Minimally Invasive Spine Surgery vs Standard Open Surgery for Spinal Metastases, a Retrospective Comparison

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Learning Objectives

1) Describe the goals of surgery for spinal metastases

2) Discuss the potential benefits of minimally invasive spine surgery (MISS)

3) Be able to discuss pros and cons of open surgery vs. MISS for individual cases

Introduction

Utilizing minimally invasive spine surgery (MISS) for treating spinal metastases causing spinal cord compression and/or instability has great potential, however data supporting the safety and efficacy of MISS over open surgery is still emerging. The aim of this study is to compare outcomes for MISS vs. open surgery for the decompression and stabilization of spinal metastases.

Methods

This is a single institution retrospective study. Both groups received the same surgical treatment goal including circumferential decompression via laminectomy and transpedicular approach to debulk ventral epidural disease as well as instrumented stabilization. Mean values were compared via unpaired t-tests and proportions via chi-squared tests.

Results

There were 17 patients in the MISS group and 24 in the open surgery group. The average age of the MISS group was significantly older than the open surgery group (65.5 vs. 56.6; p = 0.026). A significantly higher proportion of patients in the open group had a KPS <70 (54.2% vs 11.8%, p=0.005). This was evidenced by the higher proportion of emergency procedures performed in the open group than the MISS group, 9 out of 24 patients vs. 0 out of 17 patients, respectively. The SINS scores, number of levels fused, and operative parameters including blood transfusions and length of stay were similar, except for the average estimated blood loss for the open surgery vs. the MISS group (783mL vs. 430mL; p = 0.021). The open surgery group experienced 3 complications, including 2 wound infections, and the MISS group had one wound infection. The open surgery group had 2 deaths within 60 days, with both due to other coexisting problems.

Table 1

Parameter	MISS	Open Surgery	p-value
Number of patients	17	24	
Mean age	65.5 ± 12.5	56.6 ± 11.9	0.026
Male sex	12 (70.6)	15 (62.5)	0.591
Female sex	5 (29.4)	9 (37.5)	
Comorbidities			
Diabetes (%)	5 (29.4)	5 (20.8)	0.529
Hypertension (%)	10 (58.8)	11 (45.8)	0.412
CAD	3 (17.7)	1 (4.2)	0.152
Chronic kidney disease (%)	2 (11.8)	3 (12.5)	0.943
Chronic lung disease (%)	2 (11.8)	1 (4.2)	0.357
Chronic liver disease	2 (11.8)	1 (4.2)	0.357
Karnofsky < 70	2 (11.8)	13 (54.2)	0.005
Spinal Instability Neoplastic Score	9.4	11	0.099

Patient Demographics

Table 2

Operative parameters	MISS	Open surgery	p-value
Mean operative time (m)	380	405	0.66
Estimated Blood Loss (mL)	430	783	0.021
Amount transfused (mL)	216	325	0.39
Number of levels fused	5.8	6.5	0.25
Hospital Course			
Mean length of stay after surgery (d)	13.2	12.3	0.74
30 day outcomes			
American Spinal Injury Association score			
Improved	4 (24)	10 (42)	0.444
Stable	11 (65)	11 (45)	
Worse	2 (12)	3 (13)	
No. of Complications	1 (5.9)	3 (12.5)	0.482
No. of deaths	0 (0)	2 (8.3)	0.222

Results

Conclusions

MISS for spinal metastases is a safe and effective approach for decompression and stabilization compared with standard open surgery. Increased ability to perform MISS in emergent settings as well as larger prospective studies are needed.

References

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