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## Appendix

# Spondylectomy in the Treatment of Neoplastic Spinal Lesions – A Retrospective Outcome Analysis of 582 Patients Using a Patient-Level Meta-Analysis

Alexander Spiessberger<sup>1,2\*</sup>, Varun Arvind<sup>1</sup>, Mansoor Nasim<sup>3</sup>, Basil Grueter<sup>4</sup>, Edin Nevzati<sup>5</sup>, Silvia Hofer<sup>6</sup> and Samuel K Cho<sup>1</sup>

<sup>1</sup>Department of Orthopedic Surgery, Icahn School of Medicine, Mount Sinai Hospital, New York, USA

<sup>2</sup>Department of Neurosurgery, North Shore University Hospital, Hofstra School of Medicine, Manhasset, New York, USA

<sup>3</sup>Department of Pathology and Laboratory Medicine, Zucker School of Medicine at Hofstra Northwell, Lake Success, New York, USA

<sup>4</sup>Department of Neurosurgery, University Hospital Zurich, Frauenklinikstrasse, Zurich, Switzerland

<sup>5</sup>Department of Neurosurgery, Cantonal Hospital of Lucerne, Spitalstrasse, Lucerne, Switzerland

<sup>6</sup>Department of Medical Oncology, Cantonal Hospital of Lucerne, Spitalstrasse, Lucerne, Switzerland

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### ABSTRACT

**Background:** En-bloc spondylectomy in the treatment of spinal tumors is a complex procedure with potential complications. This study aims at identifying predictors of postoperative complications, lesion recurrence and overall survival.

**Methods:** A systematic review of the literature was conducted, and patient-level data extracted from the included studies. Multiple linear-regression models were calculated to predict the occurrence of postoperative complications, lesion recurrence and overall survival based on age, tumor etiology, surgical approach, mode of resection (en-bloc versus intrasessional), tumor extension based on Weinstein-Boriani-Biagini classification system and number of levels treated.

**Results:** Data of 582 individual adult and pediatric patients were extracted from the literature; Patient characteristics are: 45% female, median age of 46 years (range 5-78); most common etiologies were: sarcoma (46%), metastases (31%) and chordoma (11%). The surgical technique was: anterior (2.5%), combined (45%) and posterior approach (52.4%); 68.5% underwent en-bloc spondylectomy; average levels resected were 1.6 (1-6); 65% of patients had neurologic deficits at presentation, average survival was 2.6 years; Direct procedure-related complications were observed in 17.7%, with the most prevalent being CSF leaks, wound infections and neural injury. For postoperative complications, recurrence and 5-year survival significant regression equations were found ( $F(7,90)=2.57$ ,  $p=0.018$ ) with an  $R^2$  of 0.1; ( $F(5,147)=2.35$ ,  $p=0.044$ ) with an  $R^2$  of 0.07 and ( $F(4,101)=7.2$ ,  $p=0.01$ ) with an  $R^2$  of 0.38. Odds ratio for predicted complications was 1.35 for en-bloc resection and 1.25 for more than one level treated. The odds ratio for tumor recurrence was 0.78 for en-bloc resection; odds ratio for 5-year survival were 0.79 for increased patient age, 0.65 for increasing tumor grade, 0.79 for tumor dissemination at diagnosis and 1.68 for en-bloc resection.

**Conclusion:** En-bloc spondylectomy provides improved survival and lower recurrence rates but also higher operative complication rates when compared to intrasessional resections. Interestingly the complication rate was not influenced by tumor stage (WBB scale) and tumor etiology.

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\*Correspondence to: Alexander Spiessberger, M.D., Department of Neurosurgery, North Shore University Hospital, Hofstra School of Medicine, 300 Community Drive, 11030 Manhasset, New York, Department of Orthopedic Surgery, Icahn School of Medicine, Mount Sinai Hospital, 5 East 98th Street, 10029, New York, USA; E-mail: [aspiessberge@northwell.edu](mailto:aspiessberge@northwell.edu)

Article number	First author	Year of publication	Number of patients
1	Abe E	2001	14
2	Akeyson EW	1996	25
3	Balke M	2012	2
4	Chou D	2009	3
5	de Carvalho	2016	1
6	Demura S	2011	10
7	Disch AC	2011	20
8	Feng D	2013	16
9	Guo C	2011	6
10	Hasegawa K	2007	13
11	Hsieh PC	2011	5
12	Huang W	2010	20
13	Huang W	2018	9
14	Jia Q	2018	13
15	Jia Q	2018	15
16	Jia Q	2018	20
17	Junming M	2008	21
18	Kato S	2016	8
19	Kato S	2014	26
20	Kawahara N	2011	10
21	Liljenqvist U	2008	21
22	Luzzati AD	2014	9
23	Matsumoto M	2013	8
24	Melcher I	2007	15
25	Sakaura H	2004	12
26	Salame K	2015	12
27	Schwab J	2012	15
28	Shimizu T	2018	30
29	Sundaresan N	1989	8
30	Tomita K	1997	7
31	Tomita K	1994	20
32	Vasudeva VS	2016	6
33	Wang X	2018	18
34	Xiao J	2018	5
35	Xiong W	2018	5
36	Yang H	2016	21
37	Yang P	2016	7
38	Yin H	2015	26
39	Yokogawa N	2018	25
40	Yoshioka K	2013	22
41	Zhong N	2017	21
42	Zhou H	2018	12

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