Abstract Code: IUC26655-89

Pretreatment Hemoglobin-Albumin-Lymphocyte-Platelet Score, Dosimetry, and Acute Toxicity After Definitive Prostate Radiotherapy: Interim Real-World Evidence

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Abstract

Objective:

The hemoglobin-albumin-lymphocyte-platelet (HALP) score reflects nutritional and inflammatory status, but its relationship with acute radiotherapy toxicity in prostate cancer is unclear. We evaluated pretreatment HALP, dosimetric parameters, and acute genitourinary/gastrointestinal toxicity in an interim real-world prostate radiotherapy cohort.

Methods:

This single-center retrospective interim analysis included 40 patients treated with definitive external-beam radiotherapy for localized or locally advanced prostate cancer. Radiotherapy was delivered using a forward-planned field-in-field technique, and setup was verified using portal imaging. Pretreatment HALP was calculated from pre-radiotherapy laboratory values. Bladder and rectal dose-volume histogram metrics, including V70, were extracted from treatment plans. Maximum acute genitourinary and gastrointestinal toxicity grades were collected; grade ≥2 toxicity was derived from recorded maximum grades. Continuous variables were compared using Mann-Whitney U test, categorical variables using Fisher's exact test, and toxicity proportions using Wilson 95% confidence intervals.

Results:

Median age was 73.0 years (interquartile range [IQR], 64.8–75.3), and 25/40 patients had high- or very-high-risk disease. Median prostate-specific antigen was 12.04 ng/mL (IQR, 7.78–20.52). All patients received conventionally fractionated radiotherapy: 37 received 74 Gy in 37 fractions, and three received 76 Gy in 38 fractions. Median HALP was 4.74 (IQR, 3.91–6.02). Median bladder V70 was 16.8% (IQR, 10.1–21.5), and median rectum V70 was 11.45% (IQR,

9.0–13.4). Acute grade ≥2 genitourinary or gastrointestinal toxicity occurred in 20/40 patients, 50.0% (95% confidence interval [CI], 35.2–64.8). Acute grade ≥2 genitourinary and gastrointestinal toxicity occurred in 18/40 (45.0%; 95% CI, 30.7–60.2) and 8/40 (20.0%; 95% CI, 10.5–34.8), respectively. Continuous HALP did not differ significantly by acute grade ≥2 toxicity status (p=0.298). When dichotomized at the median, acute grade ≥2 toxicity occurred in 8/20 patients below and 12/20 at or above the median HALP value (Fisher's exact p=0.343).

Conclusion:

In this interim real-world cohort, acute grade ≥2 genitourinary/gastrointestinal toxicity after definitive prostate radiotherapy was common, with modest median high-dose bladder and rectal exposure. Pretreatment HALP did not show a clear standalone predictive association with acute toxicity. Larger cohorts integrating clinical, hematologic, and dosimetric factors are needed before predictive claims can be made.