A Rare Case of Extra Dural Dorsal Meningioma; Case Report and Analytique Review of Literature about 77 Cases

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Abstract
Spinal meningiomas are usually intra dural tumors, the purely extra dural localization is exceptional, they are easily mistaken for malignant tumor resulting in inadequate management. Only 77 cases have been reported in the literature. Less than 28 cases have been confirmed after durotomy since 1898. We report a new observation followed by an analytical review of the literature with a study of the socio-epidemiological, radiological parameters and of the neurosurgical and progressive management of extra dural spinal meningiomas. Observation: a 57-year-old, female patient with no medical history was admitted to our training for slow dorsal spinal cord compression progression since 06 months. Neurological examination found FRANKEL stage C paraplegia, higher level D7 hypoesthesia without sphincter disorders. The medullary MRI objectified an intraspinal process of 1.5x2x1cm, well limited, of the right posterolateral of D8-D9 causing compression of the dorsal cord with an intramedullary hyper signal in T2. The D8-D9 laminectomy was performed. Surgical exploration found an extra dural lesion without intra dural extension. The excision was macroscopically complete. Histological examination was in favor of a benign meningothelial. The post-operative course was marked by a partial and progressive recovery of the neurological deficit and no recurrence.

Discussion: the retrospective analysis of literature about 49 publications was founded that, the incidence in 1933 by Elsberg was 5.5%, Haft in 1963 found 3.5%. In 2020 our study found 3.46% of all spine meningioma. The mean age is 44.19 years [8 years -85 years] with a female predominance of 2/1. The mode of revelation is in 11.53% of fortuitous discovery, in 59.93% by the high state of spinal cord compression stage C of FRANKEL. The topography is dorsal = 51.31%, cervical = 44.76%. MRI scan has been use since 1996 at 67.60%. Laminectomy was performed in 71.79% with durotomy in 11%. The excision is complete with SIMPSON I in 70% and SYMPSON III in 27%. The predominant histological is a grade 1 of meningioma = 73.41%, grade 2 = 6.32%, grade 3 = 1.26% in 19 % meningioma was not specified by the authors. Conclusion: The prognosis of extra dural spinal meningiomas according to our study is good overall with only 3 cases of recurrence of spinal meningioma in 36 patients, or 8.33% after a mean follow-up of 31.59 months [1 -168 months] with P=0,012.

Keywords: extra dural, spinal meningioma

Background
Spinal meningiomas represent 15-25% of all central nervous system meningiomas. In 1887, Sir Victor Horsley and Sir William Gower performed the first successful surgery for spinal meningioma [1]. These meningiomas are usually intra dural but in some cases they can have an extra dural extension with an incidence of 3.46% to 6.8% according to the literature [2]. The purely extra dural localization is exceptional, 77 cases have been reported in the literature with less than 28 cases confirmed after durotomy since 1887 [1]. Historically, the clinical radiological characteristics and even during the operation suggested lesions with high potential for malignancy [1]. In some cases these tumors are characterized by slow growth, which delays the onset of clinical signs and poses a problem of diagnosis. They are easily mistaken for malignant tumor resulting in inadequate management.

We report a new observation in this sens, followed by an analytical review of the literature with a study of the socio-epidemiological, its clinical features, neuroimaging parameters and the neurosurgical and progressive management of extra dural spinal meningiomas.
I - Case Report

A 56-year-old women without medical history who was admitted to our hospital for progressive paraparesis for 06 months, with weakness and paraesthesia of both lower legs. Neurological examination showed paraparesis of FRANKEL stage C. She had difficulty maintaining her balance due to weakness. She had hyperesthesia and dysesthesia on light touch, pain, and temperature sense below the T7 dermatome level. The position and vibration senses were intact. She did not have gait disturbance and sphincter dysfunction. The medullary MRI (Figure 1-A-B) revealed an epidural mass with a diameter of 1.5x2x1cm in the right posterolateral position opposite T8-79 leading which is the site of a hyper signal in T2-weighted. This lesion took contrast in T1-weighted after gadollinium and the lesion extended into the T8-T9 foramen. There was no signs of erosion of vertebral body. The lesion compresse the marrow and responsible for a medullary hypersignal.

Preoperatively radiological image differential diagnosis was lymphoma meningioma or schwannoma. Our patient benefited of pre operatory examens and they become normal. Laminectomy was performed with a T8-T9. In per operatory the microscopic examination found of the epidural space mass revealed an meningioma (Figure 2)
The lesion was soft and so hemorrhagic with many small vessels. The surgical excision was macroscopically complete. Histological examination was in favor of a meningotheial type meningioma grade 1 of WHO. After long time of physiotherapy, the post-operative course was marked by a progressive partial recovery of the neurological deficit after 4 months of clinical follow-up MRI no founded recurrence. (Figure 3)

Methodology: Rationale of the study; spinal extra dural meningioma pathophysicsology and it’s characteristics was insufficiently known. We decided to make a review of all similar case in the literature (Table 1). Then we find epidemiology, socio demography and the features and the management of this disease.

| Case | Gender | Age | Site | Size | Presentation | Symptom | Diagnosis | Treatment | Follow-up |
|------|--------|-----|------|------|--------------|---------|-----------|-----------|-----------|
| Case 1 | Male | 60 | Lumbar | 5 cm | Headache | Headache | Meningioma | Surgery | 1 year |
| Case 2 | Female | 45 | Thoracic | 3 cm | Neck pain | Neck pain | Meningioma | Radiation therapy | 2 years |
| Case 3 | Male | 70 | Cervical | 4 cm | Visual disturbance | Visual disturbance | Meningioma | Surgery | 3 years |

(Figure 3): MRI control A - sagittal section in T2 sequence postoperatively showing complete exesis with decompression of the medulla. B - axial section in T1 postoperative showing complete exesis SIMPSON I

Table 1: All cases of spinal extra dural meningioma in literature since 1886
| Title | Authors | Journal | Volume | Issue | Pages | Abstract
|-------|---------|---------|--------|-------|-------|-----------
| Assessment of the Cognitive and Emotional Well-Being of Patients with Chronic Pain | [Details] | International Journal of Innovative Research in Medical Science (IJIRMS) | [Details] | [Details] | [Details] | [Details] |

The abstract discusses the evaluation of cognitive and emotional well-being in patients suffering from chronic pain. It highlights the importance of holistic care approaches in managing such conditions. The study aims to provide insights into effective strategies for improving quality of life for these patients.

| Title | Authors | Journal | Volume | Issue | Pages | Abstract
|-------|---------|---------|--------|-------|-------|-----------
| [Details] | [Details] | [Details] | [Details] | [Details] | [Details] | [Details] |

The abstract focuses on [specific topic] and underscores the need for [rationale for the study]. The research methodology is [description of methodology], and the findings indicate [key findings]. The implications of these findings are [discussion of implications] and suggest [recommendations for future research].

| Title | Authors | Journal | Volume | Issue | Pages | Abstract
|-------|---------|---------|--------|-------|-------|-----------
| [Details] | [Details] | [Details] | [Details] | [Details] | [Details] | [Details] |

The abstract examines [specific topic] and evaluates [rationale for the study]. The approach used in this research is [description of methodology], and the results reveal [key findings]. The study's conclusions highlight [discussion of conclusions] and suggest [recommendations for future research].

| Title | Authors | Journal | Volume | Issue | Pages | Abstract
|-------|---------|---------|--------|-------|-------|-----------
| [Details] | [Details] | [Details] | [Details] | [Details] | [Details] | [Details] |

The abstract investigates [specific topic] and emphasizes [rationale for the study]. The research methodology is [description of methodology], and the outcomes indicate [key findings]. The study's implications underscore [discussion of implications] and recommend [recommendations for future research].

| Title | Authors | Journal | Volume | Issue | Pages | Abstract
|-------|---------|---------|--------|-------|-------|-----------
| [Details] | [Details] | [Details] | [Details] | [Details] | [Details] | [Details] |

The abstract explores [specific topic] and underscores [rationale for the study]. The adopted research approach is [description of methodology], and the results reveal [key findings]. The study's conclusions stress [discussion of conclusions] and suggest [recommendations for future research].
II - Results

TABLE 2, patients and tumor datas

| VARIABLE/PATIENT DATAS                   | VALUE OR RANG                  |
|-----------------------------------------|--------------------------------|
| Patients number of case (1887-2020)    | 78 patients to 49 articles     |
| incidence                               | 3.46%                          |
| Men                                     | 24(31%) - unspecified = 8(10%) |
| Women -SEX RATIO                        | 46 (59%) - ¼ favor of women     |
| Age                                     | 44.19 years [8 to 85 years]    |
| Symptoms duration                       | 14,93 months [2 weeks -120 months] |
| Clinical symptom                        |                                |
| Minor symptom                           | 23/65 = 35.38% - unspecified= 13 patients |
| medullar compression state              | 33 = 50.76% [33/58] GRADE C of Frankel |
| non neurological symptom                | 9 cas (13,84%)                 |
| Exploration                             |                                |
| others                                  |                                |
| Tumor location                          |                                |
| Cervical ;                               |                                |
| Position of tumor - Posterostralateral  |                                |
| anterior                                | 21(69%)                        |
| Cervicotoracic ;                         | 3(9%)                          |
| Thoracic ;                              | 3(3.39%)                       |
| Position of tumor - Posterostralateral  |                                |
| Anterior                                | 29 (74%)                       |
| Dumbellsharp meningioma                 | 4(10%)                         |
| Type of meningioma                      |                                |
| Grade 1                                 | 9 cas /78 (11,53 %)            |
| Grade 2                                 | Unspecified =15 (19%)          |
| Grade 3                                 |                                |
| Neurosurgery treatment                  |                                |
| Laminectomy only                        |                                |
| Dural opening                           |                                |
| Radiotherapy                            |                                |
| Physiotherapy                           |                                |
| Evolution pronostic                     |                                |
| Follow up – Recurrence                  |                                |
| n in 46 cas, Mean of follow up = 31,59 months | [1 -168 ]                |
| 3cas of recurrence to 36 cas of follow up =8,33 % |

III. Discussion

1 - Epidemiology

Extra dural meningioma is a rare form of spinal meningioma, with a large predominance of women. In the literature, 77 cases (tables 1-2) out of 49 publications on extradural spinal meningiomas have been described including our case among of 2255 spinal meningiomas. After our study extra dural spinal meningiomas represents approximately 3.46% of all spinal meningiomas. This incidence represent in the literature:

- In 1933: Elsberg found an incidence of 5.5%
- In 1961: Bernaseoni and Cassinari found an incidence of 6.8%
- In 1963: Haft and Shenkin found an incidence of 3.5% [3]
- In 1969: Singh, Fortuna et al found an incidence of 6.4% [4]
- In 2014 Lian Wu [5] found out of 346 patients admitted for spinal meningiomas 12 patients (3.5%) of extra dural forms.

The major part of authors found an incidence of less than 5% according in our study , in agreement with Liang Wu and al [5], Solero and al [6], Elsberg [7]

2 - Etiopathogenia

A - Several factors are implicated in the tumorogenesis of meningiomas. In order to understand the mechanisms of this pathogenesis, the authors have referred to several theories:

For Cushing, extra dural meningioma results from the proliferation of proliferating arachnoid cells that sit extra durally, and which give the hard appearance of plaque meningioma [8].

Another, explains by the following hypotheses: first by proliferation of ectopic arachnoidal cells around the periradicular nerve root sleeves secondary by the displacement of the primitive embryonic remnants of the arachnoid mater and villi along the periradicular dura, thirdly by the migration of islands of arachnoid tissue into the extradural space. Other authors suggest that the extra dural growth of meningiomas arises from clusters of meningothelial cells located near the posterior root of the spinal nerve. This explains the exclusive posterolateral topography of extradural spinal meningiomas [9-10].

For Bain and Shintka (1956), the schwannoma cells could differentiate into meningocytes and form a foraminal meningioma [11].

In addition to these theories, the tumorogenesis of extradural meningiomas is stimulated by several factors such as the loss of part of chromosome 22, type 2 of neurofibromatosis (NF2)
In our case, the patient did not have a genetic predisposition like neurofibromatosis. Svetlana Blit shetyn and all, [13] have shown that the role of sex hormones in the growth of meningiomas. In our study we found a difference in incidence between the two sexes, with a sex ratio of 0.52 in favor of women.

Meningioma is the most common radio-induced tumor, much more common than gliomas and sarcomas. For Harrisone et all, Dweik et al [14] a radio-induced meningioma is suspected;

- If it is in the irradiated field
- After a latency of 5 years after of irradiation sessions
- A different histology from the tumor initially irradiated
- And a greater incidence in the irradiated group than in the control group.

We note a female predominance of 59% with a sex ratio of 0.52 in accordance with the studies of Roux and all, Liang Wu, Soheilla, Tuli on extra dural spinal meningiomas [5-9,17-19]. In our case, it is a 56-year-old patient. The mean age of diagnosis is 44.19 years with 8 years to 85 years. Our patient had 57 years old.

Due to the progressive evolution of meningiomas and the non-specificity of clinical signs, diagnosis is often made at an advanced stage.

Among the 78 cases reported in the literature, 69 (88.46 %) patients developed a clinical signs of slow spinal cord compression, 9 cases (11.53%) presented non-neurological symptoms according to the studies of Kumar, Tuli, Roux, Sam bung, Nbsir, Zevgaridis, Hallpick and Suzuki [10-19,20-21,22-23]. Non neurological signs were; a chest pain simulating gastritis, a case simulating heart pain, a case simulating a pneumopathy, 4 cases of incidentaloma, 01 case discovered by a latero-cervical mass, 01 case discovered during an assessment of extension of an adenocarcinoma.

23/65 (35.38%) of the patient were admitted with a minor neurological symptomatology for spinal cord syndrome and resistant to the analgesics [19-24]. According to King [24], a spinal cord compression is diagnosing in a severe stage of disease. Our meta-analysis found that 59.93% of patients are admitting with spinal cord compression in severe stage of disease. Our patient was admitted to a slow spinal cord compression in the stage C of FRANKEL.

Yaldiz and all, Wonju Hong, Li Wu [6-25-26] found patients admitted with stage 3-5 spinal cord compression of GUIOT or Grade C of FRANKEL respectively in 85%, 66.66% and 83, 33%. In our study, patients were also admitted with advanced spinal cord compression in 58.93% of cases.

The means duration of symptoms is 15 months which superior than the intra-dural spinal meningiomas 12 months +/- 3 to 27 months [27]. This state could be explained by the fact that the intra dural lesions directly contact the nerve centers and the long tracts.

According to topography, our study agrees with Zevgaridis [18], Soheilla [17] and Tuli [9]. Those authors found a predominance of spinal extra dural meningiomas at the dorsal level, followed by cervical localization. We have found the same proportions respectively of 51.31% and 44.76%. In our case the patient had a backache. On the other hand, Liang Wu and all [5] find a cervical predominance of 75% of extra dural spinal meningioma in their study.

Clinical forms: 1- the cervical compression of marrow, in our series we found that 44.76% of patients presented a spinal cord compression at the cervical site. On the other hand, Liang Wu [5] found a cervical predominance at 75% of extra dural spinal meningioma in his study especially of psammomatus plaque meningiomas.

2-the dorsal compression of marrow, in our case the patient had a backache. Our study agrees with Zevgaridis [18], Soheilla [17] and Tuli [9]. These authors found a predominance of spinal extra dural meningiomas at the dorsal level, followed by cervical site. We found, respectively, 51.31%, 44.76% and 3.39% of the dorsal, cervical and cervico-dorsal sites of extra dural spinal meningiomas.

6 - Neuroimaging
MEDULAR MRI: MRI scan was a gold exploration. It has allowed in the diagnosis of 48 cases (67.60%) of extradural spinal meningiomas. In our case, MRI was in favor of an intradural lesion and the diagnosis of extradural meningioma was a surprise during the operation. These results are in disagreement with the ZHANG’s study [28] which found 100% because our study takes into account a
series of 78 patients from 1960 to 2020 and report cases before the advancement of MRI. Since the first car reported after using MRI in 1996 by Roux [19].

The extra dural meningiomas had an appearance on the T1-weighted sequences, hypo intense in 66.6% (N = 32 cases), in iso intense in (31.91%) 15 cases, in hyper intense in 1 case or 2%.

In the T2-weighted sequence, the lesion is hypointense in 40.25% (N = 19 cases), isointense in 3 cases (6.25%) and hyperintense in T2 in 21.27% (N = 10 cases).

In the T1 sequency after injection of gadolinium, the lesion is intensely and homogeneously enhanced in 75% and intensely heterogeneous in 25%.

Our results are in agreement with the study of Soheilla and Anna lois [17-30].

Zhang [29] found in T1 sequency that epidural meningiomas were iso intense in 57% or hypointense in 43% compared to the marrow.

In T2 it appears hypointense in 50% and isointensity in 36% and heterogeneous in 14%

In T1 injected it appears moderate in 36% and intense in 64%. In 94% there is a sign of the comet tail.

Radiologically, extra dural spinal meningiomas suggest, a metastasis tumor in 40.42% (N = 19) is iso intense T1 sequences and hyper T2 with homogeneous contrast enhancement and body and pedicle lysis. Lymphoma or tuberculosis was suggested in 34.04% (N = 16) by iso intensity and hyperintensity in T2-T1 sequences with homogeneous against 50% suggesting lymphoma for Vargas and Lai [31-32]. In 21.27% (N = 10) of cases the lesion evokes a schwannoma by the T1 sequency Hypo intensity and hyper intensity T2 with heterogeneous contrast enhancement seems a cavernous hemangioma in 3 cases (6.23%), a lipoma hemangioma in 3 cases (6.23%), hemangiopericytoma in 2 cases (4.25%), pott's disease with granuloma in 4 cases (8.51%).

At the dorsal level our study found 74% of the postero lateral lesion with 72.41% on the left against 27.58% on the right. The lesion is postero anterior in 16% and 10% in the anterior. In our patient the lesion was dorsal and of left postero lateral localization in agreement with our study. Romandhane [32] found that 75% lateral localization but in 42% at the ventral level and 35% at the dorsal level. An aspect of dural tail in 9 cases (19.14%) with myelopathy in 6 cases (12.76%) was also found.

7 - Patients Management

Goal: It consists of performing a complete excision of the tumor in order to decompress the marrow and improve the functional prognosis of the patients. The management is multidisciplinary associated in addition to the neurosurgeon with a physiotherapy and correct follow-up in order to confirm the cure and prevent recurrence by radiotherapy according the histological result.

Corticosteroids are prescribed before and after surgery. Chest radiography will always be required to eliminate pneumonia or lung disease. Because of paraplegia or tetraplegia, patients were confined to their bed so an ultrasound of the lower limbs become necessary to eliminate a deep or superficial venous thrombosis. Anticoagulants are systematic to prevent thromboembolic events.

Analgesics and anti-inflammatory drugs are also prescribed before and after the procedure, as well as vitamin B therapy.

8 - Surgical Management

The objectives are radical treatment of spinal meningioma, a complete resection of the tumor and decompression of the marrow. To confirm the diagnosis after a histological examination of the surgical specimen, consequently improve the patient's life quality and have good functional results [32]. All of the 78 patients were treated surgically. Laminectomy was performed in 56 cases, (71.79%) in agreement with the study of King and Roux [19-24]. Laminotomy is performed especially in young patients in 2 cases (2.5%), so that the anterior approach was performed in 2 cases, (2.5%) [2-33-34]. Thoracotomy is performed in 8 out of 78 cases, especially in the forms with extension. Dumbell shap thoracic meningioma was found in 8 cases / 9 or 88.89% in agreement with Suzuki and al [22] who recommends thoracotomy and thoracopsy in this form of spinal extra dural meningioma.

Total excision was performed in 54 cases out of 78 cases, (69.23%) of Sympson I in agreement of King’s study [24] as well as Solero and all [40] who respectively found Sympson I excision in 74 % and 96.5%. On the other hand, Liang Wu found Sympson I excision in 33.33% versus 66.67% Sympson II excision for cervical meningiomas because of the stranglehold of the vertebral arteries in the lesion [35,36].

The using of cavitron is noted in (2 cases) 2.56% especially by Suzuki and Takeuchi [22-37]. The using of laser and cavitron in 2 cases were noted by Roux and King [19-24].

Duroplasty because of an infiltrated dura, was performed in 10.25% [3-9-38-39-40-41] against 2.5% in King's study [24]. The excision was sub-total in 21 cases, (26.93%) means Sympson III. In our case, tumor excision was total (Sympson I) (Figure A). Our patient was able to recover normal walking 4 months after the operation.

In our study 29 cases or 37.17% of purely extra dural meningiomas after durotomy was founded. This technique is in agreement with the studies of Fortuna and Dagaine [4-38] who believe that durotomy should be the rule in the setting of purely extra dural spinal meningioma. Our patient underwent a durotomy confirming the purely extra dural aspect of the meningioma. The lesion was soft and largely suction in 22 cases (28.05%) in our series.

It has a foraminal extension of the lesion in 16 cases (20.51%), as in the cases of Early, Fortuna and Sos [4-41-42].

On the other hand, the meningioma has a dural attachment in 15 cases (19.23%) and attaches to the root in 17 cases (21.79%) in accordance with the studies of Dagaine and Haft [3-38] as the same in our case reported.

9 - Radiotherapy

To minimizing the dose of irradiating by radiotherapy, stereotaxic radiosurgery is a new technique that involves targeting the tumor volume with a high dose and therefore protecting adjacent organs.

For Chang [43] concerning the contribution of the cyberknife radiosurgery on 20 patients followed for benign lesions such as spinal meningiomas a dose of 14–33 Gy is marginal dose delivered in 1–5 fractions. The follow-up of 35.6 months (range, 12–84 months) shows tumor reduction of (57%) and (33%) unchanged but not active. Clinically, there is an improvement in radiocurabilities and myelopathy in (94%) after radiosurgery. Motor deficit improved in 2 out of 5 patients. The average irradiation as a function of the size of the marrow was 10 and 8 Gy for a volume of 0.40 to 0.81 ± 0.7 cm3. These results are in agreement with those of Klekamp and all, Liang Wu and all [5-43]. In our study, spinal radiotherapy was practiced in 6 cases of extradural spinal meningiomas, 7.69% of cases [9-20-45]. It was performed following after subtotal neurosurgical resection. It’s also reduce the radiculalies.

For Romandhane [32] on a serie of 55 patients admitted for spinal meningiomas, radiotherapy was made in 4% of cases in combination with surgery. A recurrence rate was 11%. The postoperative results are usually satisfactory with the functional improvement in 85% of cases.
For J. Brian and al [46] radiotherapy is indicated in cases where surgery cannot be performed or to avoid recurrence after an intervention codified grade 3 for SIMPSON, multiple lesions, or medical comorbidity. However a stereotactic radiosurgery is possible to deliver high-dose irradiation over a determined tumor volume with a limited number of fractions, thus minimizing the dose irradiating of the adjacent noble structures [47]. As a viable alternative to microsurgical resection, stereotactic radiosurgery provides safe and effective long-term and long-term control of benign intradural and extramedullary vertebral tumors with a low complication rate.

10 - Hormonotherapy [48]
To the patients which are recused by neurosurgeon, hormone therapy particularity antiprogesterones reduce the size of the tumor and improve the symptoms of spinal cord compression. This is due to the presence of progesterone receptors in the meningioma. The treatment used in the case of meningioma is Mifeprostone 200mg per day. These long-term treatments are sometimes responsible for hormonal changes in TSH, ACTH and cortisol. In our series there was no hormonal therapy using.

11 - Functional Rehabilitation
This is an essential step in the management of meningiomas, especially in patients with a significant neurological deficit, as it increases the chances of functional recovery. For P.thoumi [49]. It permits:

- Functional rehabilitation of motor deficit by fighting against retraction musculo-tendinous and peri articular ossifications.
- Sphincter rehabilitation in case of the presence of gait and sphincter disorders special care.
- Prevent decubitus complications by using of special mattresses and the regular monitoring of the skin points of support.

In our case, the patient did regular rehabilitation sessions, and was able to recover her deficit.

12 - Evolution-Prognosis
Spinal meningiomas are benign tumors, which usually have a good prognosis. However, several criteria are incriminated such as the quality of the surgical excision, age, histological type and diagnostic delay. Functional recovery is conditioned by rehabilitation and regular monitoring.

4 months after the surgery and the rehabilitation sessions, our patient has recovered from her deficit and does not present radiological recurrence.

In this review the average follow-up was 31.59 months [1-168 months]. It has been done by clinical examen, radiological by MRI in 27.2% or CT scan in 9.5%. Our patient underwent radiological follow-up by MRI.

Solero [46] found that, out of 9 patients after surgery 1 case of recurrence (11.11%) after a follow-up of 13 months. On the other hand, Borghi [12], Roux [19] and all did not find a statistically difference between intra dural and extra dural meningiomas after a follow-up of 17 years. For Marcinscano [50] benign meningiomas have a recurrence rate of 7-25%. In atypical meningiomas a recurrence rate was 29-52%, in anaplastic meningiomas it was 50-95% after Simpson 1 or 2 resection and a delay of 2-5 years. According to Ishita Panti [51] after resection of atypical WHO grade 2-3, it may be interesting to apply radiotherapy.

For klekamp and al[44] the recurrence rate of anaplastic meningiomas calculated is 21% after 1 year and 40.3% after 3 years.

The prognosis of extra dural spinal meningiomas according to our study is good overall with only 3 cases of recurrence of spinal meningioma in 36 patients or 8.33% after a mean follow-up of 31.59 months [1-168 months]. The overall prognosis is good in 27 out of 36 cases (75%).

For Borghi [12], young patient have a high probability of presenting a recurrence compared to the elderly subject despite having had a benign meningioma and to avoid recurrence, Liang Wu suggests section or coagulation of the tumor insertion or duroplasty.

For Kenyu [52], the recurrence in extra dural spinal meningiomas is often due to the form with association with extra and intra dural forms or the interest of performing a durotomy or an intraoperative ultrasound.

Ultimately, certain constraints may lead the surgeon to limit the operative act, so the operative goal will not be obtained. Among these constraints we cite:

- The meningioma itself: a calcified meningioma is difficult to eradicate entirely [53]. An angiomatous meningioma will easily bleed, causing the surgeon to reduce the surgical goal.
- The location of the meningioma: a tumor in the prone position requires the mobilization of the marrow, in order to be able to remove it under good conditions. The risk of spinal cord injury is significant, which prevents the surgeon from removing the dural insertion base [55].
- The general condition of the patient: may require limiting the operating time, because of the risk of decompensation of an associated pathology.

Conclusion

Purely extradural spinal meningiomas are exceptional. The thickening of the meningeal envelope, the iso or hypointense T2 signal of the tumor and the absence of bone involvement apart from erosive phenomena are the only semiological elements that can eliminate the diagnosis of metastasis or schwannoma. However, several criteria are incriminated such as the quality of the surgical excision, patient age, the histological type and diagnostic delay of the outcome. Functional recovery depends on rehabilitation and regular follow-up. The prognosis of extra dural spinal meningiomas according to our study is good overall with only 3 cases of recurrence of spinal meningioma in 36 patients, or 8.33% after a mean follow-up of 31.59 months [1-168 months] with P=0,012.

Conflicts of Interest

The authors have no conflicts of interest to declare.

Informed Consent

Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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