

MULTI-FACTOR PREDICTION MODEL FOR ESTIMATING SURGICAL REMISSION IN ACROMEGALY PATIENTS

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BACKGROUND:

Growth hormone-secreting adenomas are difficult to manage due to their complex and variable biological behavior. Surgical resection is the primary treatment, with somatostatin receptor ligands being the first-line medical treatment. Predicting treatment outcomes in this tumor is complex due to variable remission rates (24-65%) influenced by tumor size, invasiveness, and preoperative hormone levels. The concept of "difficult" or "aggressive" GH-secreting pituitary adenoma includes tumors resistant to standard treatments, exhibiting invasive growth, high proliferation rates, and recurrence. This heterogeneity in tumor behavior and treatment response necessitates a multidisciplinary approach to achieve complete remission.

OBJECTIVE:

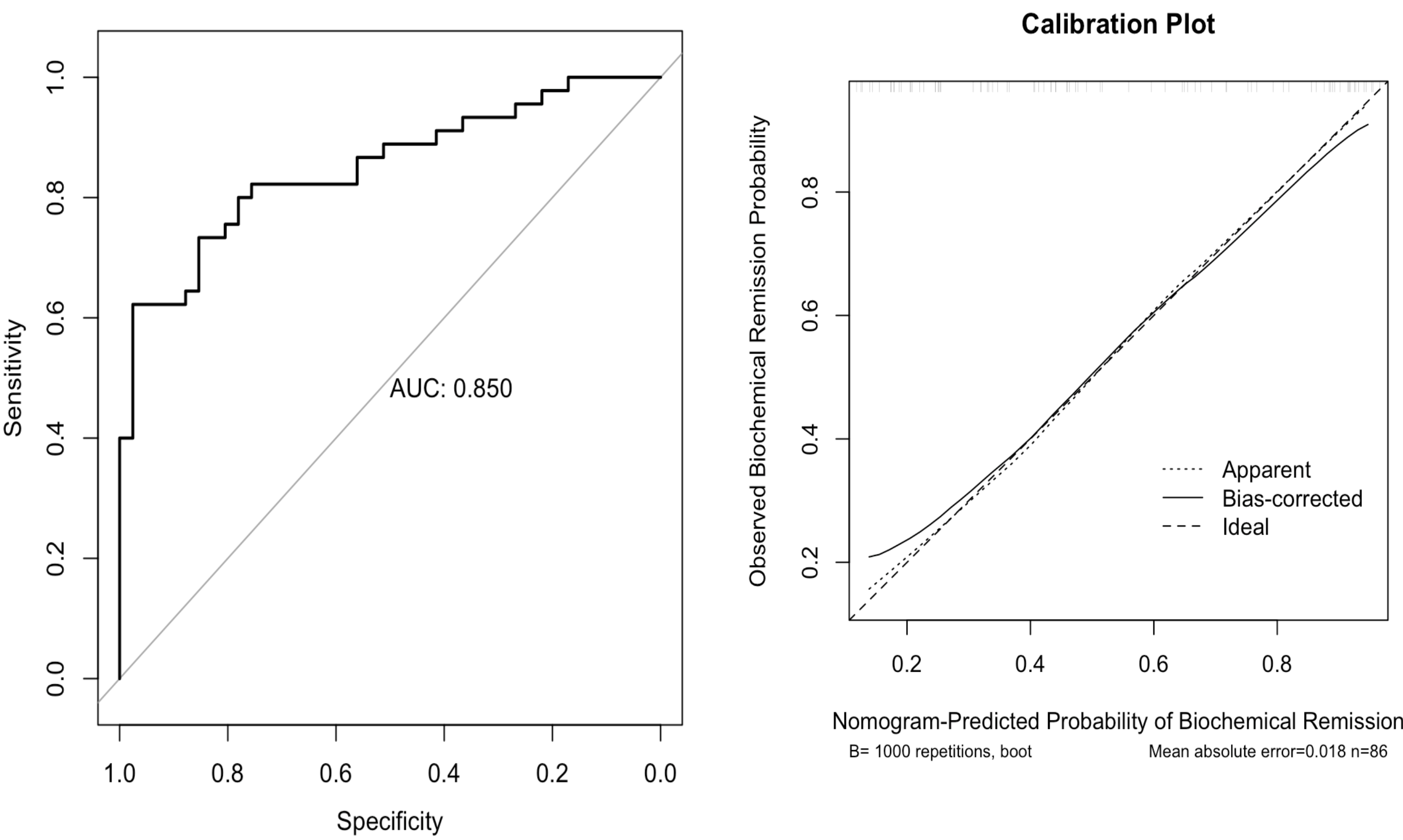
This study aimed to develop and validate a multi-factor model to predict surgical remission in patients with acromegaly.

METHODOLOGY:

We performed a retrospective study involving 86 acromegaly patients who underwent surgery at our institution between July 2014 and July 2024. Key variables that were collected included demographic information, clinical features, preoperative biochemical markers (GH and IGF-1 levels), histopathological markers, and radiological characteristics (tumor size, cavernous sinus invasion). Surgical details and post-operative outcomes, specifically remission status at 3 months and 1 year post-surgery, were recorded. A standard statistical analysis was performed. Model performance was evaluated using metrics such as the area under the receiver operating characteristic curve (AUC-ROC), accuracy, sensitivity, and specificity.

RESULTS:

The mean age of patients was 48 years, with 45 males and 41 females. The median preoperative tumor volume was 3.19 cm³. The mean extent of resection was 91.95%, and gross total resection was achieved in 54 (62.79%) patients. Of the 86 patients, biochemical remission was achieved in 45 (52.32%) patients. Older age, lower Knosp grade, and rounded tumor shape increased remission probability, while a high Knosp grade significantly reduced it. Stereotactic radiosurgery was required for seven patients.



CONCLUSION:

Our study demonstrates that a multi-factor prediction model incorporating demographic, radiological, and biochemical factors can effectively estimate surgical remission in acromegaly patients. Key predictors of remission included older age, lower Knosp grade, and rounded tumor morphology, while high Knosp grade significantly reduced remission probability. The model’s performance metrics highlight its potential utility in clinical decision-making, enabling personalized risk stratification and guiding postoperative management.