

Optimizing Radiotherapy Timing for Nasopharyngeal Carcinoma: The Impact of Radiation Scheduling on Survival

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Abstract
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Ying Li ¹, Zihan Chen ², Jue Wang ², Sufang Qiu ¹

1. Radiation Oncology, Clinical Oncology School of Fujian Medical University, Fujian Cancer Hospital, Fujian, CHN 2. Radiation Oncology, Clinical Oncology School of Fujian Medical University, Fujian, CHN

Corresponding author: Ying Li, 770193460@qq.com

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Abstract

Objectives:

Chronoradiobiology has emerged as a potential field of study with therapeutic implications for cancer treatment. We aimed to investigate the association between radiation chronotherapy and the prognosis of patients with nasopharyngeal carcinoma (NPC).

Methods:

Non-metastatic NPC patients treated with intensity-modulated radiotherapy (IMRT) in Fujian Cancer Hospital between January 2017 and December 2019 were included. Propensity score matching (PSM) with 1:1:1 was used to account for selection bias. Logistic and Cox regression analyses were performed to explore the impact of radiotherapy timing on patient survival. Sensitivity analysis was implemented to determine the size and directional stability.

Results:

1040 patients met study inclusion criteria and 332 patients were included in a PSM cohort. In the unmatched cohort analysis, morning radiotherapy exhibited a significantly superior overall survival (OS) outcome (HR: 0.60, 95% CI: 0.40-0.91, adjust log-rank $p = .028$) than afternoon one. After PSM analysis, it was observed that individuals undergoing radiotherapy in the afternoon (HR = 5.88, 95% CI: 2.55-13.58, adjusted log-rank $p = .004$) and night group (HR = 4.81, 95% CI: 1.91-12.11, adjusted log-rank $p = .018$) displayed a tendency towards shorter OS compared to the morning group. Morning radiotherapy demonstrated consistent robustness in the multivariable analysis, thereby establishing an association with higher OS. The directionality of the effect size was consistent across subgroup analysis and sensitivity analysis.

Conclusion(s):

These results underscore the potential benefits of scheduling radiotherapy in the morning for NPC management, although prospective studies are needed to confirm these findings.