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Whitehouse, Samantha, Stephenson, John, Sinclair, V., Gregory, J., Mohammad, S. and Verma, R.

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# A Validation of the Oswestry Spinal Risk Index

Samantha Whitehouse FRCS (Tr & Orth)  
ST7 Orthopaedics North West Deanery

Stephenson J, Sinclair V, Gregory J, Mohammad S, Verma R



# Background

- ♦ Oswestry Spinal Risk Index (OSRI) published in 2013 (Balain et al) aims to predict survival in patients with spinal metastases
- ♦ Cohort of 199 patients with spinal metastases
- ♦ Primary tumour pathology and general condition most important factors in predicting survival:  $OSRI = PTP + 1 - GC$
- ♦ Predicted survival important factor when planning treatment
- ♦ Less need for lengthy investigations when time is of the essence

# Methods

- ♦ Salford Royal Foundation Trust neurosurgical database
- ♦ Prospectively recorded acute referrals to on call spinal surgery and neurosurgery
- ♦ Notes reviewed to identify patients undergoing surgery for spinal metastases between January 2009 & November 2011
- ♦ Primary tumours of the spine or intradural tumours excluded

# Methods

- ♦ 100 patients identified
- ♦ Primary Tumour Pathology (PTP) score allocated based on system used by Tomita et al: based on speed of growth of primary tumour
- ♦ General condition score allocated with the categories used by Balain et al, based on the Karnofsky Performance Status
- ♦ Kaplan-Meier survival analysis conducted to compare survival between patients with varying OSRI scores

# Methods

- ♦ Median survival times with 95% confidence intervals determined for each OSRI score
- ♦ Pairwise comparison of survival between groups assessed using Mantel-Cox log rank statistic
- ♦ Nagelkerke's pseudo- $R^2$  statistic evaluated for a logistic regression analysis of patient survival using the OSRI score as a predictor

# Results

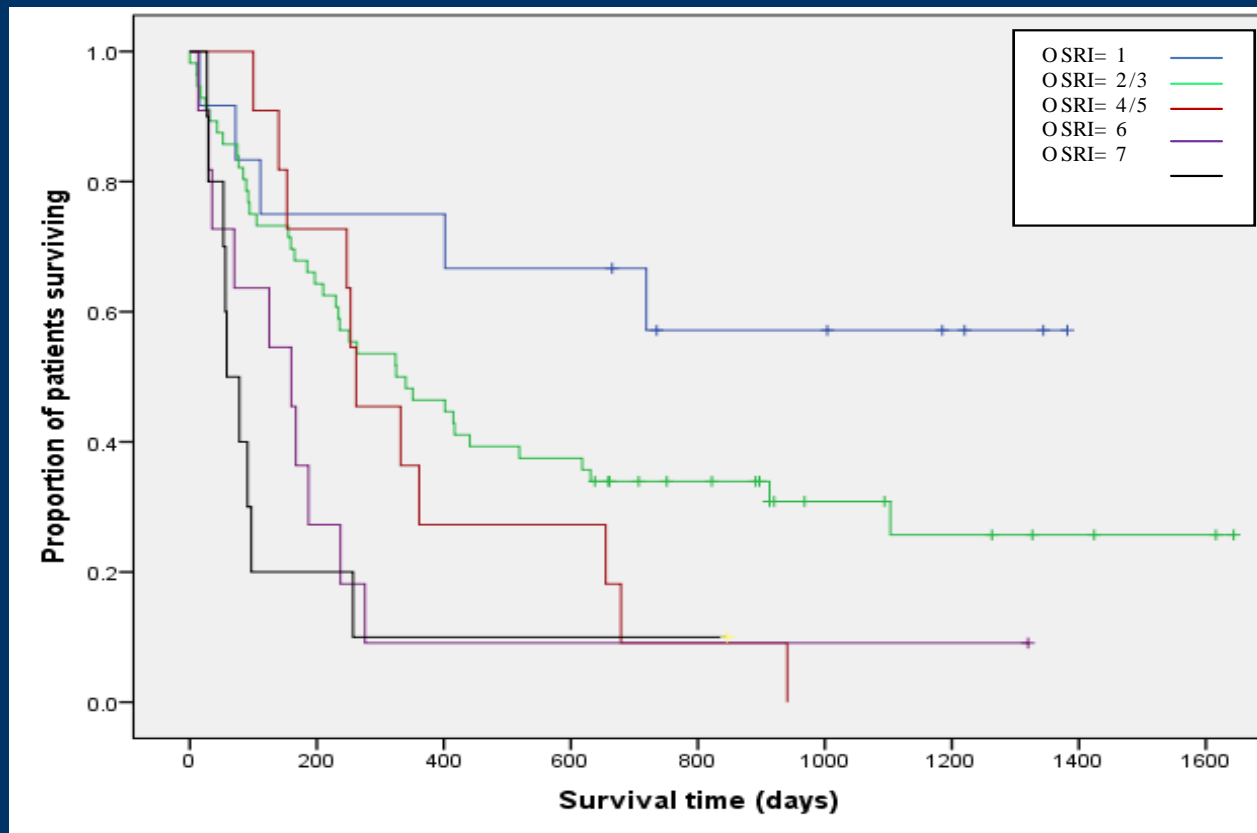
- ♦ Mean age 60.3 years (19-88)
- ♦ Most common tumour type: breast (n=24) followed by lung (n=20)
- ♦ 74 patients died during analysis period
- ♦ Analysis undertaken July 2013

## Median survival times and confidence intervals for patients with differing OSRI scores

<i>OSRI score</i>	<i>Median survival time (days)</i>	<i>95% CI for survival time (days)</i>
1 (n=12)	>50% survived until end of analysis	>50% survived until end of analysis
2/3 (n=56)	325	140-510
4/5 (n=11)	262	170-354
6 (n=11)	160	55-265
7 (n=10)	58	24-92
All (n=100)	253	165-341



# Survival curves for patients with varying OSRI scores



# Results

- ♦ Nagelkerke's pseudo- $R^2$  statistic of 0.145 obtained for logistic regression analysis of patient survival (OSRI score single predictor)
- ♦ 0.167 when patient ages were included as a controlling variable
- ♦ Balain et al, proposing the OSRI found this score to have a Nagelkerke's  $R^2$  of 0.28.

# Results

- ♦ The hazard ratio of 1.75 obtained for the OSRI score indicates that the hazard of death is raised by 75% for each advance in the OSRI classification.
- ♦ Using logistic regression (controlled for age model) 76% of patients were correctly classified.

# Discussion

- ♦ The OSRI is a significant predictor of survival in our patient population
- ♦ It is a useful tool when considering surgical treatment for patients with spinal metastases.
- ♦ The index has demonstrated good transferability across data sets, self-consistency and predictive capability in a validated study.
- ♦ We recommend its use.