Neutrophil-to-Lymphocyte Ratio (NLR) and Platelet-to-Lymphocyte Ratio (PLR) in Pituitary Adenomas

Dear Editor,

The neutrophil-to-lymphocyte ratio (NLR) and the platelet-to-lymphocyte ratio (PLR) are used as markers of subclinical inflammation and show prognostic value in various situations, including cancer.[1] Their role has been evaluated in some endocrine tumours, but rarely in pituitary tumours, despite the involvement of inflammatory status in adipose tissue and in endothelial dysfunction in acromegaly, and the relation of prolactin with inflammatory components. A recent publication showed high levels of NLR in patients with Cushing's disease, and higher NLR and PLR in reoperated cases of non-functioning adenomas (NFA) suggesting that these scores may predict invasive/refractory adenomas.[2] Here, we report results when assessing the NLR and PLR ratios (NLR = number of neutrophils/number of lymphocytes; PLR = number of platelets/number of lymphocytes) in patients who had GH, prolactin-secreting, or non-functioning adenomas.

The data from 337 patients with pituitary tumors were collected from medical records. Patients with infectious, autoimmune, or hematopoietic diseases, renal failure, use of corticosteroids in non-physiological doses, and previous radiotherapy were excluded.

The sample (52.1% female; mean age 57.7 ± 15.9 years old) consisted of 96 patients with a somatotrophic adenoma, 162 with NFA, and 79 with macroprolactinoma. The NLR varied from 0.3 to 17.5 and PLR from 39.2 to 556.6 in the entire sample.

The values according to the adenoma functionality are shown in Table 1. The NLR and the PLR did not vary significantly between groups. Considering the upper limit of the 95% CI of the median, which is 3.6 for NLR and 209 for PLR, we found, respectively, 26 cases (7,72%) and 14 (4.15%) that extrapolate these limits [Figure 1]. Values greater than 5 for NLR were observed in 14 cases, and greater than 300 for PLR in 5 cases. NLR was significantly higher in giant prolactinomas [Table 2]. In acromegaly, the median PLR in women was significantly higher, 129.1 vs 102.7 (P = 0.021). We did not observe differences in

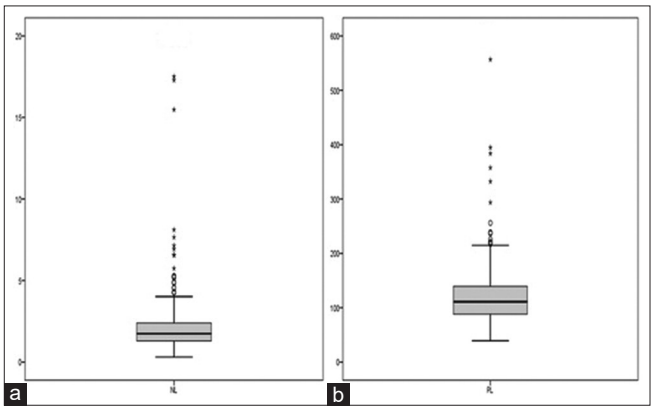

Figure 1: Distribution of NLR and PLR in Pituitary Adenomas. (a) Distribution of NLR and (b) distribution of PLR. NLR, neutrophil-to-lymphocyte ratio; PLR, platelet-to-lymphocyte ratio. 1.5*P75=3.6 (NLR) and 209 (PLR)

Table 1: NLR and PLR in the study groups

	Pituitary tumors (n=337)			
	Acromegaly (n=96)	NFA (n=162)	Prolactinoma (n=79)	P*
NLR				
Mean (±SD)	2.1 (±1.2)	2.1 (±1.6)	2.3 (±2.6)	
Median (P25-75)	1.8 (1.2-2.4)	1.7 (1.3-2.4)	1.7 (1.3-2.3)	0.914
PLR				
Mean (±SD)	121.9 (±40.2)	115.2 (±48.7)	130.2 (±75.3)	
Median (P25-75)	119.0 (91.8-154.4)	107.9 (86.7-132.4)	107.6 (87.3-157.6)	0.147

NFA, nonfunctioning adenoma; NLR, neutrophil-to-lymphocyte ratio; PLR, platelet-to-lymphocyte ratio; *Kruskal-Wallis test

Table 2: NLR and PLR in giant and non-giant pituitary tumors

	NFA			Prolactinoma		
	Giant (n=40)	Non-giant (n=123)	P*	Giant (n=8)	Non-giant (n=71)	P*
NLR	1.6 (1.2-2.7)	1.7 (1.3-2.4)	0.743	1.3 (1.1-1.5)	1.8 (1.3-2.5)	0.031
PLR	106.5 (83.9-134.1)	108.6 (86.7-132.4)	0.853	94.4 (77.1-146.7)	108.6 (88.1-162.4)	0.314

NFA, nonfunctioning adenoma; NLR, neutrophil-to-lymphocyte ratio; PLR, platelet-to-lymphocyte ratio. *Mann-Whitney test. Values are given as median (P25-75)

NLR and PLR when considering tumour volume and invasion, presence of Diabetes Mellitus, or controlled and non-controlled disease in acromegalic patients during follow-up.

The mean NLR observed here (2.1) is similar to the mean general population in the United States (2.15).[3] Guthrie and colleagues showed that the limit chosen to define an elevated NLR in cancer patients differed across the studies, with >5 being the most commonly used threshold.[4] Using this cut-off, we found higher NLR levels in less than 10% of the sample.

Lohr *et al*. suggested the link between IGF-1 and inflammation.[5] In the current series, 4 acromegalic patients presented NLR values above 5 and no value above 300 for PLR. Yilmaz *et al*. assessed the NLR in acromegalics and controls, not observing any difference between the groups.[6] Although patients with diabetes had significantly higher NLR than subjects who did not,[3] in this study, the concomitance of diabetes mellitus in a quarter of the acromegalic group was not accompanied by changes in NLR. In patients with NFA and prolactinomas, we detected rare cases of elevated NLR and PLR ratios.

The present results are predominantly negative. The finding of 7.72% and 4.5% of patients extrapolate an established maximum threshold for, respectively, NLR e PLR, as well as the detection of significantly higher values of NLR in giant prolactinomas and in women with acromegaly, are of difficult interpretation. In this specific population, other variables are to be explored, such as the hypopituitarism influence and its hormonal replacement. The significance of high individual NLR and/or PLR values requires extended assessments to establish their clinical relevance.

Ethical aspects

The retrospective study was approved by instutional ethics committee, name of institute, approval letter number and date. The informed consent was waived by ethics committee as it was a retrospective study. The study followed recommendations of Declaration of Helsinki 1964 and its later amendments.

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Conflicts of interest

There are no conflicts of interest.

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