# Relationship Between Clinicopathological Factors and Treatment Response in Thyroid Carcinoma Patients Undergoing Total Thyroidectomy and Radioablation

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## Abstract

**Background:** Differentiated thyroid carcinoma (DTC) demonstrates variable responses to total thyroidectomy followed by radioactive iodine (RAI) ablation, particularly in intermediate–high risk disease. From a surgical perspective, tumor extent and nodal involvement are critical determinants of oncologic outcome. This study evaluated clinicopathological factors associated with post-therapy response in a high-volume tertiary referral center.

**Methods:** We conducted a retrospective cohort study of intermediate–high risk DTC patients treated at RSUPN Dr. Cipto Mangunkusumo between 2020 and 2025. Eighty-five patients undergoing total thyroidectomy followed by RAI ablation were included. Surgical and pathological variables analyzed included tumor size (T stage), extrathyroidal extension (ETE), vascular invasion, multifocality, lymph node metastasis, distant metastasis, and histological subtype. Treatment response was classified according to the 2015 ATA guidelines. Associations were assessed using chi-square and Spearman correlation tests, with independent predictors identified through multivariable ordinal and polytomous multinomial logistic regression analyses.

**Results:** The median age was 47 years, with a female predominance (74.1%); papillary carcinoma accounted for 89.4% of cases. Treatment response was excellent in 40.0% of patients, biochemical incomplete in 14.1%, and structural incomplete in 45.9%. On bivariate analysis, larger tumor size, ETE, vascular invasion, lymph node metastasis, and distant metastasis were significantly associated with poorer response (all $p < 0.05$). Multivariable ordinal logistic regression identified tumor size as the sole independent predictor of worse treatment response ($p = 0.005$). Polytomous multinomial logistic regression demonstrated that ETE and lymph node metastasis independently reduced the likelihood of achieving an excellent response by approximately two-fold (Exp(B) = 0.469 and 0.503, respectively). These findings highlight the oncologic impact of local invasion and nodal disease, which may limit the effectiveness of adjuvant RAI.

**Conclusions:** In intermediate–high risk DTC, surgically relevant pathological features—particularly tumor size, extrathyroidal extension, vascular invasion, and lymph node metastasis—are strongly associated with post-therapy response. Accurate intraoperative assessment and comprehensive pathological evaluation are essential to guide surgical extent, optimize adjuvant treatment, and improve oncologic outcomes.

## Keywords

Thyroid cancer, treatment response, extrathyroidal extension, vascular invasion, total thyroidectomy, radioactive iodine ablation.