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## Evaluation of the GATIS score for predicting prognosis in rectal neuroendocrine neoplasms

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### Abstract

The GATIS score, developed by Zeng *et al*, represents a significant advancement in predicting the prognosis of patients with rectal neuroendocrine neoplasms (R-NENs). This study, which included 1408 patients from 17 major medical centres in China over 12 years, introduces a novel prognostic model based on the tumour grade, T stage, tumour size, age, and the prognostic nutritional index. Compared with traditional methods such as the World Health Organization classification and TNM staging systems, the GATIS score has superior predictive power for overall survival and progression-free survival. With a C-index of 0.915 in the training set and 0.812 in the external validation set, the GATIS score's robustness and reliability are evident. The study's use of a large, multi-centre cohort and rigorous validation processes underscore its significance. The GATIS score offers clinicians a powerful tool to accurately predict patient outcomes, guide treatment decisions, and improve follow-up strategies. This development represents a crucial step forwards in the management of R-NENs, addressing the complexity and variability of these tumours and setting a new benchmark for future research and clinical practice.

**Key Words:** GATIS score; Rectal neuroendocrine neoplasms; Prognostic model; Overall survival; Multicentre study

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**Core Tip:** Compared with traditional methods, the GATIS score is a novel, highly accurate prognostic tool for rectal neuroendocrine neoplasms, offering superior predictive power for overall and progression-free survival.

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## TO THE EDITOR

We highlight a groundbreaking study by Zeng *et al*[1], which presents a novel prognostic tool for rectal neuroendocrine neoplasms (R-NENs) – the GATIS score. This research encompasses data from 1408 patients across 17 major medical centres in China over a span of 12 years, making it one of the largest studies in this domain to date.

### Significance of the study

Existing prognostic methods for R-NENs, such as the World Health Organization (WHO) classification and TNM staging, have notable limitations[2]. While the WHO classification system offers a broad framework, it often fails to stratify patient prognosis effectively for R-NENs specifically. Similarly, the TNM staging system, with its intricate criteria, has limited predictive power. The GATIS score, developed by Zeng *et al*[1], addresses these shortcomings by incorporating multiple independent prognostic factors identified through advanced statistical models.

### Key findings

The GATIS score, a novel prognostic model, has emerged from a meticulous 12-year multicentre study involving 1408 patients with R-NENs. This score is a culmination of an integrative analysis that combines five critical indicators: Tumour grade, T stage, tumour size, patient age, and the prognostic nutritional index[3]. The groundbreaking nature of the GATIS score is reflected in its exceptional predictive accuracy. With a C-index of 0.915 for the training set and 0.812 for the validation set, the GATIS score not only outperforms conventional prognostic methods but also sets a new benchmark for precision in overall survival prediction. This high degree of accuracy is crucial for early-stage R-NENs, where traditional staging systems often fall short in stratifying patient risk and guiding treatment strategies. The GATIS score's ability to provide nuanced prognostic information is a testament to the power of data-driven medicine in advancing clinical practice[4].

### Strengths and validation

The strength of the GATIS score study is anchored in its robust methodology and extensive patient cohort, which spans 17 major referral hospitals in China. This multicentre approach ensures a diverse and representative sample that enhances the applicability of the findings to broader patient populations. The study's internal and external validation processes are executed with precision, utilising random forest and Cox proportional hazard models to identify risk factors and construct the nomograms. The validation sets, comprising 30.8% of the total patient data, serve as a critical component in affirming the GATIS score's predictive capabilities. Decision curve analysis adds another layer of validation, revealing that the GATIS score offers a significant net benefit over single-factor predictions, particularly in identifying high-risk patients who may require more aggressive treatment interventions[5]. This comprehensive validation process cements the GATIS score as a reliable and clinically relevant tool in the oncological field.

### Clinical implications

The clinical implications of the GATIS score are profound, offering a transformative approach to managing R-NENs. For clinicians, the GATIS score serves as an indispensable decision-making aid, enabling a more granular understanding of each patient's risk profile[6]. This nuanced insight is vital for tailoring treatments to individual patient needs, optimising therapeutic outcomes, and minimising unnecessary interventions. In the context of neuroendocrine neoplasms, the development of the GATIS score represents a significant advancement in predicting R-NENs, fully leveraging the power of radiomics and machine learning. Studies conducted within various organisations have focused on classifying different tumours *via* magnetic resonance imaging radiomics, but the methodologies employed provide a roughly similar framework for how advanced analytics can enhance the accuracy of tumour characterization[7]. Similarly, the GATIS score utilises these advanced technologies to provide a standardised metric for prognostic stratification in R-NENs, highlighting the potential of such approaches in the field of personalised oncological care. Moreover, the GATIS score's predictive strength can inform clinical decisions, similar to other machine learning-based models developed for neuroendocrine tumours, which have shown potential in improving survival prediction and guiding individualised treatment strategies[8].

In assessing the significant advancements of the GATIS score, we also recognise its inherent limitations. Although the GATIS score demonstrates superior accuracy in predicting the prognosis of patients with R-NENs, it is still based on currently available clinical and pathological data. With the discovery of future biomarkers and the application of emerging detection technologies, the GATIS score may require further refinement and validation to ensure its ongoing

relevance and predictive power. We look forward to future research exploring these potential improvements, thereby perfecting the GATIS score to improve clinical decision-making.

## CONCLUSION

Zeng *et al*'s study[1] is a landmark contribution to the field of neuroendocrine neoplasm research. The GATIS score not only fills a critical gap in the prognostic assessment of R-NENs but also sets a new benchmark for future research and clinical practice through its robust validation across multiple centres. Like other multicentre studies, such as the nomogram developed for gastric neuroendocrine carcinoma, which utilise data from numerous institutions, the GATIS score emphasises the value of large-scale collaborations in improving prognostic accuracy and enhancing clinical decision-making[9]. The implementation of the GATIS score in clinical settings is anticipated to significantly enhance our ability to provide personalised and effective care for patients with R-NENs.

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## FOOTNOTES

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