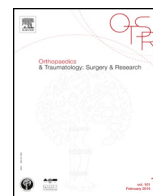




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Original article

Retrospective multicenter study by the French Spine Society of surgical treatment for spinal metastasis in France[☆]

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ABSTRACT

Introduction: The occurrence of spinal metastasis is a turning point in the progression of cancer. The optimal management has not been well defined. The aim of this study was to identify the various treatments currently being used in France and to determine the benefits of surgical treatment.

Material and methods: The records of patients treated between 2011 and 2015 at seven spine surgery centers in France were reviewed retrospectively. The pain level (VAS), McAfee scale, walking ability and Frankel Grade were evaluated at inclusion and at 6-months postoperative. The Tomita and Tokuhashi prognostic scores were also determined.

Results: The cohort consisted of 319 patients. Preoperatively, 63.5% of patients could walk without assistance and 66% were Frankel Grade E. Twenty percent of patients were bed-ridden according to the Karnofsky Performance Status. According to the Tokuhashi criteria, 44% were predicted to have less than 6 months to live. The Tomita score recommended palliative surgery in 48% of cases. Potentially unstable lesions were present in 67% of patients. The surgical indication was made because of a neurological deficit in 40% of cases, to alleviate pain in 30% of cases, and for an instability in 30% of cases. Spinal cord decompression and posterior fixation were the most common procedures. The overall complication rate was 38.6%. At 6-months postoperative, 24 patients had died of the 245 available for review. Only 13 patients could not walk (5.3%), 69.4% of patients were Frankel Grade E and pain levels were significantly lower than preoperatively (2.4 vs. 4.6, $p < 0.001$).

Discussion: This study's findings are evidence of the difficulties encountered when treating spinal metastases. The main prognostic scores do not appear to be valid for these patients. A large number of patients were operated urgently because of a neurological deficit, before the treatment could be discussed in a multidisciplinary team (MDT) meeting. Nevertheless, the surgical treatment of these patients is associated with an acceptable complication rate and clinical improvement.

Conclusion: Surgical treatment of spinal metastases is not well standardized; thus many different strategies are used. There is evidence that it improves the quality of life in most patients by reducing their pain and allowing them to walk again. However, this treatment must be discussed in the context of an MDT meeting before it is carried out. These patients should be evaluated early on by a spine surgeon to reduce the need for emergency surgery when a neurological deficit appears.

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1. Introduction

The spine is one of the most common locations for metastasis and the prevalence of spinal metastases continues to increase [1–3]. More than 60% of cancer patients will develop bone metastases during the progression of their disease. [1]

The optimal care for these patients has not been well defined. While surgical treatment has been shown to be beneficial for patients with neurological deficits [4,5], the strategy for asymptomatic patients or those with pain but no associated deficit has not been defined. The occurrence of symptomatic spinal metastasis is a turning point in the disease progression. However, survival has improved thanks to advances in cancer treatment, in particular targeted therapies [6–8].

In parallel with these advances, the development of minimally-invasive surgery offers the possibility of less aggressive procedures to these fragile patients, with earlier start or restart of adjuvant treatments [9–11]. The current objectives for these patients are to improve their quality of life by preserving their autonomy for activities of daily living with less pain and shorter hospital stays [12–14].

The numerous prognostic scores currently used to guide the care (surgical or not) of these patients during multidisciplinary team (MDT) meetings are not well suited to current technical advances. They do not allow standardization of the practices in terms of deciding on the surgical indication and the type of surgery [7,15–20].

This led the French Spine Society (SFCR) to conduct a multicenter retrospective study of patients who underwent surgical treatment for one or more spinal metastases in France. The primary aim was to identify the various treatments offered and to assess the outcomes.

2. Materials and methods

2.1. Patient inclusion

The medical records at seven spine surgery centers in France (Marseille Timone, Paris [Foch/Cochin/Salpetrière], Lille, Bordeaux, Strasbourg) were reviewed systematically. This led to the inclusion of 319 patients operated between December 2011 and March 2015. Inclusion criteria were patients above 18 years of age with a diagnosis established based on clinical and radiological evidence of secondary spine localizations (whether the primary cancer was known or not), independent of the type of surgical procedure performed. Exclusion criteria were the presence of a surgical contraindication or the presence of a neurological deficit before the spinal metastasis was established.

2.2. Data collection

At inclusion, the patient's age, sex, BMI, type of primary cancer, and delay between the diagnosis and metastasis was recorded.

Various criteria were used to assess pain, neurological status and autonomy at inclusion:

- preoperative pain: visual analog scale (VAS) and McAfee scale;
- preoperative autonomy: neurological status (using the Frankel Grade [21]) and walking ability, which was classified in five categories—normal walking without assistance, altered walking without assistance, walking with cane, walking with two canes or walker, cannot walk.

These same criteria were reassessed at 6-months' postoperative:

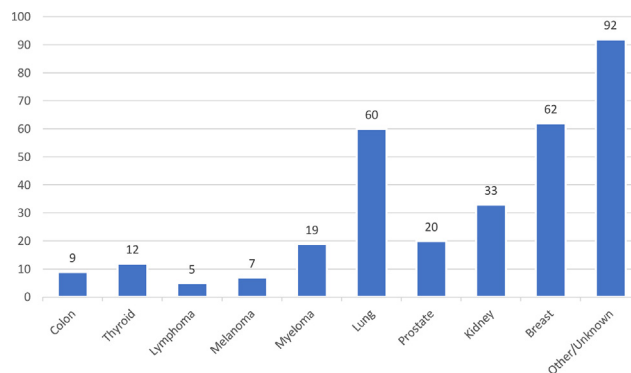


Fig. 1. Type of primary cancer.

- in parallel, various prognostic indicators were determined preoperatively;
- the Karnofsky scale [22] assesses the patient's physical ability, where 100% represents normal health and 0% corresponds to death;
- the Tokuhashi score [19], which is used to guide the surgical treatment according to the patient's life expectancy by taking into consideration their general condition, the presence of neurological deficits, the nature of the primary tumor and the other secondary sites;
- the Tomita score [7] is used to determine the treatment goal and surgical strategy;
- the spinal instability neoplastic score (SINS) [23] is used to determine the spinal stability of patients with metastases based on the location of the lesion, mechanical pain, type of bone lesion, radiographic spinal alignment, loss of vertebral height, involvement of posterior elements. This assessment results in a description of "stable", "potentially unstable" or "unstable" with the need for surgical treatment;
- the Tomita Surgical Classification of Spinal Tumors (SCST) which classifies metastases based on their location.

For each included patient, any preoperative treatment (embolization) and the type of strategy was recorded, along with the surgical approach, type of procedure, anterior instrumentation, or the need for two-phase surgery.

During the follow-up period, general complications and those related to the surgical procedure were recorded.

3. Results

3.1. Epidemiology

The cohort consisted of 319 patients: 157 men (49.2%) and 162 women (50.8%) with a median age of 63 years [21–90] and a mean BMI of 24.8 [13.7–50.3]. The discovery of a metastasis was the first sign of cancer in 59 patients (18%). The primary tumor location was known in more than 80% of cases. The mean time elapsed between the diagnosis and the spinal metastasis was 33 months.

The most common types of primary cancer (Fig. 1) were breast (19.7%) and lung (18.7%). The spine was the first metastasis location in 65.3% of cases, mainly the thoracic spine (56.2%) (Fig. 2).

3.2. Preoperative data

Various neurological, pain and autonomy indicators were determined preoperatively:

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