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The Effectiveness of Postoperative Radiotherapy on Thymoma: A Retrospective Cohort Study

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Published 03/19/2025

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Categories: Radiation Oncology
Keywords: general radiation oncology, invasive thymoma, malignant thymoma, radiation and clinical oncology, squamous cell thymic carcinoma, thymic epithelial carcinoma, thymic squamous cell carcinoma, thymoma mediastinal mass

How to cite this abstract
Kumaresan S, Liu Y, Thomas T (March 19, 2025) The Effectiveness of Postoperative Radiotherapy on Thymoma: A Retrospective Cohort Study. Cureus 17(3): a1540

Abstract

Purpose: Thymomas and thymic carcinomas are the most common neoplasm in the anterior mediastinum, representing 1.5% of all malignancies. The 15-year survival rate is 12.5% in those with invasive thymoma and 47% in those with noninvasive thymomas1. Thymomas are categorized into Masaoka clinical stages I-IVa/b based on capsule invasion and metastasis; the current mainstay of treatment for early stage thymomas is surgical resection while for late stage thymomas both resection and postoperative radiotherapy (PORT) has been utilized within 3 months of surgery. Due to low prevalence of this disease and lack of randomized control trials, there is uncertainty about the efficacy of PORT and when to use it. The objective of this study is to determine the progression-free survival and local control benefits of treating thymoma patients with PORT compared to those treated without.

Methodology: Data was collected from patients treated at Northwestern Memorial Hospital from January 2005 through May 2024 using the Northwestern Electronic Data Warehouse and internal Northwestern Radiation Oncology database. CPT codes were used to identify diagnosis of thymoma or thymic carcinoma and for resections of mediastinal tumors. Duplicates between the two databases were removed. Chart reviews were conducted to identify variables of interest, including the following: sex, birth date, surgical resection date, diagnosis, paraneoplastic syndrome, carcinoma subtype, tumor size, Masaoka stage, resection status, neoadjuvant/adjuvant chemotherapy, PORT dosage and fractions, PORT treatment duration, local recurrence, distant metastasis, and overall survival. Kaplan-Meier survival curves are used to analyze differences in overall survival and recurrence-free survival between the two groups.

Results: 23 patients were identified as having received resection for thymoma/thymic carcinoma without undergoing PORT, while 41 patients made up the intervention arm having received both resection and PORT. There were significant differences in the Masaoka stages ($p<0.05$) and resection status ($p<0.05$) between the two groups. There is no statistically significant difference in overall survival ($p=0.47$) and recurrence-free survival ($p=0.08$).

Conclusions: Thymoma and thymic carcinomas are extremely rare, leading to limited availability of RCTs that elucidate the effects of PORT on treatment. This study demonstrates no significant differences in overall survival or disease recurrence from the utilization of PORT. However, due to limited sample size, a larger multi-institutional review should be conducted to better understand the true effect of PORT on thymoma.