronto-temporal hyposignal with significant mass effect. Fig. 2 is an injected T1 coronal slice showing significant contrast.

A preoperative assessment was performed on all our patients without any notable particularities. The medical treatment consisted of anti-comitial treatment (Sodium valproates), corticosteroid therapy (Methylprednisolone) administered preoperatively to prepare patients for surgery

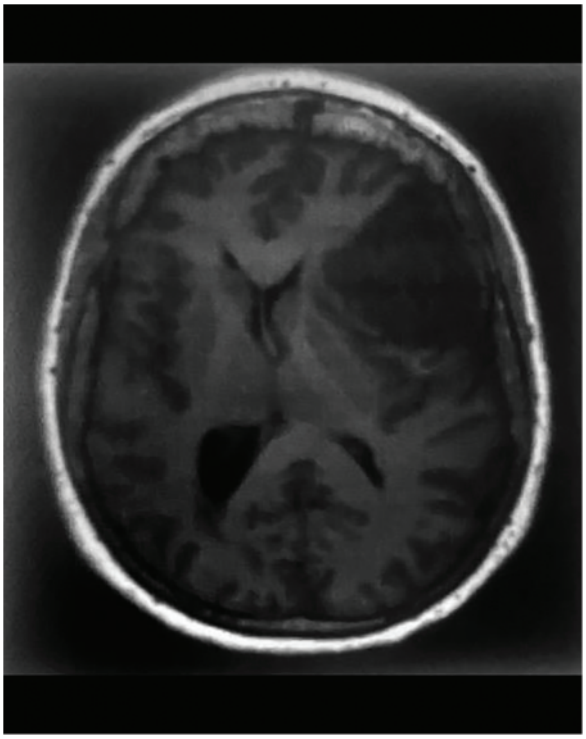

Fig. 1. Brain MRI image axial section T1 sequenceHyposignal with mass effect on the frontotemporal extra-axial solid lesion.

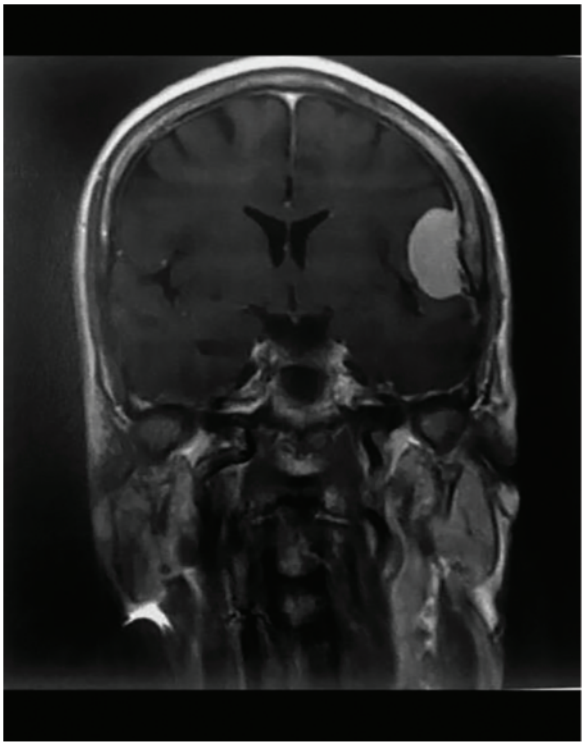

Fig. 2. Brain MRI coronal section in sequencing a left frontal mass inT1-weighted after injection of PDC showing parenchyma and median structures. Left with homogeneous contrast capture.

and post-operatively to reduce and prevent cerebral edema, anticoagulant treatment (LMWH) and analgesics.

The optimal therapeutic option remains surgical excision. Its purpose is to decompress the vital structures of the region and avoid iatrogenic. The surgical approach is chosen according to the topography of the meningioma, its extension, and the surgical habits of the surgeon. The supine position is used for all 8 patients, head on the Mayfield headrest, with an operating microscope and microsurgical instruments. All patients underwent excision surgery with histological study of the operative specimen.

In our series (shown in Table II), tumor excision was macroscopically complete (Simpson I, Simpson II) in 5 patients (62.5%). In comparison, it was subtotal in 3 patients (37.5%) due to the location and large tumor volume with invasion of nerve and bone structures. The surgery was uneventful in 6 patients (75%), while 2 patients (25%) experienced intraoperative complications, mainly bleeding. All of our patients have been in the Intensive Care Unit post-operatively. Concerning mortality, in our series, one of our patients unfortunately died on day 5 post-operatively from cardio-respiratory arrest.

TABLE II: Post-Operative Follow-Up of Our Series

Suites post op.	Cas name	Percentage (%)
Uncomplicated	3	37.5
With complication	4	50
Wound infection	1	12.5
CSF leakage	1	12.5
Hemorrhage	2	25
Death	1	12.5

The histopathological examination confirmed the diagnosis of meningioma 100% in all patients in our series:

1. 6 of 8 meningiomas operated on (75%) were WHO grade I (4 meningotheliomatous meningiomas (50%)), 1 case of transitional meningioma (12.5%), and 1 case of mucoid fibrous meningioma (12.5%).
2. 2 of 8 meningiomas operated on (25%) were WHO grade II (atypical meningioma).

Adjuvant treatment with complementary radiotherapy was recommended for the 2 patients with grade II atypical meningioma, but only 1 was able to benefit from this treatment.

In the short term, 6 of our patients saw their neurological symptomatology gradually improve, 1 patient kept the initial symptomatology without any improvement, and 1 case of death by cardio-respiratory arrest.

There was difficulty in following the evolution of most patients in the long term, given the benignity of the tumors, which did not require any therapeutic complement (in the majority of cases). Some were lost to follow-up (2 cases), 3 patients had an independent life, 1 patient experienced a bad evolution with worsening of his symptomatology, and 1 patient died one year after surgery.

4. Discussion

Meningiomas are brain tumors that have probably been known for several years, not least because of the occasional production of grotesque cranial deformities that have attracted the attention and interest of humanity. Nearly 100 years ago, Dr. Harvey Cushing coined the term "meningioma" to describe this intracranial tumor. However, Dr. Platter, an eminent Swiss physician and anatomist, first described the meningioma 400 years ago (1614). Due to its peculiar appearance and clinical behavior, meningioma has attracted the attention of neurosurgeons, anatomists, and pathologists. In 1771, the French surgeon Antoine Louis published a series of cases of meningiomas entitled "Fugueuses de la dure-mere." In the United States, Dr. William Keen successfully resected a case of meningioma in 1887. Decades later, Dr. Harvey Cushing coined the term "meningioma" in 1922.

Macroscopically, the tumor is granular, fleshy, dense, grayish, or whitish. Sometimes, a shred of dura mater is resected. Calcifications can also be observed. Invasion of the cerebral parenchyma is a histological criterion of malignancy. Microscopically, WHO grade is the most useful morphological predictor of recurrence. Grades I, II, and III are associated with recidivism rates of 7% to 25%, 29% to 52%, and 50% to 94%, respectively.

The correct application of the WHO criteria is decisive, as the prognosis of patients with grade II and III meningiomas of this classification differs from that of patients with WHO grade I meningiomas regarding recurrence and disease progression [12].

WHO grade I meningiomas are benign and represent 80% to 90% of intracranial meningiomas: secreting meningiomas, microcystic (of recent discovery, has no predilection for sex), lymphoplasmacytic, angiomatous, meningotheliomatous, fibroblastic, and transitional (association of meningotheliomatous and fibroblastic meningiomas).

WHO grade II meningiomas include atypical, clear cell, and choroid meningiomas; they typically have a higher KI-67 proliferation index and higher recurrence rates. Another important immunophenotypic marker is the expression of the progesterone receptor, which is inversely associated with the meningioma grade [12].

WHO grade III meningiomas are mostly negative for progesterone receptors. Anaplastic, papillary, and rhabdoid meningiomas are in this category. The average survival time is 2 to 5 years for patients with anaplastic meningioma, depending on the degree of Simpson's resection [3].

Molecular markers of meningiomas are an increasingly important target for medical practice, as they allow therapeutic strategies to be found [13]. Chromosomal instability is an extremely common molecular alteration that characterizes recurrent meningiomas with a poor prognosis. The accumulation of cytogenetic aberrations is associated with higher-grade meningiomas and a higher risk of recurrence. This explains why high-grade meningiomas have more altered cytogenetic profiles than benign meningiomas. The most common cytogenetic event is the loss of chromosome 22q, where the NF2 gene is located and affects about 50% of benign meningiomas and 75% to 85% of atypical or anaplastic meningiomas. Benign meningiomas usually do not present any other cytogenetic abnormalities.

Mutations have been reported in the promoter gene TERT (telomerase reverse transcriptase), which has a clear effect on these tumors, which worsens the prognosis of meningiomas since they are associated with a decrease in survival time. These mutations are common in anaplastic meningiomas because telomerase reactivation is one of the hallmarks of malignancies.

DNA methylation profiles allow for the definitive diagnosis of meningiomas in histologically questionable cases and better identification of grade I meningiomas that are likely to recur as high-grade meningiomas. In addition, they make it possible to determine the risk of recurrence with better precision than the WHO classification.

Several arguments imply the association between sex hormones and the development of meningiomas. Numerous findings show that meningiomas tend to increase in volume during the luteal phase of the menstrual cycle, during in vitro fertilization protocols, or during pregnancy, and to regress spontaneously in the postpartum period. There is no conclusive evidence that the use of oral contraception is associated with an increased risk of developing meningioma [14]. On the other hand, taking hormone replacement therapy is associated with a relative risk of developing meningioma. Taking progesterone in high doses is an independent risk factor for developing meningiomas in this setting [15].

From 2007 onwards, many series have reported an increased risk of developing meningiomas with prolonged use (5 to 30 years) of high doses of progesterone acetate (25 mg–100 mg per day). All studies agree that the risk of meningiomas is proportional to the cumulative dose (depending on the duration of treatment and the daily

dose). These meningiomas have clinical and radiological particularities. They develop in patients who are, on average, younger (48 years old), are in 50% of multiple cases, and develop at the anterior and middle levels of the skull base (specific risk multiplied by 47). Meningiomas developed under PCR are histologically WHO grade I, expressing progesterone receptors in 98% of cases. After discontinuation of PCR therapy, approximately 70% to 80% stabilize or regress. Cases of spectacular regressions have been reported, probably related to a significant decrease in vascularization. Cases of meningiomas have recently been reported in patients undergoing treatment with Chlormadinone Acetate or Nomegestrol Acetate in the treatment of gynecological pathologies such as endometriosis or menstrual cycle disorders. It is estimated that 100 cases per year of women undergoing surgery for meningiomas are attributed to these molecules [15], [16].

Exposure to ionizing radiation (IR) is the main environmental risk factor identified for meningioma, with risks 6 to 10 times higher. At high doses, there is evidence from atomic bomb survivors showing an increased risk of meningioma. The most recent case-control study of 200 patients with meningioma who underwent panoramic radiographs had a significantly increased risk of meningioma. Radiation therapy for intracranial tumors has also been associated with the risk of meningioma [17].

Head trauma has been considered a risk factor for meningioma since the time of Harvey Cushing, although the results of studies are inconsistent. Some studies report no such association.

The relationship between mobile phone use and the risk of meningioma remains an issue of great interest to the public. Despite some studies on this association, there is currently little evidence of a correlation between the two. However, the sample sizes specific to meningiomas are relatively small, and the follow-up time since the advent of the mobile phone is approximate [18]. A large analysis showed that permanent mobile phone use led to a limited decrease in the risk of meningioma in adults.

The relationship between MRI features and histopathological features in certain subtypes of meningiomas has been studied in numerous reports. The intensity of T2 signals is closely related to WHO Grade I meningioma subtypes. A low T1 and high T2 signals were clearly observed in angiomatous meningiomas.

No statistical differences in the incidence of peritumoral edema were observed between meningioma subtypes. One study shows that angiomatous meningiomas are more strongly associated with severe peritumoral edema than other subtypes [19].

The analysis of diffusion-weighted imagery determines the ADC value. A high ADC value has been observed in angiomatous meningiomas. The specific features of fibroblastic and angiomatous meningiomas significantly differ in their ADC values.

There is a statistical difference in the degree of reinforcement between the different subtypes. Angiomatous meningiomas mainly present a homogeneous enhancement. Lee reported that a high enhancement percentage could be seen in completely calcified meningioma [19]. Heterogeneous MRI enhancement after Gadolinium injection is associated with uneven distribution of tumor cells, or even ischemic necrosis, hemorrhage, cystic degeneration, accumulation of tumor cell secretions, and signs of rapid tumor expansion, characteristic of malignant tumors (WHO grade II and III).

Proton Magnetic Resonance Spectroscopy (H-MRS) shows that Choline concentration and Choline/Creatine ratio decrease and Creatine concentration increases in benign meningiomas compared to malignant meningiomas. Various results indicate that H-MRS plays an important role in differentiating meningioma subtypes and that its characteristics may facilitate the diagnosis of WHO Grade I meningiomas [19].

Positron emission tomography (PET) is a new nuclear medicine imaging technique that fuses radiation emission images with X-ray transmission images. It makes it possible to visualize and quantify the distribution of a radiopharmaceutical, reflecting the metabolic activity within a tumor compared to healthy tissue. 18F-FluoroDeoxyGlucose PET can be used to determine the grade of the meningioma, predict biological behavior, and even prognosis [20]. Liu *et al*. found that 18-Fluoro-FDG was useful in differentiating between benign and malignant meningiomas [4].

Meningiomas account for 20% to 30% of intracranial tumors (higher when post-mortem data are included). It is the second most common primary brain tumor. The incidence varies according to age. The risk of developing a meningioma increases considerably after the age of 65. The average incidence is 2.5 per 100000 inhabitants. Recent studies by Souad [21] show that meningioma remains common in Morocco, with a rate of 21% compared to other brain tumors.

The incidental detection of intracranial meningioma has increased in the elderly as the global population has aged and diagnostic imaging tools have evolved [22]. Intracranial meningiomas were detected 3.5 times higher in patients over 70 years of age compared to patients 70 years of age. In our series, 62.5% of patients were between 70 and 74.

Meningiomas are more common in females than males. The studies by Jassim [23] and Khaoula showed a female predominance of 63 and 73.33%, respectively. Our series is in line with the results of the literature (a predominance of 62% of women).

Meningiomas are extracerebral tumors that evolve slowly, their revelation late and with an insidious onset. Depending on their topography, the localizing value of semiology is precise. Those at the base of the skull are in close contact with the cranial nerves and are manifested by more specific signs than those of convexity [24].

In the series by Badiane *et al*. (79 cases) [25], the duration of evolution before diagnosis (DEAD) was 15 months on average. In our series, the DEAD had an average of 9.9 months.

Headache is the main symptom of intracranial meningioma, according to several studies for Balhaoui (60%), Amjahdi (64.29%), and us (62%).

The involvement of the cranial pairs in meningiomas is dominated by that of the second cranial pair, especially in

meningiomas of the anterior level of the base of the skull. In our series, the visual disturbance was in 3 patients or 37.5% (blurred vision, decreased visual acuity, and bilateral blindness). We had one nerve VII damage (12.5%) and three nerve II damage (37.5%).

Hal El FADL reports in his study a 57.9% motor deficit. In our series, the motor deficit is 75%, with variable severity of involvement (hemiparesis, hemiplegia, and mono paresis). Tumor epilepsy is observed mainly in sustentorial meningiomas and especially in the temporal, occipital, and frontal sites [26]. Comitiality testifies to the cortical and extraparenchymal location of the meningioma. It was 46% for Chan and Thompson [27], 37% for Sakho and 37.5% in our series. Awad *et al*. reported a series of 75 patients over the age of 60 who underwent surgery, 21% of whom were asymptomatic. In our series, 100% of patients were symptomatic. Four patients, or 50% of the cases in our series, presented with impairment of higher functions (37.5% phasic disorders and 12.5% memory disorders), Chan and Thompson [27] reported memory disorders in 15%, and Cornu *et al*. reported memory disorders in 19%.

According to several studies, between 95% and 100% of positive diagnoses are obtained with computed tomography (CT). Our series made it possible to make the diagnosis in 100% of cases; 100% of the lesions were hyperdense and had an enhancement after the injection of iodinated PDC. Calcifications were not revealed in our series. Epitumoral edema was objectified in 70% of cases for Nakamura, 61.6% for Ephrem [17], and 71.3% for Chaoui. In our series, it was 100% of the time. The mass effect was noted in 73.4% of cases in Balhaoui [28], 59.26% of cases in Amjahdi, and 100% of patients in our series. In our series, bone lesions were not found in patients who underwent CT scans.

Brain MRI is currently the reference technique in the exploration of brain tumors. The diagnosis of meningioma is essentially based on morphological criteria. In sequence T1, meningiomas appear spontaneously in isosignal (65%) and less often in hyposignal (35%) [6]. In our series, 33.33% of meningiomas are in hyposignal and 66.67% are in isosignal in T1-weighted sequence and T2-weighted sequence, 33.33% b of meningiomas are in isosignal, 66.67% are in hypersignal. Preoperatively, spectroscopy differentiates between the tumor and other lesions (pyogenic abscesses). In therapeutic follow-up, perfusion and spectroscopic MRI provide arguments to differentiate radionecrosis from tumor recurrence or post-operative physiological contrast intake.

Arteriography was essential for diagnosing and assessing meningioma before the advent of CT scans. In our series, none of our patients have had angiography. Positron emission tomography (PET) differentiates hyperostosis from tumor invasion of the bone, and it is also useful in patients who have already received radiation therapy. The treatment of choice for meningioma is total excision; the more complete the excision, the lower the risk of recurrence (Simpson's classification). Perioperative morbidity and mortality in elderly subjects undergoing total meningioma resection range from 45% to 52% [29]. In risk stratification, several algorithms and scores are used (CLASS algorithm, the SKALE system, the Charlson Comorbidity Score (CCS), the Gerontological Scoring System, and The clinical radiological grading system (CRGS)). Embolization was not performed in any of our patients.

The preoperative steps remain classic, as in any surgery, but with some specificities. These include corticosteroid therapy, anticomitials, assessment of cardiovascular and respiratory status, and systemic assessment of metabolic disorders, including monitoring the effect of corticosteroids on blood glucose.

Intraoperatively, the patient's position meets certain requirements: good monitoring, antibiotic prophylaxis, and anti-edematous treatment are required.

The approach depends on the site of implantation of the tumor, its size, and extent. It should be noted that neurosurgical procedures require a technical platform and specific conditions. All the patients in our series had undergone craniotomy.

Radiation therapy can be used in certain conditions, inaccessible tumors, or a small tumor to stunt growth, as well as for advanced-grade meningiomas as adjunctive therapy and, in some cases, of recurrence. No patient in our series has had radiotherapy.

Several studies are rethinking the surgical resection or radiotherapy of certain incident meningiomas [8]. Treatment should only be considered when it significantly improves the patient's quality of life. Observation consists of sequential imaging and regular follow-up appointments. Older patients are associated with a less favorable outcome due to a higher risk profile [29].

Gender (sex) is not considered a risk factor for survival. According to several studies, the preoperative clinical condition is a prognostic factor. Not all studies agree on the association of "tumor location and prognosis" as a prognostic factor. On the other hand, a large tumor diameter was found to be a significantly unfavorable prognostic factor. The quality of surgical excision is an essential clinical parameter that can modify the prognosis. The type, or better still, the histological grade, is recognized as a prognostic factor. Immediate operative morbidity was reported from 2.8% to 58.9% for patients over 70 years of age and 5.9% for those over 80 years of age [29]. Mortality varies according to the series and the tumor location. In our series, overall intraoperative mortality was zero. One patient died on day five post-operatively in intensive care and one other remotely, one year after the procedure. Overall mortality was 25% (2 cases/8). In our series, we did not note any cases of recurrence or metastasis.

5. Conclusion

We reported our experience of a retrospective series of 8 cases of intracranial meningioma in elderly subjects, from the Neurosurgery Department of the Ibn Rochd University Hospital Center of Casablanca, while comparing our results with the data of the literature in different aspects (epidemiological, clinical, radiological, therapeutic, histological, evolutionary and prognosis).

Intracranial meningiomas are extra-axial tumors that are usually benign. Despite their evolutionary potential and slow growth kinetics, they can take on certain aspects

of malignancy that still pose problems that are difficult or even insoluble for the neurosurgeon.

Despite the presence of infrastructure and modern diagnostic means within this department, we have seen a high frequency of patients referred at an advanced stage, with symptoms such as significant cerebral edema, papilledema, and even cases of blindness or impaired consciousness. Significant efforts are needed to raise awareness of the importance of early diagnosis.

Our results in terms of morbidity and mortality are very satisfactory and even encouraging, thanks to the overall improvement of our technical platform and to our advances in the field of neuro-anesthesia-resuscitation.

Conflict of Interest

The authors declare that they do not have any conflict of interest.

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