

# Development and validation of a preoperative Ultrasonography-based nomogram to predict occult cervical lymph node metastasis in micropapillary thyroid cancer



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## Introduction

- Ultrasound is currently the first recommended imaging method for thyroid cancer (TC) because of its sensitivity in identifying tumor features such as irregular margins and punctate echogenic foci. Meanwhile, almost all patients with micropapillary thyroid cancer (MPTC) are inadvertently detected on ultrasound.
- However, ultrasonography does not effectively address the identification of centralized lymph node metastases (CLNM) in patients with TC. The incidence of CLNM in PTC is as high as 30%-80%, and the probability of unrecognized, occult, or microscopic CLNM in MPTC ranges from 30%-62, which almost suggests that Some types of MPTC may also lead to a poor prognosis and require exhaustive analysis.
- The aim of this study was to investigate whether the occurrence of occult CLNM in patients with MPTC could be predicted preoperatively by noninvasive ultrasonography using ultrasound characteristics of MPTC patients and clinical data, and to further guide clinical activities.

## Materials and methods

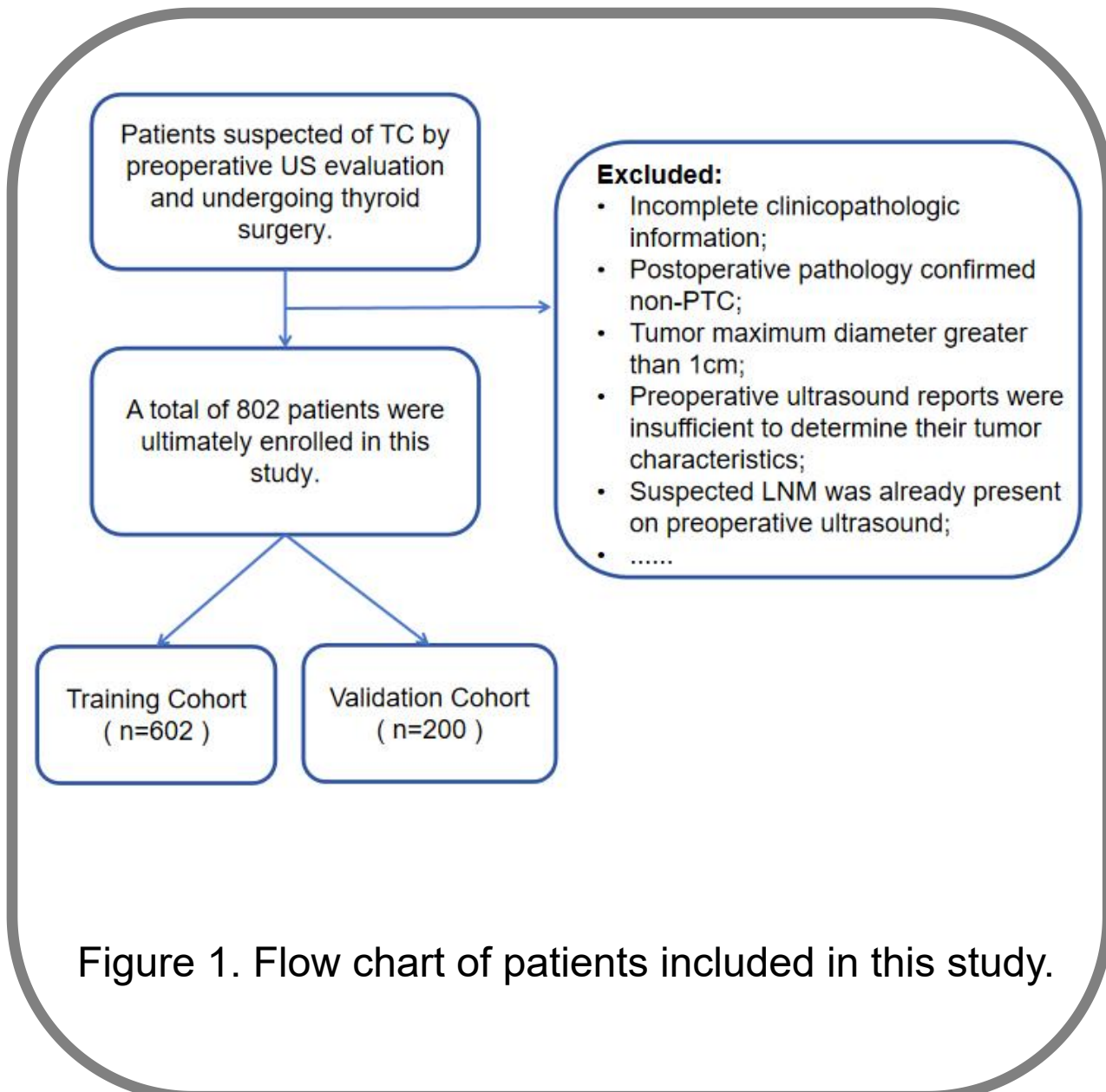


Figure 1. Flow chart of patients included in this study.

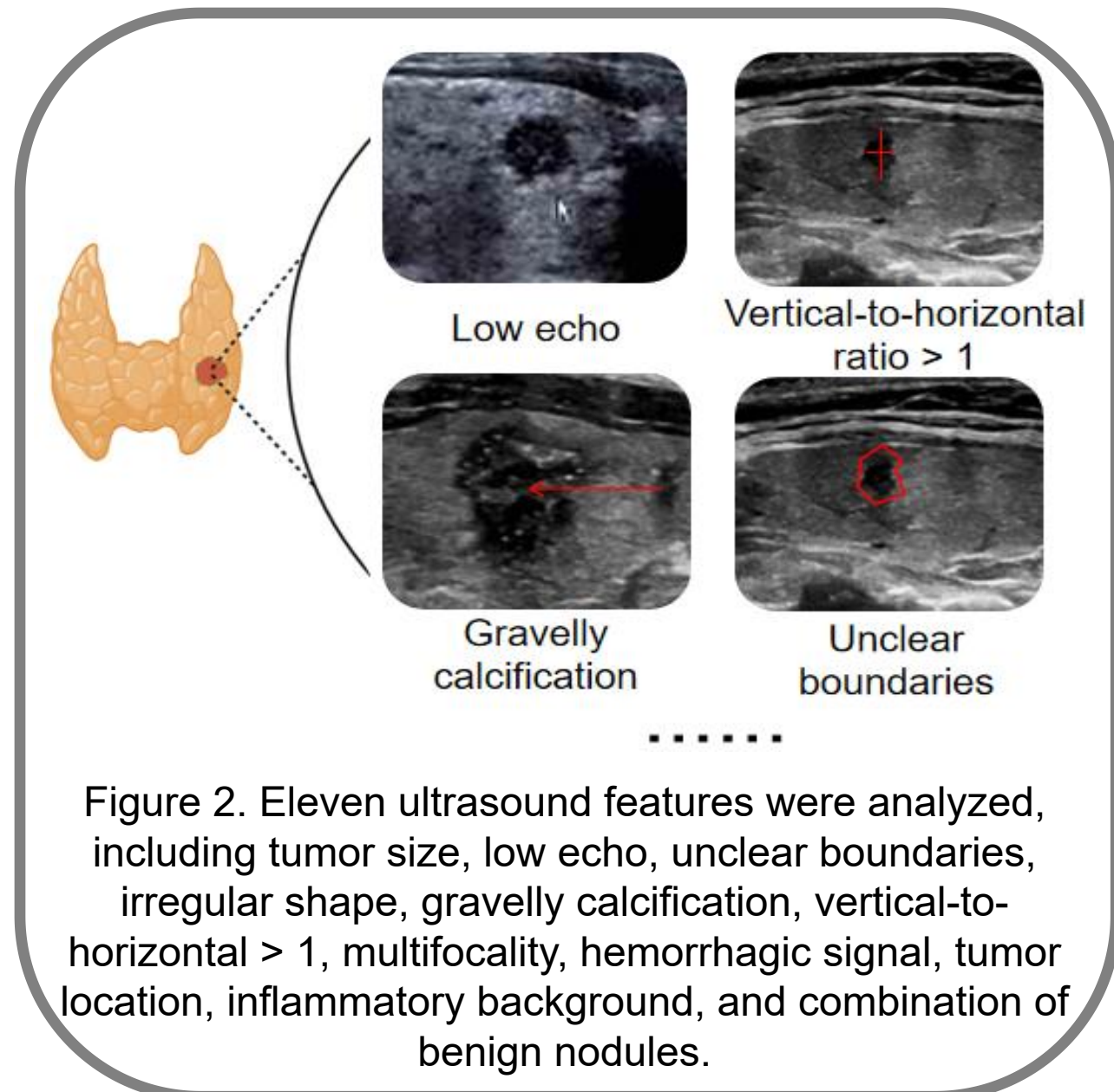


Figure 2. Eleven ultrasound features were analyzed, including tumor size, low echo, unclear boundaries, irregular shape, gravelly calcification, vertical-to-horizontal > 1, multifocality, hemorrhagic signal, tumor location, inflammatory background, and combination of benign nodules.

## Results

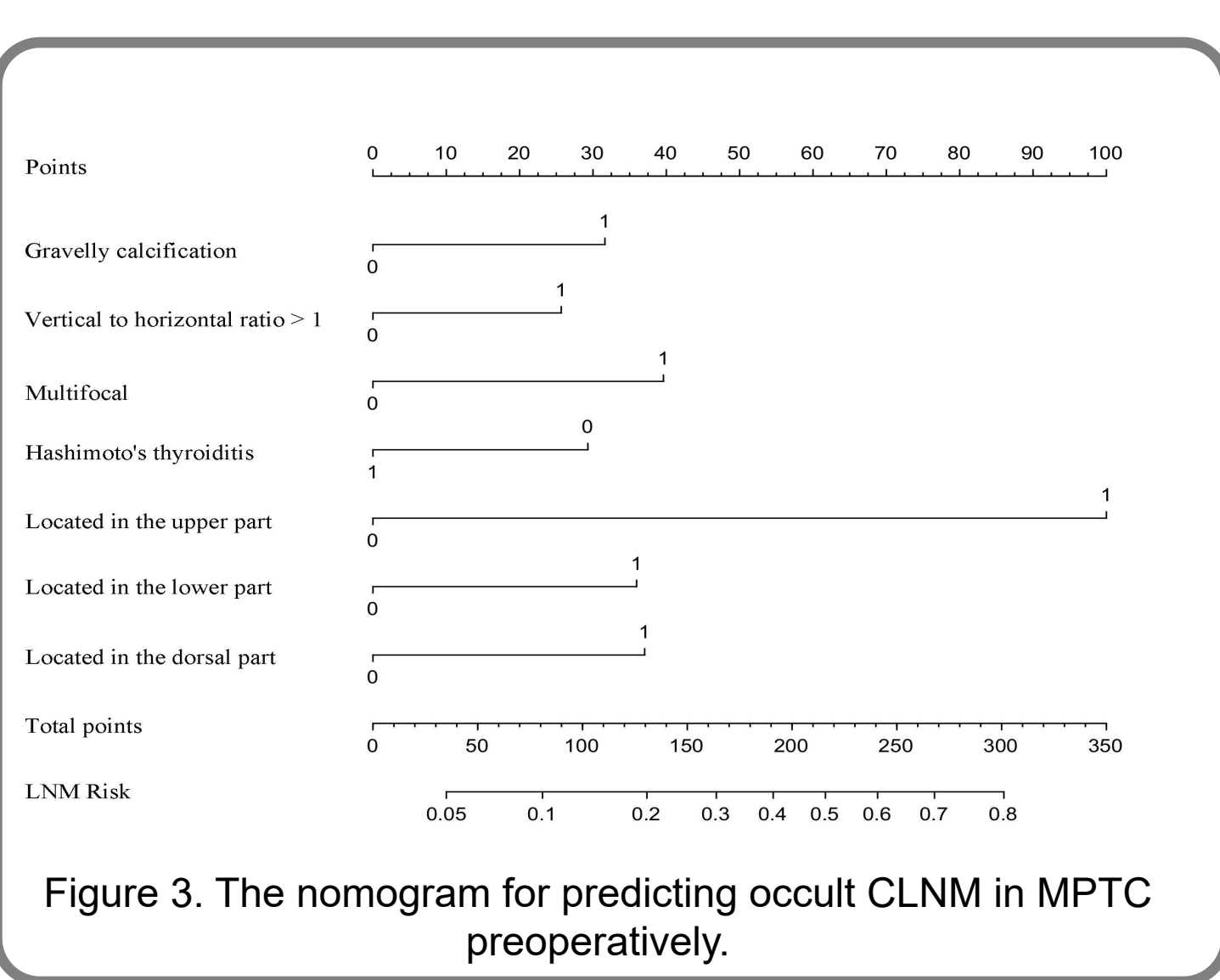


Figure 3. The nomogram for predicting occult CLNM in MPTC preoperatively.

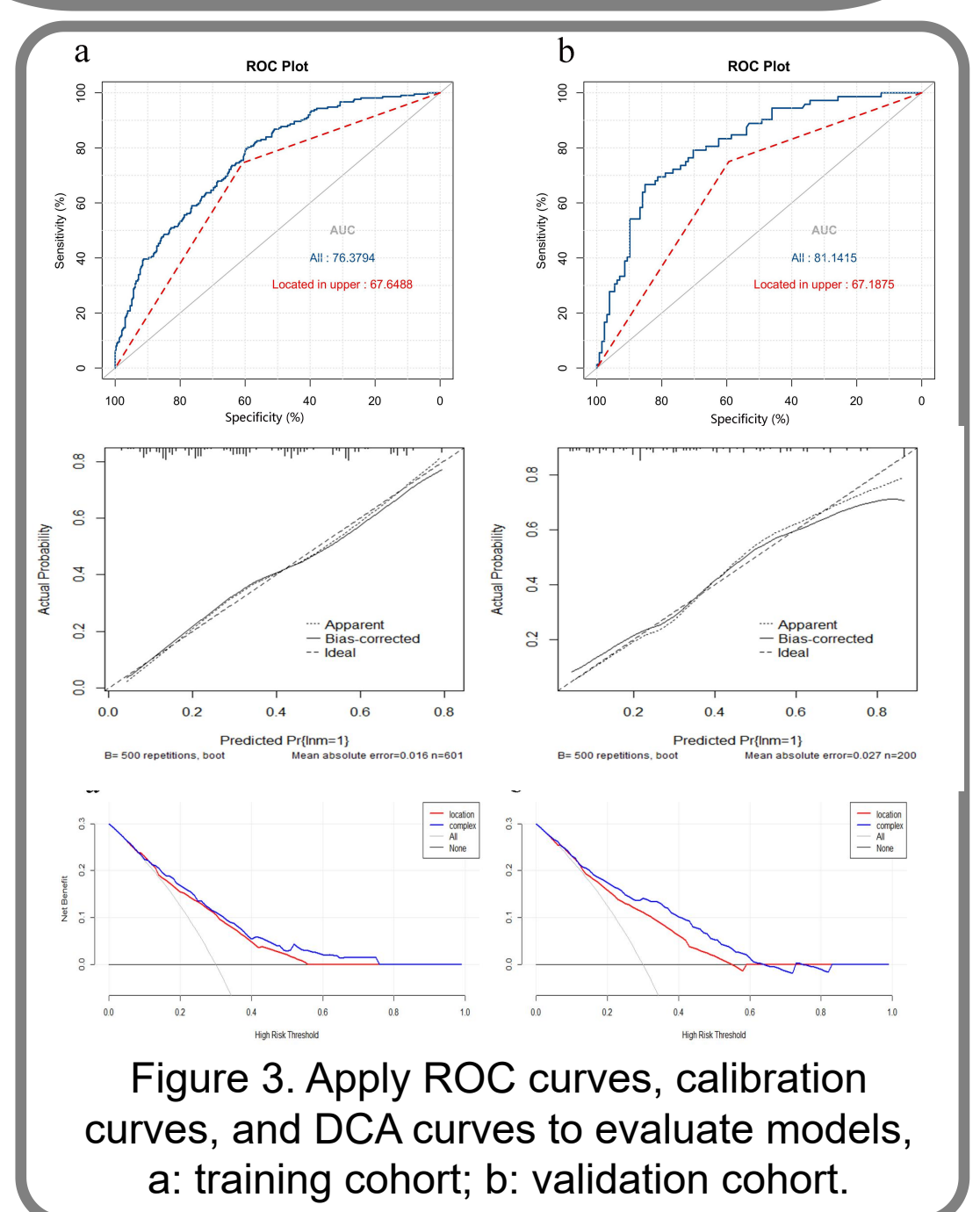


Figure 3. Apply ROC curves, calibration curves, and DCA curves to evaluate models, a: training cohort; b: validation cohort.

## Conclusion

- The presence of gravelly calcification, vertical-to-horizontal > 1, multifocality, comorbid Hashimoto's thyroiditis, and tumor location were found to be significantly associated with occult CLNM in both cohorts ( $p < 0.05$ ). Furthermore, CLNM was more likely to occur when the tumor was located in the upper, lower, or dorsal regions .
- The developed nomogram performs well in preoperative prediction of occult CLNM in MPTC and can effectively assist in clinical decision making.