

ABSTRACT NO:29
META-ANALYSIS**Comparative Analysis of Prognostic Scoring Systems for Survival Prediction in Patients Undergoing Surgery for Spinal Metastases: A GRADE-approached Systematic Review and Meta-Analysis**

Kanchan Chaudhary¹, Mohammad A Zaied², Abdallah Shawwa³, Hamza Ahabbane⁴, Mira alnaser Khashman⁵, Moath Naser⁶

Abstract

Objective: Accurate estimation of survival is fundamental to guiding surgical decision-making in patients with spinal metastases. Several prognostic scoring systems have been developed, yet their relative accuracy remains uncertain. This review aimed to compare the discriminatory performance of six widely used models, Revised Tokuhashi, Tomita, Modified Bauer, Skeletal Oncology Research Group (SORG) Machine Learning, SORG Classic, and SORG Nomogram, in predicting postoperative survival.

Methods: This review adhered to the PRISMA 2020 guidelines and was prospectively registered with PROSPERO (CRD420251056914). PubMed, Scopus, and Web of Science were systematically searched to identify studies from 2014 until July/2025 and researched on 26th/January/2026, involving adults with spinal metastases treated surgically that reported time-specific AUROC or concordance index (C-index) for at least two of the aforementioned prognostic models. Data extraction and quality assessment were independently performed using the QUADS-2 tool. Random-effects meta-analyses (REML) of logit-transformed AUROCs were conducted at 3, 6, and 12 months intervals.

Results: Seventeen studies encompassing 4465 patients published between 2014 and 2025 were included. Tomita, Revised Tokuhashi, Modified Bauer scores demonstrated moderate discriminatory performance (pooled AUROC 0.60–0.69) across all time intervals, while the SORG Nomogram achieved the highest pooled performance with AUROC values of 0.72 (95% CI, 0.68–0.76) at 3 months and 0.73 (95% CI, 0.68–0.79) at 12 months while high heterogeneity ($I^2 = 52\text{--}96\%$) indicated variable performance across studies.

Conclusion: As prognostic models exhibit only moderate accuracy in survival prediction, with the SORG Nomogram performing best. Integration of such models within multidisciplinary frameworks like LMNOP may improve individualized surgical planning and optimize patient outcomes with metastatic spine disease.

Keywords: Spine metastases, Surgery, Survival Prediction, AUROC.

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¹Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan,

²Faculty of Medicine, Jordan University of Sciences and Technology, Irbid,

Jordan, ^{3,5}School of Medicine, University of Jordan, Amman, Jordan,

⁴University Hassan II, Faculty of Medicine and Pharmacy of Casablanca,

Casablanca, Morocco, ⁶Faculty of Medicine, Hashemite University, Al-Zarqa,

Jordan

Correspondence: Mohammad A Zaied

Email: Dr.zaied.mohammad@gmail.com

ORCID ID: 0009-0000-3742-5684