Development and validation of clinical prediction models of survival and clinical outcomes for patients with metastatic epidural spinal disease: A systematic review

Anick Nater MD; Jetan H. Badhiwala MD; James Hong; So Kato; Melanie Anderson; David Choi FRCS, ChB, PhD; Michael G. Fehlings MD PhD FRCS(C) FACS
[Institution]

Click To Add Logo

Introduction

In multivariable prognostic research, the development and external validation are the first phases typically involved towards the establishment of clinical prediction models (CPMs) in practice. This systematic review aims to identify and assess CPMs created to predict clinical outcomes in patients with metastatic epidural spinal disease (MESD) and subsequent validation studies.

Methods

Three electronic databases were searched (January 1, 1990 to June 20, 2017), without language restriction, to identify studies that developed or evaluated CPMs predicting any clinical outcomes in adult patients with MESD (PROSPERO: CRD42017072908). Selected studies were then assessed based on their accordance with the Transparent Reporting of a multivariable prediction model for Individual Prognosis Or Diagnosis (TRIPOD) statement.

Results

Among 7,275 unique full-text articles, 106 were included. Among the 42 articles describing the development of a CPM, 25 did not include any assessment related to internal validity/model performance while 13 reported the number of outcome events and 5 how missing data were handled and only one allowed to obtain outcome predicted probabilities. We identified 79 studies evaluating CPMs. Among the 25 articles with the term “validation”, “validated” or “validity” in the title or abstract, missing data for predictors and outcome, number of outcome events, and both calibration and discrimination were specifically mentioned in 8, 15 and 3 studies, respectively.

Conclusions

Since 1990, over 40 CPMs predicting clinical outcomes in patients with MESD were developed and 76 studies performing some sort of evaluation of these CPM were published. Based on the items included in the TRIPOD statement, the majority of these studies did not report on key methodological and data analysis elements. The lack of rigor in the development and validation of CPMs may explain why most CPMs are not generally used in clinical practice.

Learning Objectives

This systematic review aims to identify and assess CPMs created to predict clinical outcomes in patients with metastatic epidural spinal disease (MESD) and subsequent validation studies.

References