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Association of tumour border configuration and stromal reaction in papillary thyroid carcinoma with lymph node metastasis

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Introduction

- Papillary thyroid carcinoma (PTC) carries an excellent prognosis, yet **lymph node metastasis (LNM)** significantly affects prognosis.
- Tumour border configuration is an established prognostic factor in several malignancies, but has **not been studied in PTC**.

Objective

To describe tumour border configuration and stromal reaction in PTC and to assess its association with lymph node metastasis.

Methodology

Design

- Retrospective cross-sectional study of **88 consecutive PTC cases** diagnosed in 2021–2023 at National Hospital, Galle and Faculty of Medicine, University of Ruhuna

Inclusion / exclusion criteria

- Confirmed PTC with documented lymph node assessment were included
- Encapsulated tumours were excluded

Variables recorded

- Tumour border: pushing vs infiltrative
- Presence / absence of stromal reaction
- LNM status; lymphovascular invasion (LVI)

Statistics

- Pearson Chi-Square and Fisher's exact test; $p < 0.05$

Results

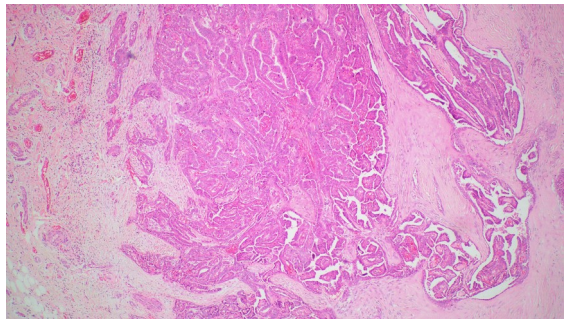


Fig. 1 H & E (×10): PTC with an infiltrative border and stromal reaction

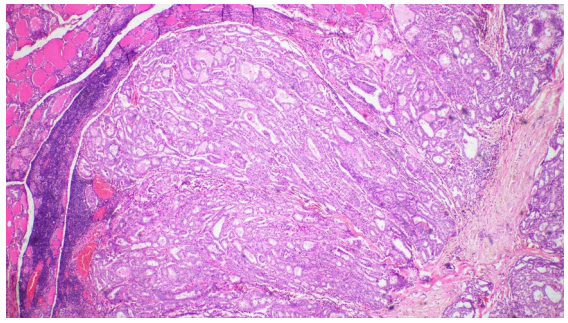


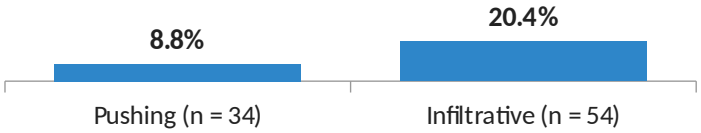
Fig. 2 H & E (×10): PTC with a pushing border and without stromal reaction

Clinicopathological data

88 PTC cases	**88.6%** female	**43.6 y** mean age ± 13.7	**79.5%** total thyroidectomy
64.8% tumour ≤ 10 mm	**33%** multifocal	**27.3%** LVI present	**15.9%** LN metastasis

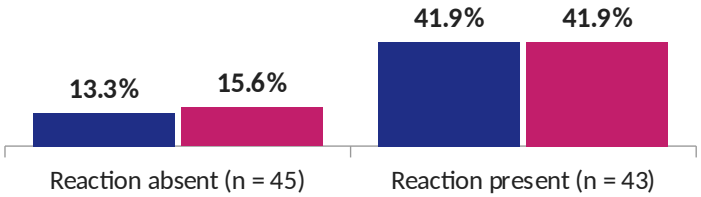
Tumour border vs lymph node metastasis

% with LNM **p = 0.149 (not significant)**



Stromal reaction vs LVI and composite LN/LVI

LVI **p = 0.003** Composite LN/LVI **p = 0.006**



Conclusion

- Infiltrative borders predominate (61.4%) but were **not significantly associated** with lymph node metastasis (p = 0.149).
- Stromal reaction at the invasive front showed a **significant positive association with LVI (p = 0.003)** and with composite LN/LVI outcome (p = 0.006).
- The tumour–stroma interaction may play a meaningful role in early tumour spread in PTC, even when border morphology alone does not predict nodal disease.

Keywords: Tumour border, PTC, Lymph node, Metastasis, LVI

Limitations and ethics

Single-region, retrospective design; only 14 LNM events limit statistical power. Approved by the Ethical Review Committee, Faculty of Medicine, University of Ruhuna. No external funding; no conflicts of interest declared.