The neutrophil-to-lymphocyte ratio in clinical practice

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We read with great interest the article, "Evaluation of neutrophil-to-lymphocyte ratio prior to prostate biopsy to predict biopsy histology: Results of 1836 patients," by Gokce et al.[1] Investigators aimed to evaluate the role of neutrophil-to-lymphocyte ratio (NLR) prior to prostate biopsy to predict biopsy histology and Gleason score in patients with prostate cancer.

The mean NLR of the prostate cancer group was significantly higher than that of the benign prostatic hypertrophy (BPH) group (p=0.002). The mean NLR of the prostatitis group was higher than that of both the prostate cancer and BPH groups (p=0.0001). The mean NLR of the Gleason score (GS) 8–10 group was higher than that of the GS 7 and GS 5–6 groups. The authors conclude that NLR was found to vary with regard to histology of prostate biopsy and higher GS was associated with higher NLR in patients with prostate cancer.

Complete blood count is a inexpensive, comparatively routine, and practical laboratory test that gives us important information about the patient's formed blood contents. Routine peripheral blood counts may be useful in diagnosis and prognosis of many disorders, including prostatic diseases.[2-12]

NLR is measured by dividing the number of neutrophils by the number of lymphocytes. NLR may be an indicator of systemic inflammation, as neutrophils and lymphocytes are thought to be significant in tumour immunology and inflammation. Inflammation plays a significant role in the proliferation, angiogenesis, and metastasis of cancer cells and is important in the development and progression of the disease.[2,3] Even when white blood cell count is in normal range, NLR has been demonstrated to play a predictive role in the prognosis of chronic and acute inflammatory processes.[2-12]

A recent meta-analysis study concludes that a high NLR is an independent factor associated with poorer overall survival in many solid tumours (colorectal, hepatocellular, gastroesophageal, ovarian, and pancreatic carcinoma). This marker may be associated with renal or hepatic dysfunction, diabetes mellitus, abnormal thyroid function, hypertension, metabolic syndrom, hematological malignancies, known malignancy, preceding history of local or systemic infection, inflammatory diseases, and any use of medication connected to inflammatory status of patients. [9-12] The authors should have mentioned these factors.

In conclusion, we strongly believe the findings obtained from the current study will lead to further studies examining the evaluation of NLR prior to prostate biopsy to predict biopsy histology.

Competing interests: The authors declare no competing financial or personal interests.

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Author reply: The neutrophil-to-lymphocyte ratio in clinical practice

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We would like to thank our colleagues for their precise comments on our article.[1] Neutrophil-to-lymphocyte ratio (NLR) is a valuable tool for evaluation of inflammation and is obtained from an inexpensive and widely attainable laboratory test — complete blood count. Currently, there are valuable tests for prediction of prostate cancer, particularly high-grade cases. These tests include: PCA3; prostate health index (PHI) multibiomarker test, which combines free and total prostate-specific antigen (PSA) with [-2]proPSA; and four kallikrein protein biomarkers (total PSA, free PSA, intact PSA, and human kallikrein-related peptidase 2), named as 4K score.[2-4] However, these tests are expensive and not yet available worldwide. Therefore, tests that are widely available, like NLR, are especially important for use in developing countries.

Distinct phases of carcinogenesis and cancer growth cause different immune system responses.[5] Initially, association of NLR and prostate cancer was shown in metastatic cases, that is, higher NLR indicated more aggressive disease and poor response to treatment.[6] Recently, further studies investigating the role of NLR in the pre-biopsy setting were published.[1,7] In these studies, higher NLR values were found to be associated with higher rates of prostate cancer. There is also one study focusing on and early-stage and low-risk prostate cancer. In this study, Kwon et al found that lymphocyte count was associated with Gleason score upgrading and neutrophil count was associated with biochemical failure; NLR was not found to have association with any of the study endpoints.[8]

Our group also investigated the results of low-risk cases in which the patients underwent radical prostatectomy. We found that NLR was associated with higher rates of Gleason score upgrading and high-grade prostate cancer cases, but not with disease upstaging (data not yet published).

Although the results from the early-stage prostate cancer cases are conflicting, there is good proof of alterations in the immune system in the development and progression of prostate cancer. However, as it was mentioned in the comment to our study, levels of immune cells in the peripheral blood are prone to change in many circumstances.[9] Due to the retrospective nature of our study, we could not retrieve data on the conditions that might have affected levels of immune cells. On the other hand, such data, although valuable, still does not clarify the changes in immune system and immune response to development and progression of prostate cancer cells. A study with immunohistochemical examination of the prostate tissue from biopsy or radical prostatectomy specimens would better identify the changes in the prostatic tissue level.

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