

CHANGE OF THE NEUTROPHIL TO LYMPHOCYTE RATIO DURING TREATMENT: A POTENTIAL PROGNOSTIC BIOMARKER IN METASTATIC PROSTATE CANCER TREATED WITH RADIUM-223 DICHLORIDE

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Purpose

- A better understanding of the predicting treatment response is needed to optimize the use and the sequencing of available therapies in metastatic castration resistant prostate cancer (mCRPC)¹, where several life-extending therapeutic options are now available.
- The neutrophil to lymphocyte ratio (NLR) at baseline has been shown to have prognostic value in metastatic prostate cancer^{2,3}.
- Little is known about the importance of a change in the NLR during treatment in patients treated with Radium-223 (²²³Ra).
- We investigated the prognostic value of the NLR at baseline and during therapy in patients with mCRPC treated with ²²³Ra.

Materials and Methods

- Review of all mCRPC patients treated with ²²³Ra in our center from October 2013 to March 2022.
- NLR was calculated as the ratio of the absolute neutrophil count (ANC) divided by the absolute lymphocyte count (ALC).
- Patients were stratified according to NLR ≤5 and >5 at baseline and at 12 weeks of therapy.
- Overall survival (OS) was estimated by the Kaplan-Meier method and compared with the Log Rank test.
- The association between NLR measured at baseline and at 12 weeks and OS were evaluated using univariable and multivariable Cox models.
- All tests were two-sided.
- A level of significance of p < 0.05 was used.
- Study was conducted according to the Declaration of Helsinki and approved by the institutional ethics committee's (CER 21.328).

Results

- 149 patients treated with ²²³Ra were evaluated.
- Median age was 72 years (interquartile range, IQR 65–79).
- Median follow-up was 68.1 months (95% CI 20.4-Not reached).
- OS was significantly longer in patients that had a NLR ≤5 (versus >5) **at baseline** (14.5 months [95% CI 10.2–16.4] versus 8.5 months [95% CI 6.8–10.5], p<0.0001) [Figure 1(a)]
- OS was significantly longer in patients that had a NLR ≤5 (versus >5) **at 12 weeks** (15.0 months [95% CI 12.7–21.4] versus 9.5 months [95% CI 8.3–18.4], p = 0.03). [Figure 1(b)]
- Patients with a **baseline NLR ≤5 that remained ≤5 at 12 weeks** of treatment had significantly longer median survivals (16.0 months [95% CI 14.8–25.5]) compared to patients whose **NLR was ≤5 at baseline that converted at 12 weeks to >5** (9.1 months [95% CI 7.1–NR]), p=0.001. (Figure 2)

Neutrophil to lymphocyte ratio at baseline and after 12 weeks of ²²³Ra therapy is associated with **improved overall survival** in mCRPC patients.

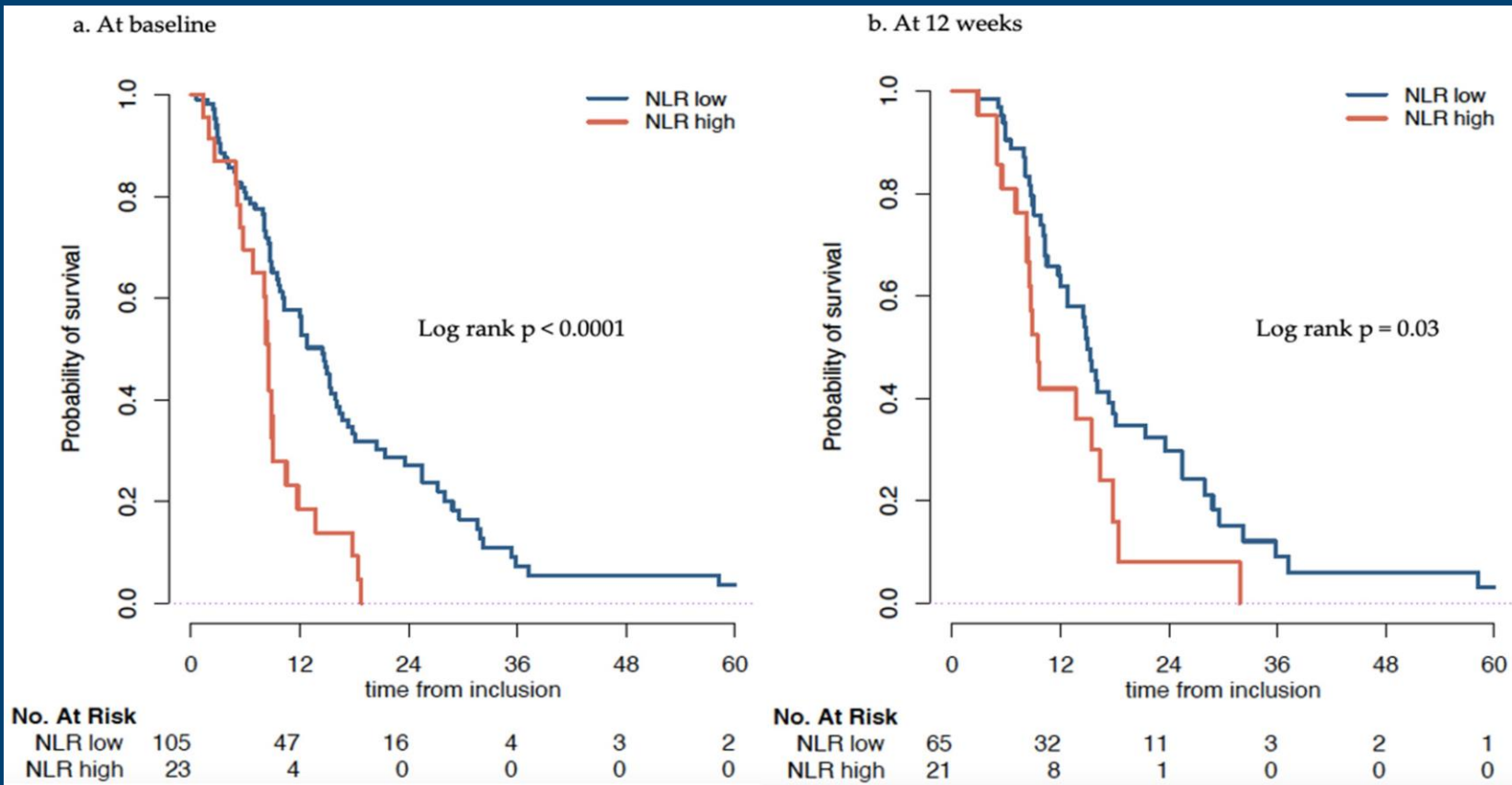


Figure 1.

Overall survival (months) of patients treated with ²²³Ra estimated by Kaplan-Meier stratified by NLR low (≤5) and NLR high (>5) at baseline (a) and at 12 weeks (b).

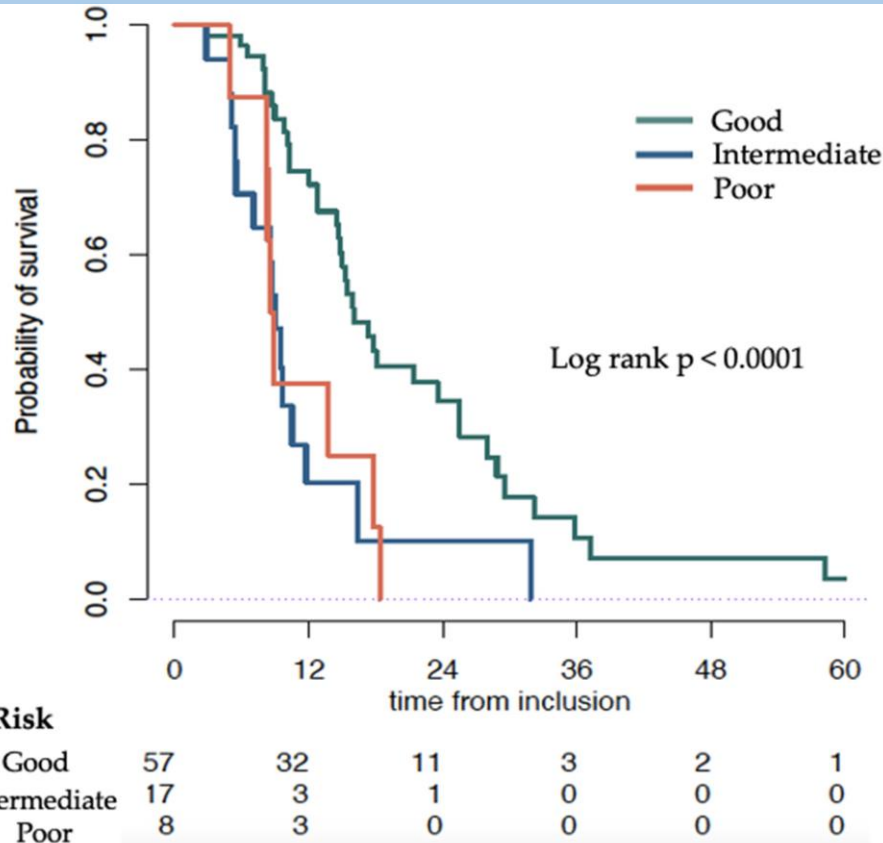


Figure 2.

Overall survival (months) of patients treated with ²²³Ra estimated by Kaplan-Meier stratified by NLR score: Good (NLR ≤ 5 at baseline and at 12 weeks), Intermediate (NLR ≤ 5 at baseline and >5 at 12 weeks) and Poor (NLR > 5 at baseline and at 12 weeks).

Discussion

- Median OS consistent with the phase 3 ALSYMPCA study⁴
- Baseline NLR association with OS in ²²³Ra-treated patients well recognized^{5,6}
- Unique finding : change of the NLR at 12 weeks is a prognostic factor
- No consensus on ideal cutoff defining low and high NLR
- NLR is a low-cost and minimally invasive biomarker

References

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