11486 - Can A Single Tool Provide One, Three, Six, And 12-Month Survival Estimates In Patients With Metastatic Bone Disease?

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Background:

Survival estimates are important for patients living with metastatic bone disease, because they can help set patient, family, and physician expectations. In addition, objective means of estimating survival can used to guide surgical decision-making and to risk stratify patients for randomized clinical trials. Though tools have been designed to estimate three and 12-month survival, recent work, including a survey of the Musculoskeletal Tumor Society Membership indicated that estimates of survival at one and six months post surgery would also be helpful.

Question/Purpose:

We asked whether a single tool could provide one, three, six and 12-month survival estimates in patients undergoing surgery for metastatic bone disease.

Patients and Methods:

We used a new international skeletal metastasis registry designed to collect data from a variety of countries with differing treatment philosophies. Data from Memorial Sloan-Kettering Cancer Center (n=189) served as the training set. We adapted an existing Bayesian Belief Network originally designed to estimate the likelihood of three and 12-month survival, to determine whether it could also be used to provide estimates at one and six months post surgery. Data from eight major referral centers across Scandinavia (n=815) served as the external validation set. For each model, we calculated the area under the receiver operator characteristic curve (AUC) as a metric of accuracy, as well as the net benefit using decision curve analysis to determine whether the models were suitable for clinical use.

Results:

On external validation, the AUC for the one and six-month models was 0.762 and 0.759, respectively. Decision curve analysis indicated that the models conferred positive net benefit, indicating each could be used in a clinical setting, rather than assume all patients, or no patients would survive greater than one or six months, respectively.

Conclusions:

The Bayesian approach appears well suited for estimating survival in this patient population. When combined with the previously developed models, this tool generates objective estimates of survival at one, three, six and 12 months post surgery. Decision analysis confirms that it is suitable for clinical use, and may now be used to guide surgical decision making, or as a risk stratification method in support of future clinical trials.