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A. Khelifa,
W. Bennabi,
L. Berchiche,
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Surgical management of intramedullary spinal cord metastasis. Report of three cases that revealed unknown malignancies

A. Khelifa, W. Bennabi, L. Berchiche,
B. Yakoubi, F. Aichaoui, A. Morsli

Neurosurgical Department of BEO University Hospital,
Algiers, ALGERIA

ABSTRACT

Intramedullary spinal cord metastasis (IMSCM) is a rare complication of malignancies still studied by case reports; although surgery is related with the best results, the management is still debated considering the risks and the low life expectancy; in fact, many authors prefer conservative management (radiotherapy, chemotherapy), and so less than 200 cases reported in the literature with patients IMSCM were treated surgically; reporting such cases will help to understand the pathology and elaborate a clear management protocol. We report three cases of IMSCM operated at our department; in those patients, the intramedullary lesions revealed the primary tumours.

INTRODUCTION

Face to patients with intramedullary spinal cord metastasis (IMSCM) the management is a challenge, because of the low life expectancy and the bad general condition of those patients. We report three patients with IMSCM managed surgically, in those patients the spinal cord location revealed the primary tumour.

CASE PRESENTATION

Case 1

The first patient is a 57 years old man, with heart disease and smoking history of 30 years. The onset of the troubles dates back to 5 months, with weakness of the left hemibody, and Bravais-Jacksonian convulsions; a month later, there was the appearance of upper back pain with radiation to the limbs as well as functional impotence which confined the patient to bed. The clinical exam at the admission found: cauda equina syndrome with Urinary urgency, Saddle anaesthesia, Abolition of myotatic reflexes in the two lower limbs, there was a

Keywords
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Corresponding author:
Khelifa Adel

Neurosurgical Department of BEO
University Hospital,
Algiers, Algeria

drkhelifaadel@gmail.com

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significant muscular atrophy of the two lower limbs, total deficit of the dorsiflexion and plantar flexion of the foot, sensitive deficit (hypoesthesia in the path L5-S1), partial deficit in flexion and extension of the leg on the thigh and the thigh on the trunk, and a Babinski sign. Initially a brain MRI objectified right parietal nodular lesion of 2 cm diameter (figure 1A). The spinal MRI objectified an intramedullary lesion of conus medullaris in heterogeneous hypersignal on T1 WI and T2 WI (figure 1B, C, D). The diagnosis of central nervous metastasis was retained and the investigations for the initial tumour was pushed; the

thoracic CT objectified a right apical pulmonary neoplasia with parietal extension classified T3 N0 Mx (figure 1E). The patient was operated and a gross macroscopic removal of the conus medullaris tumour was performed. In post operative there was a slight recovery on the sensitive and motor functions. The anatomopathological study was in favor of a metastasis of lung adenocarcinoma. The patient was sent then to oncology where a complement of radiotherapy and chemotherapy was performed. There were no complications within 30 days.

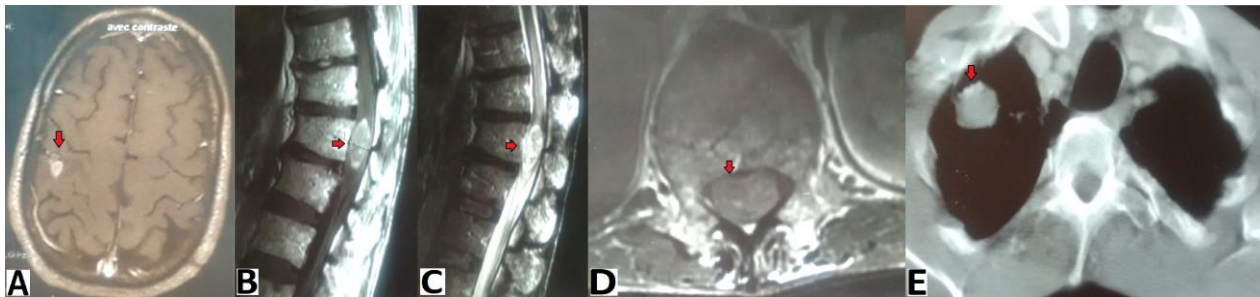


Figure 1. Images of patient 1; (arrows: the tumour in different locations). (A): axial T1 injected brain MRI, objectifying the right parietal metastasis; (B): sagittal T1 WI injected spinal MRI showing the enhancement of conus medullaris nodule; (C): sagittal T2 WI spinal MRI; (D): axial T1 WI spinal MRI; (E): axial thoracic CT, objectifying right apical pulmonary neoplasia with parietal extension.

Case 2

The second patient is a 41 years old man, with past medical history of what it was thought to be lung abscess treated with antibiotics without following. The onset of the disorder dates back to two months before admission, marked by the installation of muscle weakness in the lower limbs of rapid progression. The neurological exam at the admission found a total flasco-spasmodic paraplegia, abolishing of osteotendinous reflexes of the two lower limbs and bilateral Babinski sign. A spinal MRI objectified an expansive intraspinal intramedullary process of the conus medullaris with heterogeneous hypersignal on T1 WI and T2 WI (figure 2A, B). Already in the preoperative assessment, a chest X-rays performed for the anesthesia preoperative assessment objectified a suspect inhomogeneous opacity on the lower left lobe (figure 2C). As part of the investigations thoraco-Abdomino-pelvic CT objectified a lower left lobe pulmonary excavated mass, and multiple hepatic hypodense lesions (figure 2D, E). The patient underwent a CT-guided trans-parietal puncture of the lung lesion brought 40 cc of pus, the bacteriological study was negative but the

anatomopathological examination was in favor of lung squamous cell carcinoma. The patient was operated; he underwent a partial removal of the tumour of the conus medullaris through Th 11, Th 12 and L1 laminectomy. In post operative the patient was stable. The pathological examination was in favor of a metastasis of a lung squamous cell carcinoma. The patient was sent then to oncology where a complement of radiotherapy and chemotherapy was performed. There were no complications within 30 days.

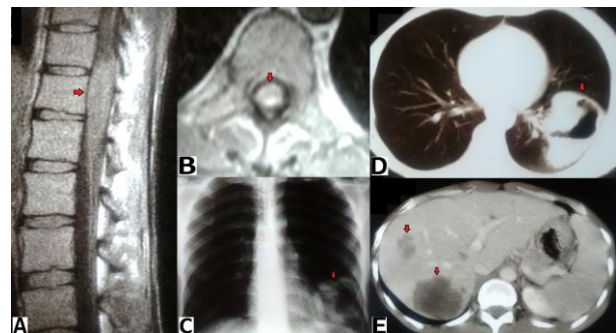


Figure 2. Images of patient 2; (arrows: the tumour in different locations). (A): sagittal T1 WI spinal MRI, showing the conus medullaris tumour; (B): axial T1 WI spinal MRI; (C): chest X-rays

performed in the preoperative assessment showing suspect inhomogeneous opacity on the lower left lobe; (D): axial thoracic CT confirmed the presence of a lower left lobe tumour with necrosis; (E): abdominal CT, showing multiple liver metastasis.

Case 3

The third patient is 26 years old woman without past medical history; the onset of the disorder dates back to one month before admission with the appearance of a weakness in the four limbs, urinary and fecal urgency. The neurological exam at the admission found neck pain, paresthesia in the four limbs, a total flasco-spasmodic tetraplegia, abolishing of osteotendinous reflexes on the four limbs, right Babinski sign, and urinary retention. Spinal MRI objectified a fusiform enlargement of the cervico-dorsal spinal cord with extensive lesions from C4 to Th 2, hyposignal T1WI, hyper signal T2 WI, after injection of gadolinium there was an enhancement in form of small heterogeneous eccentric masses

extended on 8.5 cm from C4 to Th 2, with edematous infiltration of the overlying spinal cord segments up to the bulbomedullary junction as well as underlying segments down to Th 7 (figure 3). The patient was operated and the tumour was removed through a C3 to Th2 laminectomy. The histological exam found a metastasis from a breast carcinoma; in fact a thoraco-abdominal CT was performed and found a suspect left breast mass (figure 3F); the patient was sent then to oncology for further investigations and management (radio and chemotherapy). In post operative immediately the patient was stable, but three weeks later she presented breathing difficulties for what she was admitted; an urgent spinal CT was performed without abnormalities, but the thoracic CT objectified an atelectasis; the patient was put under oxygenotherapy unfortunately 3 days later she presented sudden hemodynamic instabilities followed by a heart arrest and the resuscitation efforts failed.

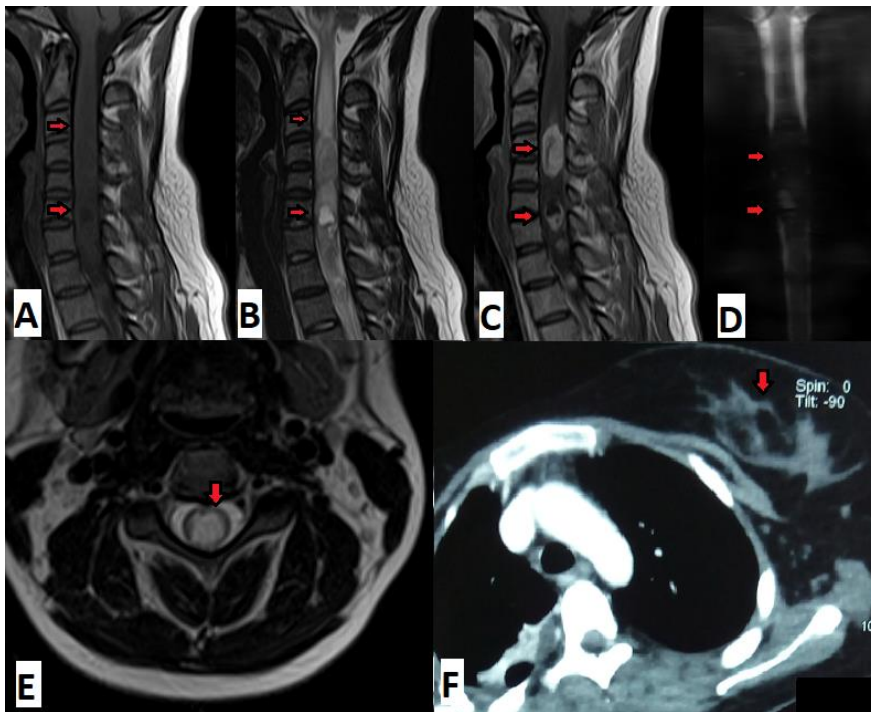


Figure 3. Images of patient 3. (A): sagittal T1 WI spinal MRI, the tumour appears isointense and hypointense with spinal cord swallowing (arrows); (B): sagittal T2 WI spinal MRI, the tumour appears with heterogeneous signal mostly hyperintense with the presence of myelomalacia and a cyst (arrows); (C): sagittal T1 WI injected spinal MRI, heterogeneous enhancement of multiple nodules (arrows); (D): MR-myelography, objectifies the amount of swallowing the tumour was creating; (E): axial T2 WI spinal MRI, showing spinal cord compression by an intramedullary formation (arrows); (F): thoracic CT, showing the left breast suspect nodule (arrow).

Table 1: Summary of our IMSCM cases (*morbidity* and mortalities were evaluated within one month).

Patients	Age	Sex	Locations	Primary tumours	Management	Other metastasis	Outcome	Morbidity & Mortalities
Case 1	57	M	Conus	Lung	Surgery	Brain	Improvement	None

Case 2	41	M	Conus	Lung	Surgery	Liver	Stable	None
Case 3	26	F	Cervico-dorsal	Brest	Surgery	None	Stable	Death

DISCUSSION

Metastasis to the spinal cord are rare [1,2,3,5], and described mostly by case reports [5]. Based mostly on Sung et al review of the English literature [3], Jincai et al performed In 2019 a summary of prior studies about IMSCM treatment and outcome, they reported also their own series of 61 patients; in their paper, in sum 519 patients have been reported since 1960 of them only 152 were treated surgically [1]. As in our cases, the most common primary locations are the lung and the breast respectively [1, 5]; other locations are less common including colon [6], melanoma [2], and renal [2]; in 10 patients (3.3%) of Sung et al series the primary tumour was unknown [2]. One of our three patients had brain location, and in the Jincai et al review 206 (40%) of the patients with IMSCM have brain metastasis [1], so we find it very reasonable to ask systematically for brain MRI for those patients even in absence of clinical symptoms. There is no clear protocol for the management of IMSCM [1, 2, 4, 5]; surgery gave an improvement rate of 77% and a stability of 23 % according to kalayci et al [3], for that it seems to be the optimal management tool if the general condition allows such heavy procedure, and also if the life expectancy is acceptable, in fact the prognosis of IMSCM is widely depending on the other locations and is frequently poor. For some authors, surgery could be difficult to propose, and they prefer radiotherapy that might assure an acceptable local control, except for radioresistant tumours such as renal cell carcinoma and melanoma [1, 2, 4, 5]. In our cases, the three patients were without past medical history of diagnosed malignancies, and images were not specific; after surgery, the investigations were urged by our pathology laboratory colleagues, even before giving the final histopathological results; so the diagnosis was based on surgical biopsy of the tumours and the invasive management was inevitable [5]. The surgeon should not consider radical removal of the tumour, but rather spinal cord decompressing by debulking [5], keeping in mind the fact that it is about a low life expectancy patient; the surgeon also is warned to not in any case expose the patient to complications that could deteriorate the quality of his short life.

CONCLUSION

Intra spinal cord metastasis are rare complications of some malignant tumours, especially lung and breast cancers; surgery is the treatment of those if the life expectancy and the general condition of the patient are good; otherwise radiotherapy could in some cases assure relief and local control of the tumour.

CONFLICT OF INTEREST

None.

FOUNDING

None.

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