

Prognostic Factors of Surgical Complications and Overall Survival of Patients with Metastatic Spinal Tumor

Gábor Czizléczki^{1,2}, Tamás Mezei², Péter Pollner⁴, Anna Horváth³, Péter Banczerowski^{1,2}

■ **OBJECTIVE:** Oncologic treatments increase the incidence of spinal metastases. Surgical treatment of spinal metastases results in a high complication rate, which must set against the expected benefits. The aim of this article was to study the effect of several prognostic factors on surgical complications and survival time using an extended database of patients with spinal metastases.

■ **METHODS:** This retrospective study comprised 337 patients with spinal metastases who were surgically treated between 2008 and 2015. Demographic and clinical features, oncologic histories, surgical interventions, and end results were collected. Descriptive statistical methods were used to analyze the cohort of patients. Kaplan-Meier formula and log-rank test were used to examine overall survival times.

■ **RESULTS:** Median overall survival time was 222 days (range, 175–274 days). Age, preoperative motor disorders, preoperative Frankel grade categories, Karnofsky performance scale, type of primary tumor, and presence of internal metastasis had a significant negative effect on overall survival. Complications such as bleeding or need for intensive care could be predicted preoperatively based on preoperative performance status, type of primary tumor, affected vertebral levels, and type of surgical interventions.

■ **CONCLUSIONS:** Spinal metastatic disease is a challenging surgical problem. If the exact prognostic factors are known preoperatively, surgical outcome and overall survival can be predicted more precisely. Our results could

provide a basis for a future multicenter prospective study to determine the best treatment protocol for patients with spinal metastases.

INTRODUCTION

Longer life expectancy of patients with cancer and successful oncologic treatments have resulted in an increased incidence of spinal metastases.^{1–4} Spinal metastases can be expected in 70% of patients with a cancer diagnosis, and neurologic symptoms related to spinal cord compression may develop in 10%.⁵ The main goals of surgical treatment should be to improve mechanical stability, decompress neural structures, relieve neurologic symptoms, and improve quality of life; however, most of the underlying cancer types and stages carry dismal prognoses.^{2,6} Surgical treatment of spinal metastases results in a complication rate of 20%–30%, which must be considered against the expected benefits.^{2,7} If the exact risk and complication factors are known preoperatively, surgical outcome can be predicted more precisely. Scoring systems, such as Tokuhashi,^{8–10} Tomita,¹¹ Bauer,^{12,13} and Linden¹⁴ systems, are widely used in clinical practice to offer the best surgical strategy based on the patient's prognostic factors. Using an extended database of patients who underwent surgical interventions because of spinal metastases, the aim of this article was to study the effect of the risk factors of 4 prognosis scoring systems on the survival time of patients with metastatic spinal tumors. Furthermore, we aimed to investigate the prediction ability of scoring systems for prognosis and to possibly evaluate new risk factors to extend the

Key words

- Overall survival time
- Prognosis scoring systems
- Prognostic factors
- Risk factors of surgical complications
- Spinal metastases

Abbreviations and Acronyms

KPS: Karnofsky performance scale

OS: Overall survival

Statistical and Biological Physics Research Group, Hungarian Academy of Sciences, Eötvös University, Statistical and Biological Physics Research Group, Budapest, Hungary

To whom correspondence should be addressed: Gábor Czizléczki, M.D.

[E-mail: gczigleczki@gmail.com]

Citation: *World Neurosurg.* (2018).

<https://doi.org/10.1016/j.wneu.2018.01.092>

Journal homepage: www.WORLDNEUROSURGERY.org

Available online: www.sciencedirect.com

1878-8750/\$ - see front matter © 2018 Elsevier Inc. All rights reserved.

From the ¹National Institute of Clinical Neurosciences, ²Department of Neurosurgery, and ³3rd Department of Internal Medicine, Semmelweis University, Budapest; and ⁴MTA-ELTE

prediction ability of various prognostic systems in the future. Correlating risk factors with the main surgical complications were also examined.

MATERIALS AND METHODS

Patient Database

We created a retrospective database of 337 patients who underwent spinal surgery for spinal metastases at the National Institute of Clinical Neuroscience, Department of Neurosurgery, Semmelweis University, Budapest, Hungary, between 2008 and 2015. Surgical intervention was the only criterion of admission for the study. Of the 382 interventions identified in the inquiry, 337 patient histories were compiled; 38 patients had records with multiple surgical interventions (31 patients with 2 interventions and 7 patients with 3 interventions; none of the patients had >3 interventions).

Most of the examined risk factors are presented in prognosis prediction systems (revised Tokuhashi, Tomita, modified Bauer, and van der Linden scores) (Tables 1–4). Several other factors from the patients' history were also collected. Demographic and baseline clinical variables of interest included sex and age at time of surgery. Baseline functional status was measured with the Karnofsky performance scale (KPS). Further data recorded about the status of the patient included main clinical symptoms, presence of motor or sensory deficit, Frankel scores, extraspinal bony metastases, and metastases in the internal organs. Regarding the surgical intervention, we extracted the following details: affected vertebral levels, steps of intervention, postoperative condition, and period of hospital stay. Each patient history consisted of data about the metastasis (categorized by primary site of origin), histologic diagnoses, and other comorbidities. Finally, 2 main types of complications were examined. A bleeding complication was defined as an intraoperative or postoperative hemorrhage that necessitated blood transfusion. Other complications were defined as the need for postoperative intensive care related to difficulties because of the surgery in at least 1 of the 7 main organ systems (cardiovascular, respiratory, central nervous system, gastrointestinal tract, renal, hematologic, or metabolic).

Statistical Analysis

Descriptive statistics were used to describe the cohort of patients. The selected factors and their clustering were not modified after the first statistical evaluation to avoid distortion of retrospective results. Fisher exact tests were employed to identify significant associations between covariants of interest and categorical outcomes (complications). Kaplan-Meier formula and log-rank test were used to examine overall survival (OS). Results with P values <0.05 were considered statistically significant in the final analysis. In the post hoc analysis, we applied statistical corrections (Bonferroni correction) where combinatorial selection was used. R software (R Foundation for Statistical Computing, Vienna, Austria) was used for all statistical analyses.¹⁵

RESULTS

Survival Data and Rate of Complications

We identified 337 patients, 199 (59.1%) men and 138 (40.9%) women, with a mean age of 63 ± 12 years (range, 15–88 years). OS

Table 1. Revised Tokuhashi Score

Predictive Factors	Points
General condition (KPS)	
Poor (KPS 10%–40%)	0
Moderate (KPS 50%–70%)	1
Good (KPS 80%–100%)	2
Number of extraspinal bone foci	
≥ 3	0
1–2	1
0	2
Number of metastases in vertebral body	
≥ 3	0
2	1
1	2
Metastases to major internal organs	
Nonremovable	0
Removable	1
No metastasis	2
Primary site of cancer	
Lung, osteosarcoma, stomach, bladder, esophagus, pancreas	0
Liver, gallbladder, unidentified	1
Others	2
Kidney, uterus	3
Rectum	4
Thyroid, breast, prostate, carcinoid	5
Palsy	
Frankel A, B (complete)	0
Frankel C, D (incomplete)	1
Frankel E (none)	2
Prognostic Categories	Interpretation
0–8 points	85% live <6 months \rightarrow conservative treatment or palliative surgery
9–11 points	73% live >6 months (and 30% live >1 year) \rightarrow palliative surgery or (exceptionally) excisional surgery
12–15 points	95% live >1 year \rightarrow excisional surgery
KPS, Karnofsky performance scale.	

was calculated by the Kaplan-Meier formula (Table 5). Median OS (amount of time when 50% of the patients have died) was 222 days; the 95% confidence interval ranged from 175 to 274 days. Because some patients were alive at the time of data taking, we provide the restricted mean (upper limit = 2739 days) for the OS

Download English Version:

<https://daneshyari.com/en/article/8691745>

Download Persian Version:

<https://daneshyari.com/article/8691745>

[Daneshyari.com](https://daneshyari.com)