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Management of neoplastic spinal tumors in a spine surgery care unit

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ABSTRACT

Background context: Spinal cord compression and fracture are possible complications of spine metastasis and multiple myeloma. Prompt diagnosis and treatment of threatening lesions are likely to reduce the frequency of these dreaded complications.
Purpose: To evaluate the proportion of neoplastic spine lesions operated on emergency.
Study design: Retrospective study.
Patient sample: All patients who underwent palliative surgery for the treatment of a neoplastic spine lesion in our institution between 2005 and 2012.
Outcome measures: Percentage of patients who underwent surgery as an emergency for acute fracture or rapid neurological decline.
Methods: We retrospectively reviewed the data of all patients who underwent palliative surgery for the treatment of a neoplastic spine lesion from solid cancer or multiple myeloma, in our institution between January 2005 and December 2012. The study was supported by grant from our institution.
Results: A total of 317 patients were included in the study. There were 166 men and 151 women and the mean age was 57.97 years (range 26–88; SD 12.45). The cancer was known for 224 patients, while the lesion revealed the disease for the other 93 patients. The percentage of patients with known cancer operated as an emergency in our institution decreased significantly between 2005 and 2012 ($p = 0.0006$).
Conclusion: Due to the variability of clinical and radiological presentations, best care requires a truly multidisciplinary approach, to offer each patient a prompt and individualized treatment option, which is likely to reduce the incidence of emergency surgeries.

1. Introduction

The World Health Organisation (WHO) estimates that 10 million people were newly diagnosed with cancer worldwide in 2000 and expects cancer rates to increase by 50% to reach 15 million by 2020. In 2010, an estimated 1.53 million cases of newly diagnosed cancer were expected in the US alone [1]. Bones are the 3rd most common site of metastases following lung and liver [2]. Of the various bones, the spine is the most commonly affected site. As cancer patients live longer, due to an improvement in treatment options, the incidence of spine metastases, which are known to occur in 30 to 50% of cancer patients [3], will also rise. Breast, prostate, lung, kidney, thyroid and multiple myeloma are the most common primary sites, reflecting both the high prevalence of these cancer types and their predilection to the bones. The management of spine metastases is an important concern not only for oncologists but also for patients, as they can severely affect their quality of life. Indeed, axial or radicular pain occurs in up to 80% of patients with spine metastasis [4,5]. Moreover, spinal cord or cauda equina compression occur in up to 20% of patients with pre-existing spine metastasis and in 5 to 10% of all cancer patients [6]. It is well established that patients with no or slow development of neurological deficits are good candidates for radiotherapy as they have a good functional outcome. In contrary, patients with rapid deterioration within 48 h are not suitable for radiotherapy only, as it demonstrated poor outcomes [7]. Although, surgery allows rapid and wide decompression of neurological elements, emergency interventions are associated with uncertain recovery and increased morbidity in

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such patients [8]. Neurological impairment may be due to an epidural involvement or to an acute pathologic fracture. Both situations can be avoided if detected and treated early. Management of spine metastasis require a truly multi-disciplinary approach to detect and treat promptly patients at risk, in order to avoid this dreaded complication. A multidisciplinary staff meeting has been established in January 2007 in our institution, and this study aims to assess how it could decrease the proportion of neoplastic spine lesions operated on emergency.

2. Methods

2.1. Data collection

Using the coding process, we retrospectively studied patients hospitalized for the treatment of a spine tumor in the spine surgery care unit of the Lille university hospital, between January 2005 and December 2012. The clinical records of 523 patients were carefully analyzed. Age, sex, clinical signs, radiological findings, and histopathological results have been systematically recorded in the medical records. Pain and neurological status were respectively measured using the VAS scale and the Frankel classification [9] (Table 1). We investigated whether the lesion was revealing or if the patient suffered from a known neoplastic disease (solid cancer or multiple myeloma). We have also consistently reported the indication for surgery, surgical strategy, complications and if the operation was performed urgently. The urgency was defined by a rapidly progressive neurological deficit or a pathological fracture requiring intervention within 48 h following diagnosis.

2.2. Inclusion-exclusion criteria

Between January 2005 and December 2012, we included all patients who underwent palliative surgery for the treatment of a neoplastic spine lesion from solid cancer or multiple myeloma, in our institution. Then, we excluded patients who underwent excisional surgery for a primitive spine tumor. We also excluded patients who underwent excisional surgery for a solitary spine metastasis, as their presentation and management are different.

2.3. Statistical analysis

First, descriptive analyses have been performed in order to check and resume the data. Continuous data were then expressed as mean and standard deviation, qualitative ones as frequencies. Comparisons of distributions have been realised using the Wilcoxon test, comparisons of frequencies have been performed using the Chi-squared test or the Fisher exact test if Chi-squared was not valid.

Comparisons of frequencies over time have been performed using the Cochran–Armitage trend test. Statistical analyses have been performed using the SAS System V9.3, Cary, NC, USA. Significance level was set to 0.05.

3. Results

3.1. Population

In total, 317 patients were included in the study. There were 166 men and 151 women and the mean age was 57.97 years (range 26–88; SD 12.45). The mean Karnofsky score was 75 (range 40–100; SD 14.59). At the time of admission, 224 patients had a known cancer, while the lesion revealed the disease for the other 93 patients. After final pathological analysis, 60 patients had a multiple myeloma while the 257 others suffered from a solid

Table 1
Main classifications.

a: Frankel classification.
b: Tokuhashi scoring system. Interpretation:
Score ≤ 8: life expectancy < 6 months
9 < score < 12: life expectancy 6 to 12 months
Score ≥ 12: life expectancy > 12 months (excisional)
c: Spinal Neoplastic Instability Score. Interpretation:
Score < 7: stability
8 < score < 13: moderate instability
Score ≥ 13: severe instability

(a)

Type	Definition
A	Complete: no motor or sensory function
B	Incomplete: sensory present, motor function absent
C	Incomplete: sensory present, motor function present but not useful (grade 2 or 3/5)
D	Incomplete: sensory present, motor function present and useful (grade 4/5)
E	Normal sensory and motor function

(b)

Characteristic	Score
General condition (Karnofsky)	
Poor (10–40%)	0
Moderate (50–70%)	1
Good (80–100%)	2
Number of extra spinal bone metastases	
>2	0
1–2	1
0	2
Number of spine metastases	
>2	0
2	1
1	2
Metastases to major organs	
Unremovable	0
Removable	1
None	2
Primary site	
Lung, Stomach, Oesophagus, Pancreas	0
Liver, Gall bladder, unknown	1
Others	2
Kidney, Uterus	3
Rectum	4
Breast, Prostate, Thyroid, Carcinoid	5
Palsy	
Complete (Frankel A or B)	0
Incomplete (Frankel C or D)	1
None (Frankel E)	2

(c)

Parameter	Score
Location	
Junctional (C0-C2, C7-T2, T11-L1, L5-S1)	3
Mobile spine (C3-C7, L2-L4)	2
Semirigid (T3-T10)	1
Rigid (S2-S5)	0
Pain	
Continue	3
Occasional	1
None	0
Bone lesion	
Lytic	2
Mixed	1
Blastic	0
Radiographic alignment	
Subluxation/translation	4
Deformity (scoliosis, kyphosis)	2
Normal	0
Vertebral body collapse	
>50%	3
<50%	2
No collapse but >50% body involved	1