The Clinical Utility of the Spinal Instability Neoplastic Score (SINS) and its Role in Surgical Management of Patients With Spinal Metastatic Disease

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Introduction

Metastatic destruction of integral spinal elements increases the risk of instability, pain and neurologic deficits. The Spinal Instability Neoplastic Score (SINS) is used to assess mechanical instability based on radiographic and clinical factors. We conducted this study to evaluate the clinical utility of SINS in surgical decision-making in spinal metastasis and its association with metastatic epidural spinal cord compression (MESCC).

Research question

Does SINS correlate with:

1) different treatment strategies in spinal metastasis ?
2) degree of functional disability and spinal cord cord compression?
3) survival post-spinal metastasis ?

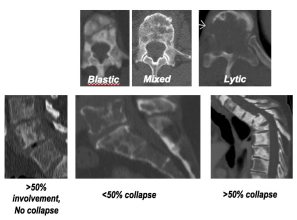
The Spinal Neoplastic Instability Score (SINS)

Spinal Instability Neoplastic Score (SINS)

Location	Bone met	Pain	Vertebral collapse	Deformity	Posterolateral involvement
0=rigid spine 1=Semi-rigid spine 2=Mobile spine 3=Junctional spine	0=none 1=non-mechanical 3=mechanical	0=blastic 1=mixed 2=lytic	0=none 1= >50% involvement, No collapse 2= <50% collapse 3= >50% collapse	0=None 2=kyphosis/scoliosis 4=Translation	0=none 1=unilateral 3=bilateral

Scores 1-6 → Stable
Scores 7-12 → potentially unstable
Scores 13-18 → unstable

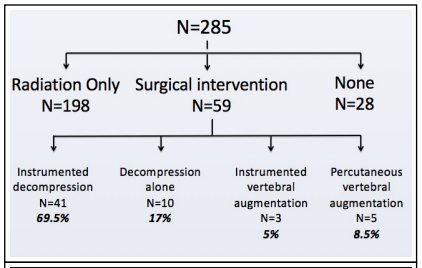
Examples of SINS categories



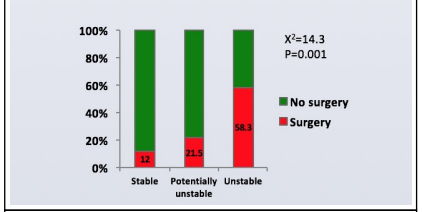
Methods

We allocated 285 patients with spinal metastatic disease using an oncology database, with their disease characteristics identified through a retrospective review. SINS was calculated using good-quality computed tomography (CT) imaging studies. The degree of MESCC was assessed using 0 to 3 grading system.

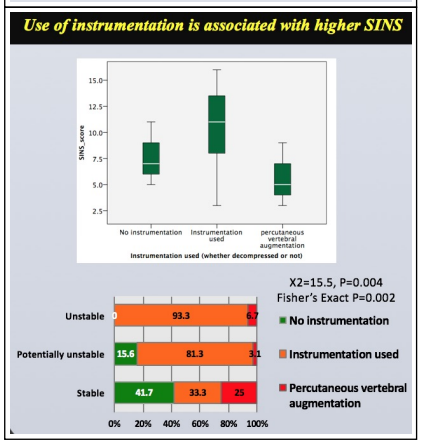
Results



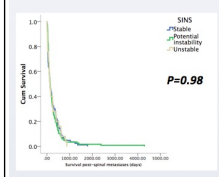
SINS categories correlate with surgical interventions in spinal metastatic disease



Use of instrumentation is associated with higher SINS

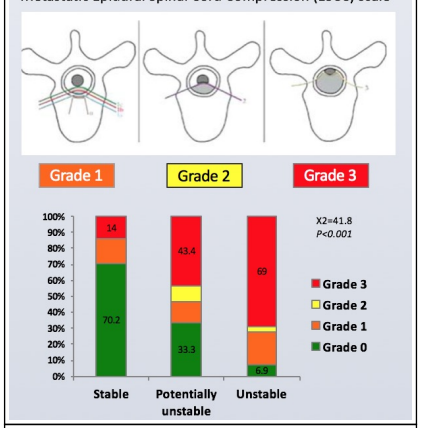


SINS is not associated with differences in survival post-spinal metastases

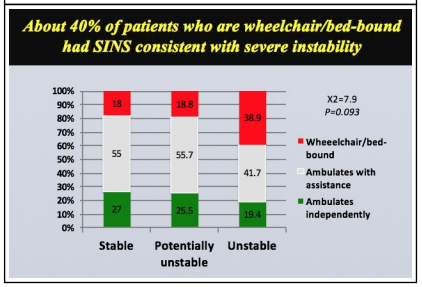


SINS class	Mean±SD (d)
Stable	269.6±35.6
Potentially unstable	279.9±45.2
Unstable	220.4±45.9

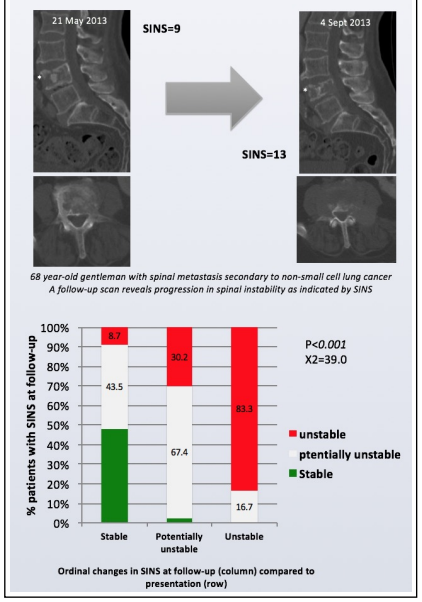
Higher SINS categories are associated with severe metastatic epidural spinal cord compression



About 40% of patients who are wheelchair/bed-bound had SINS consistent with severe instability



Ordinal changes in SINS categories at average 12.1±8.1 months follow-up in the radiation group (N=93)



Conclusions

- Higher spinal instability scores are associated with surgical interventions in the treatment of spinal metastases and correlate with the use of instrumentation
- There is no relationship between the degree of spinal instability and survival post-spinal metastases
- Metastatic epidural spinal cord compression is associated with higher degrees of spinal instability
- SINS helps predicts development of instability in patients treated with radiation

References

- Fisher CG, DiPaola CP, Ryken TC, Bilsky MH, Shaffrey CI, Berven SH, et al. A novel classification system for spinal instability in neoplastic disease: an evidence-based approach and expert consensus from the Spine Oncology Study Group. Spine. 2010;35(22):E1221-9.
- Moulding, H. D., Elder, J. B., Lis, E., Lovelock, D. M., Zhang, Z., Yamada, Y., & Bilsky, M. H. (2010). Local disease control after decompressive surgery and adjuvant high-dose single- fraction radiosurgery for spine metastases. J Neurosurg Spine, 12(1), 87-93.