

ORIGINAL ARTICLE

Reference Intervals for SII, NLR, PLR, and LMR: a Comparison of Nonparametric and refineR Approaches Using Big Data

Mehmet F. Alpdemir ¹, Medine Alpdemir ², Esra F. Oğuz ¹, Funda Eren ¹

¹ Medical Biochemistry, Ministry of Health Ankara Bilkent City Hospital, Ankara, Türkiye

² Medical Biochemistry, Ministry of Health Ankara Training and Research Hospital, Ankara, Türkiye

SUMMARY

Background: Based on the widespread use of the systemic immune-inflammation index (SII), neutrophil-lymphocyte ratio (NLR), platelet-lymphocyte ratio (PLR), and lymphocyte-monocyte ratio (LMR), markers, we aimed to calculate and compare the reference intervals (RIs) of these indices in adults, using both nonparametric method according to the Clinical and Laboratory Standards Institute's (CLSI) EP28-A3C:2010 guideline and refineR algorithm using a large dataset.

Methods: We analyzed data from 293,585 adults (18 - 65 years) retrospectively obtained from complete blood count results (using laboratory information system). The study involved a two-stage outlier exclusion process. White blood cells, platelets, neutrophils, lymphocytes, and monocytes were measured using the Advia 2120i (Siemens Healthineers, Germany), and SII, NLR, PLR, and LMR were calculated. Subgroups were formed based on age and gender, and RIs were estimated using an indirect sampling technique, specifically the nonparametric statistical method (2.5th and 97.5th percentiles) and refineR algorithm.

Results: Our study showed that the values of SII, NLR, PLR, and LMR varied significantly between males and females. For all the parameters, the lower and upper limits of reference intervals (RIs) for males were higher when using the RefineR algorithm. RIs based on age groups using CLSI guideline and the refineR algorithm were calculated, showing wider limits of the RIs in refineR.

Conclusions: We detected a difference between the RI values of the indexes according to the different RI calculation methods and observed that the reference intervals calculated according to CLSI guideline have a narrower range than by refineR algorithm.

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Correspondence:

Mehmet F. Alpdemir
Department of Medical Biochemistry
Ankara Bilkent City Hospital
1604 Street
06800 Ankara
Türkiye
Email: mfalpdemir@gmail.com

Supplementary Data**Table S1. Number of age groups according to nonparametric, two-sided percentile method (CLSI) and refineR for all patients.**

	CLSI		refineR	
	female	male	female	male
Age groups	N	N	N	N
18 - 19	4,382	2,610	5,599	3,184
20 - 29	35,474	17,990	45,866	22,612
30 - 39	28,816	16,272	37,472	20,901
40 - 49	32,700	16,606	42,384	21,640
50 - 59	31,317	17,397	38,677	23,445
60 - 65	14,173	9,904	17,792	14,023