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Management of Intraspinal Meningiomas in the Neurosurgery Department, CHU Med VI, Marrakech, about 36 Cases

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Abstract

Spinal meningioma are rare tumor, about 5% of central nervous system tumors, and generally benign. Their origin is most often a solitary proliferation of arachnoid cells. The descriptive and analytical purpose of our study is to draw up the epidemiological, clinical, para clinical, therapeutic and evolutionary profiles of spinal meningioma in our formation and to compare our results with data from the literature. This will allow us to focus on the difficulties encountered during the diagnosis and management of this disease. This is a retrospective study of 36 cases of spinal meningioma operated in the neurosurgery department of CHU Mohamed VI, between January 2002 and December 2020. Spinal meningioma represented 17% of slow spinal cord compression operated during the same period. With an annual incidence of 1.8 cases/year, the female predominance was very clear with a percentage of 77.78% against 22.23% for men. The average age of our patients was 50 years old with extremes ranging from 28 to 72 years old. Clinically, the consultation time was on average 6 months with extremes ranging between 1.5 months and 02 years. The clinical examination was able to objectify a spinal cord compression syndrome in 31 patients (86.11%), a lesion syndrome in 13 patients (36.11%) and a sub-lesion syndrome in 20 patients (90.9%). Spinal magnetic resonance imaging is the most effective examination for locating the tumor and recommending treatment. It was performed in all our patients. The most frequent locations are at the thoracic level (55%), then lumbar (28%) and cervical (17%). In our study, almost all patients underwent complete resection, except 04 patients where the resection was partial. All were done posteriorly. Spinal meningioma is characterized by the poverty and non-specificity of clinical signs, this aspect seems to be illustrated in our series, by the average admission time of 6 months and a diagnostic delay exceeding 6 months in 42.85% of cases. Spinal meningioma evolves gradually, resulting in clinical signs of slow cord compression. Spinal meningiomas are usually benign tumors that develop from arachnoid cells. Their diagnosis is mainly based on magnetic resonance imaging. Their care should not suffer any delay and this from the onset of the first symptoms.

***Keywords**: Spinal Meningioma; Spinal Cord Compression Syndrome; Magnetic Resonance Imaging; Surgical Excision*

Introduction

Spinal meningiomas are rare tumors, about 5% of central nervous system tumors, and generally benign. Their origin is most often a solitary proliferation of arachnoid cells. They are intradural extramedullary tumors, most often posterolateral or anterolateral in relation to the radiculo-medullary structures. Spinal meningiomas are characterized by slow growth, which explains their late discovery, with

sometimes the possibility of giant pan medullary tumors. Long unrecognized clinical signs can evolve into spinal cord and/or radicular compression, and therefore constitute a diagnostic and therapeutic neurosurgical emergency. Magnetic resonance imaging (MRI) currently remains the para clinical exploration of choice thanks to its high performance. It helps to guide the diagnosis by specifying the nature, location and relationship of the lesion with the neighboring nervous structures; it also has an important role in the therapeutic decision by the choice of the approach. Management is multidisciplinary involving radiologist, neurosurgeon, pathologist, radiotherapist and physiotherapist. However, the treatment remains primarily surgical. Recent technical progress has enabled more complete excision of the lesion with less damage to the spinal cord, and improving clinical results and quality of survival. Postoperative results are usually satisfactory with a clear functional improvement in 85% of cases. Despite the risk of long-term recurrence, spinal meningiomas remain benign tumors with generally a good prognosis, especially in cases diagnosed and treated early and correctly.

Materials and Methods

Our work is a retrospective study spread over 18 years, extending from January 2002 to December, 2020 concerning 36 cases of spinal meningiomas, treated in the neurosurgery department of the CHU Mohammed VI in Marrakech. This work is based on the exploitation of clinical files, the interpretation of the radiological assessment, the analysis of therapeutic methods, as well as the short-term evolution. To exploit these data, we established an exploitation sheet of clinical files including epidemiological, clinical, para clinical, therapeutic and evolutionary data. We included in this study all cases of spinal meningioma confirmed by the histological study and whose clinical records were usable. The purpose of this work is to report the experience of the service in the management of this pathology, and to compare our results with those of the literature.

Results

This serial study of 36 cases of spinal meningioma in patients aged between 20 and 76 years, noted a female predominance of 77.78% with a sex ratio F/M of 2.5 and an average age 50 years old. The consultation time was on average 6 months with extremes ranging between 1.5 months and 02 years. Spinal pain is found in 30 patients, a frequency of 83.33%. Back pain was all mechanical in nature and involved the dorsal spine in 29 cases, the cervical spine in 3 cases and the lumbar spine in 4 cases. 5 patients consulted for radicular pain such as sciatica and cervical brachial neuralgia in 3 cases. Motor disorders were found in 26 patients or 72.22%, they were in the form of functional impotence involving the two lower limbs in 23 cases and the four limbs in 2 cases.

Sensory disorders were reported in 20 patients (55.43%) dominated by hypoesthesia. 26 patients in our series (72.22%), presented sphincter disorders such as constipation, anal incontinence, urinary incontinence, dysuria and urinary retention. While 6 male patients had reported the notion of sexual impotence. The clinical examination was able to objectify a spinal cord compression syndrome in 31 patients, a lesion syndrome in 13 patients and a sub-lesion syndrome in 20 patients with a pyramidal syndrome in 15 patients. Not all deficient patients showed signs of phlebitis or bedsores. Magnetic resonance imaging performed in all patients, objectified the lesion responsible for the clinical signs. This lesion was solitary in all cases, dorsal in 71.43% of cases and posterolateral in 57.14% of cases. All patients received medical treatment with analgesics and non-steroidal anti-inflammatory drugs preoperatively and analgesic, anticoagulant and corticosteroid treatment postoperatively. Surgical treatment was indicated in all patients; the posterior approach is the only one used in all cases. Resection was complete in all patients except 04 patients where the resection was partial. The most frequent histological type is the meningothelial meningioma (57.14%), with a radio-histological concordance of 78.25%. Functional rehabilitation was recommended in all deficient patients. The short-term evolution was marked by complete recovery from neurological and sphincter disorders. The average length of hospitalization of patients in our series is 8 days with extremes ranging from 4 to 15 days. Unfortunately, we could not follow the long-term evolution of all patients.

Discussion

Spinal meningiomas are rare tumors. They represent 12.5% of all CNS meningiomas [1], 25% of all spinal tumors [1,2] and 12% of slow spinal cord compressions [2], a value close to 17% of the cases reported by our study [3]. In the literature, the preferred age is between 40 and 70, with a clear female predominance [3,5]. In our series, the age of our patients varied between 28 and 72 years with a significant incidence in the age group 41 - 50 years and a female predominance of 77.78%. Spinal meningioma is characterized by the poverty and non-specificity of clinical signs [4], this aspect seems to be illustrated in our series, by the average admission time of 6 months and a diagnostic delay exceeding 6 months in 42.85% of cases. Spinal meningiomas evolve gradually causing clinical signs of slow spinal cord compression which give rise to the following syndromes: spinal, lesion and sub-lesion [5]. Spinal syndromes are quite common in form of spinal pain or stiffness. Its incidence in our series is 86.11%, while it is 66.6% in the series of Kabre [6] and 16.6% in the series of Boiserie. The lesion syndrome is the consequence of compression of the root of the medullary segment where the expansive process is located. The compression of this root causes early sensory disorders, inconstant motor disorders and reflex disorders in the event of root damage responsible for a reflex arc found on examination of the reflexes. The lesion syndrome was reported in 91.5% of the cases studied by Salama [7] and in 50% in the series by Kabre [6]. In our series, we found a lesion syndrome in 36.11% of cases. The frequency of motor disorders was 100% in the study by Kabre [7] and Boiserie, whereas it was present in 92.85% of our patients. Sensory disorders were objectified in 71.43% of cases in our series. The clinical picture of spinal meningioma can take on several aspects depending on the seat of the compression in relation to the spinal cord, both in height and in width. The topographical diagnosis is based on the individualization of the lesion syndrome or on the demonstration of a precise sensory level. Magnetic resonance imaging has become the first-line investigation for any spinal cord compression [8]. It is also the examination of choice in the exploration of radiculalgia, without triggering factor, resistant to medical treatment or accompanied by spinal stiffness. It provides a very good extension assessment and allows a reliable postoperative control to detect residual tumors [9]. In our series, all patients benefited from this examination.

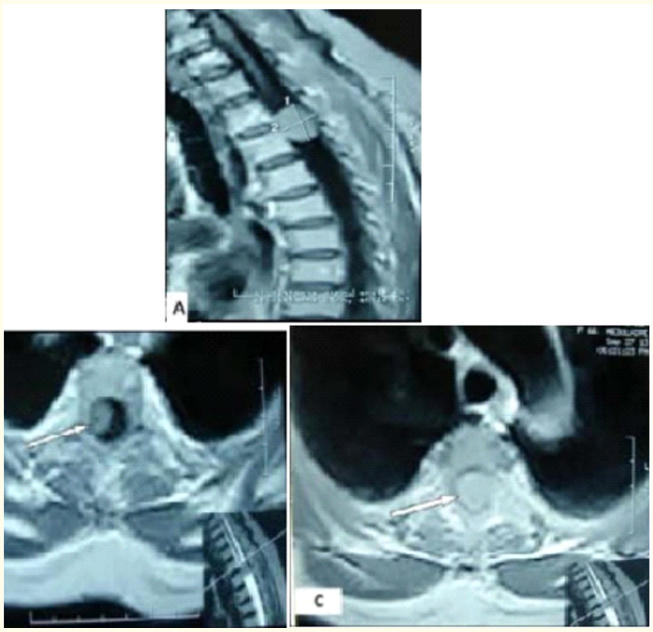

Figure 1: *Spinal cord MRI T1 sequence without contrast in sagittal (A) and axial (B) section and axial T1 section with gadolinium (C) showing a well-defined lesion, intradural extra medullary, roughly rounded, gaining contrast homogeneously and compress the facing spinal cord, with a wide implantation base.*

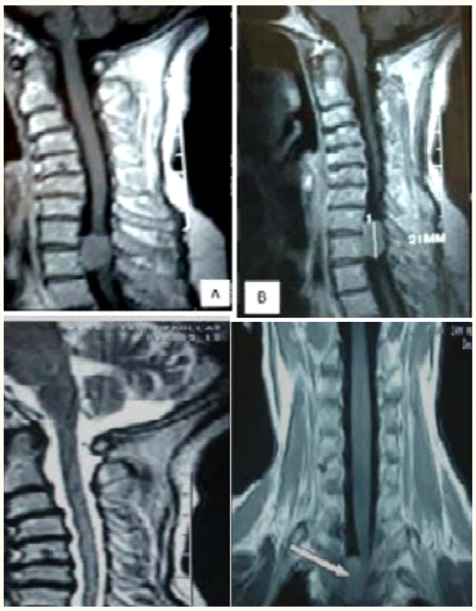

Figure 2: *Spinal cord MRI in sagittal section T1 sequence with contrast (A), without contrast (B), T2 sequence (C) and in coronal section (D) showing a voluminous intradural extramedullary lesion, pushing back the spinal cord on the left side facing of the first thoracic vertebra (T1).*

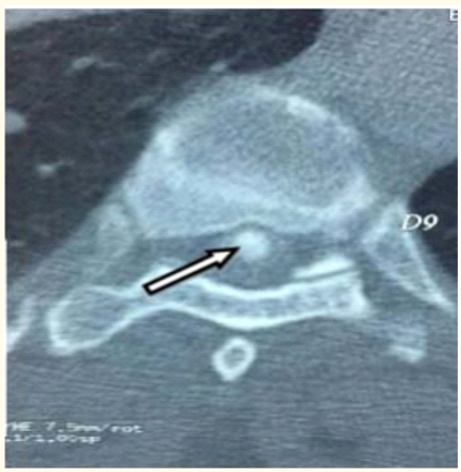

Figure 3: *Spinal CT scan in axial section, bone window, passing through T9, showing an intra canal lesion, hyper dense with regular contours, calcified compatible with a calcified spinal meningioma.*

In our series, the lateral locations are the most frequent, especially at the dorsal level (71.43%), then cervical and lumbar (14.28% each).

Authors	Dorsal	Cervical	Lumbar
Lévy [11]	73%	18%	9%
Soléro [12]	75%	17%	7%
Terrier [13]	60%	21%	5%
Our series	71,43%	14,28%	14,28%

Table 1*: Location of meningiomas.*

The only effective treatment for meningioma remains undeniably surgical, the objective of which is to remove spinal cord compression while minimizing any trauma to the spinal cord and its vascularization. Dissection justifies the use of operative microscopy, and tumor removal is facilitated by the use of an ultrasound scalpel, bipolar coagulation, or CO_2 laser vaporization [14]. The choice of approach, posterior or anterior, depends on several elements: the exact level of the lesion, its position in relation to the nervous elements and its vascular relations. In the literature, the posterior approach is the most used [10], which agrees with the results of our series. Total excision is the goal of surgical treatment for meningioma [10]. In our series, excision was total in all our patients except 4 of them, which is consistent with the data of the majority of authors in the literature. The most common histological type is the meningothelial meningioma: 35.7% of cases in the Klelamp series [15], 27.1% in the Kabre series [16] and 30% in the Harrison series [17]. This joins the results of our series, where the meningothelial type is found in 38,8% of cases.

Authors	Number of cases	Meningothelial	Psammomatous	Transitional	Angioblastic	Clear cells
Klelamp [15]	14	05	04	03	02	00
Kabre [16]	18	05	05	05	03	00
Harrison [17]	20	06	07	04	02	01
Our series	36	14	16	04	00	02

Table 2: *Histological type of spinal meningioma according to the series.*

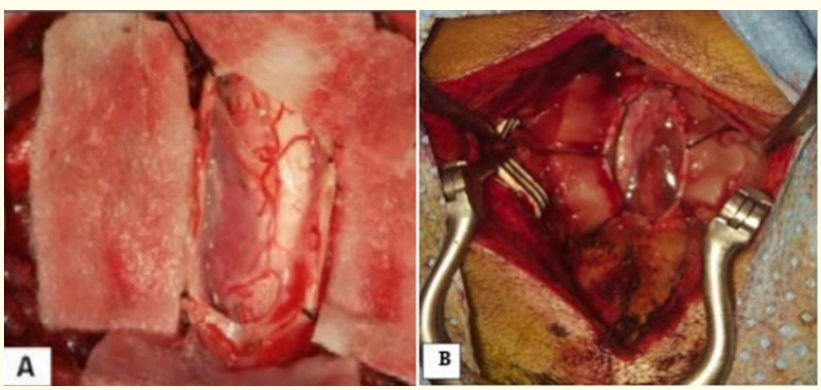

Figure 4: *Intraoperative view, before (A) and after (B) complete surgical excision of a cervical meningioma.*

There is no evidence that postoperative radiotherapy or chemotherapy reduce the risk of recurrence in cases of incomplete excision [18]. In our series, no patient benefited from these two therapeutic modalities. Physiotherapy is an important component in the treatment of neurological deficits. It improves the results of surgical treatment and increases the chances of neurological recovery [19]. In our series, rehabilitation was performed in all patients. The results reported by all the authors are excellent overall, with usually immediate regression of pain and neurological deficit induced by spinal cord compression, without risk of recurrence that can however be observed in the event of incomplete resection of the tumor [20]. In our series, the short-term evolution was marked by a complete recovery of neurological and sphincter disorders in all cases. Meningiomas are common to have a good evolution, but there are sum factors of bad prognosis: sex, age, delay in diagnosis and quality of tumor excision [21].

Conclusion

Spinal meningioma are usually benign tumors that develop from arachnoid cells. In our series the histological study showed that the most common histological types were psammomatous meningioma. The diagnosis is mainly based on magnetic resonance imaging. Their care should not suffer any delay and this from the onset of the first symptoms. The treatment is above all surgical, primarily aimed at decompression of the nervous structures. The postoperative evolution is generally favorable. The role of radiotherapy in the treatment of spinal meningioma is limited. However, physiotherapy is an important component in the treatment of neurological deficits. It improves the results of surgical treatment and increases the chances of neurological recovery.

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