

Independent predictors of complication, recurrence, and survival in patients who underwent surgery for spinal metastasis Darryl Lau; Matthew R Leach BA; Frank La Marca MD; Paul Park MD

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Introduction

Surgery for spinal metastasis can be associated with great morbidity and survival times are often less than a year. Recurrence of metastatic lesions is quite common and it remains unclear whether repeat surgery is effective. In this study, we assessed for independent predictors and risk factors for complications, recurrence, and survival.

Methods

Between 2005 to 2011, a consecutive population of adult patients who underwent surgery for spinal metastasis was identified. Utilizing multivariate logistic regression and Cox-proportional hazard regression, we assessed for independent predictors and risk factors for complications, recurrence, and survival (at 6 months, 1-year, and 2years). Furthermore, the impact of repeat surgery on survival was specifically assessed with multivariable analysis.

Results

A total of 106 patients were included in the final analysis for complications and 99 patients for the final analysis of survival and recurrence. Complication rate was 21.7%. Independent predictors of higher complications were age greater than 40 years (40-65 years had OR 1.91, CI 1.02-16.78 and greater than 65 years had OR 5.17, CI 1.54-29.81) and lesions involving 3 or more contiguous levels of the spine (OR 2.76, CI 1.09-9.61). Overall recurrence was 31.5%. Metastasis from melanoma was independently associated with higher risk of recurrence (OR 10.61, CI 1.62-69.43). Overall mean survival was 9.6 months. Patients with recurrence that underwent repeat surgery had longer mean survival times than patients with recurrence who did not undergo repeat surgery (19.6 months vs. 12.8 months, respectively). Repeat surgery was also independently associated with higher survival rates on multivariate analysis. As Table 1 shows, in addition to previously identified predictors of survival (preoperative ambulation, Karnofsky Performance Score (KPS), radiotherapy, primary cancer type, presence of extraspinal metastasis, and number of spinal segments with metastasis), pain on presentation and BMI of 25-30 were both independently associated with survival.

Conclusions

In addition to previously reported predictors for survival, pain on presentation and BMI 25-30 were found to be associated with increased survival. Our findings also suggest that repeat surgery may be a viable option in patients with metastatic recurrence, and may offer prolonged survival presumably by improved functionality and mitigating associated complications from neurologic injury. Age and 3 or more contiguous levels of involvement were predictors of increased complication.

Learning Objectives

- 1. Describe predictors for increased survival after surgery for metastatic spine disease.
- 2. Evalaute the impact of repeat surgery for tumor recurrence.

3. Describe predictors for increased complications after surgical treatment of spinal metastatic lesions.

Table 1						
	6-Month Survival		1-Year Survival		2-Year Survival	
Patient	HR	p-	HR	p-Value	HR	p-
Descriptives		Value				Value
Body mass index						
< 20			0.83	0.578		
20 - 25			ref	ref		
25 - 30			0.29	0.049		
> 30			0.28	0.608		
Coronary artery						
disease	0.00					
Yes	2.82	0.212	5.04	0.034	2.41	0.184
NO	ref	ref	ref	ref	ref	ref
Ambulatory	0.17	0.016	0.22	0.010	0.26	0.040
Yes	0.17	0.016	0.52	0.010	0.30	0.048
VDC	rei	rei	Iei	rei	rei	rei
10 40	2.00	0.019	2 70	0.050	1.60	0.067
50 70	1 77	0.019	1.05	0.059	2.06	0.007
S0 - 100	ref	0.741 ref	1.95 ref	0.952 ref	2.00 ref	0.157 ref
Primary tumor	ICI	ICI	ICI	101	ICI	101
Breast	2.95	0 394	4.03	0.226	7.65	0 1 7 2
Gastrointestinal	5.86	0.211	12 30	0.083	3.53	0.393
Hematological	1.24	0.859	3 57	0.357	2.68	0.457
Lung	8.29	0.105	22.47	0.027	10.29	0.119
Melanoma	1.63	0.722	10.35	0.086	8.54	0.014
Muscle	1.74	0.686	5.25	0.213	9.05	0.096
Prostate	2.23	0.546	4.62	0.227	3.91	0.345
Renal	1.67	0.728	8.73	0.130	8.31	0.139
Thyroid	ref	ref	ref	ref	ref	ref
Other	3.65	0.292	4.74	0.194	5.50	0.234
•						
	6-Month Survival		1-Year		2-Year	
Defient			Survival		Survival	
Descriptives	пк	P- Value	IIK	p-vaide	III	P- Value
Presentation		value				value
Pain	0.34	0.012	0.52	0.029	0.41	0.048
Neurological	ref	ref	ref	ref	ref	ref
Both	0.35	0.060	0.64	0.046	0.53	0.004
Number of levels						
involved						
1	ref	ref	ref	ref	ref	ref
2	1.05	0.933	2.07	0.184	1.73	0.199
3 or more	2.22	0.015	2.81	0.029	2.74	0.018
Intradural						
involvement						
	1.77	0.386				
Yes		-	1		1	
Yes No	ref	ref				
Yes No Sites of <u>extraspinal</u>	ref	ref				
Yes No Sites of <u>extraspinal</u> metastasis	ref	ref				
Yes No Sites of <u>extraspinal</u> metastasis 0	ref ref	ref ref	ref	ref	ref	ref
Yes No Sites of <u>extraspinal</u> metastasis 0 1 - 2	ref 2.27	ref 0.156	ref 3.05	ref 0.090	ref 1.58	ref 0.326
Yes No Sites of <u>extraspinal</u> metastasis 0 1 - 2 3 or more	ref 2.27 1.59	ref 0.156 0.508	ref 3.05 3.81	ref 0.090 0.013	ref 1.58 3.62	ref 0.326 0.013

1.06

ref

0.35

ref

0.25

ref

0.29 ref

ref

0.016 ref

ref

0.33 0.074

Yes No

Yes

No

Yes No

Radiotherapy

Repeat surgery

0.911

ref

0.058

ref

0.025

ref

0.37

ref

0.49

ref

0.026

ref

0.016

ref