

## NEUTROPHILS, LYMPHOCYTES AND NEUTROPHIL-TO-LYMPHOCYTE RATIO (NLR) AND THEIR RELATIONSHIP TO SERUM AMYLOID A (SAA), ADIPONECTIN (APN) AND OBESITY IN BREAST CANCER PATIENTS.

**Eric E. Kodama (IC)<sup>1</sup>, Aline B. Santana (PG)<sup>1</sup>, Higor C. Nascimento (PG)<sup>1</sup>, Maria S.C. Gurgel (PQ)<sup>2</sup>, Sílvia de Barros-Mazon (PQ)<sup>1</sup>.** <sup>1</sup>Department of Clinical Pathology and <sup>2</sup>Department of Obstetrics and Gynecology, School of Medical Sciences, University of Campinas (Unicamp).

### Abstract

This study investigated neutrophil, lymphocyte, and NLR in peripheral blood of breast cancer patients, in order to identify their relationship with obesity, adipokines (SAA e APN), and the clinical-pathological characteristics of the disease.

*Key words: Breast cancer, obesity, inflammatory response*

### Introduction

Obesity is considered a risk factor for breast cancer and is also associated to a low grade inflammation state which activates proinflammatory adipocytokines such as SAA and suppresses the anti-inflammatory adipokine, adiponectin (APN). Elevated levels of SAA and diminished circulating APN have been associated to the development and prognosis of breast cancer<sup>1,2</sup>. Recently, neutrophils have been associated with worse prognosis in cancer and the neutrophil-to-lymphocyte ratio (NLR) has been suggested as a prognostic marker in cancer, including breast cancer<sup>3,4</sup>. The aim of this study was to investigate the relationship of neutrophil, lymphocyte and NLR with SAA, APN and obesity.

### Results and Discussion

A total of 171 pre- and postmenopausal breast cancer patients with white blood cell counts prior to surgery was enrolled in this study. Patients were grouped as nonobese (NO) or overweight/obese (OW/O) based on body mass index (BMI) plus waist circumference (WC) measurement.

The comparative analysis between the groups showed higher absolute lymphocyte count ( $p=0,0035$ ) in OW/O group. In the total group of patients there were no correlations of absolute neutrophil count and NLR with age, BMI, WC, SAA or APN. However, the absolute lymphocyte count was correlated with WC ( $r=0,2103$ ,  $p=0,0058$ ).

Comparison between pre- and postmenopausal patients demonstrated, in postmenopausal, higher relative numbers of lymphocytes ( $p=0.0052$ ), positive correlations between absolute lymphocyte count and WC ( $r=0.2382$ ,  $p=0.0107$ ), as well as between the absolute neutrophil count and SAA ( $r=0.2277$ ,  $p=0.0257$ ). Altogether these results

suggest association with the inflammatory state that accompanies obesity. On the other hand, premenopausal patients showed higher relative values of neutrophils ( $p = 0.0029$ ) and higher NLR ( $p = 0.0034$ ), but without association with obesity. In the literature, the NLR values associated with worse prognosis range from 2.5 to 3.3<sup>4,5</sup>. In the present study we detected NLR below 2.25 in 75% of the population, which might suggest a better prognosis for these patients. This hypothesis could be supported by the detection of lower frequency of more aggressive, triple-negative breast cancer (TNBC) in the NLR<2.25 group of patients (5,6%), comparing to the NLR>2.25 group (14,3%). Nevertheless, only the monitoring of this population in a prospective study will confirm this assumption.

### Conclusions

Lymphocytes and neutrophils were respectively correlated with obesity and SAA. Premenopausal patients showed higher relative values of neutrophils and higher NLR, but without association with obesity. The NLR range detected in this study was lower than others found in previous studies, which might indicate a better prognosis for the population studied. However, this hypothesis requires further investigation.

### Acknowledgement

FAPESP, PIBIC/CNPq and FAEPEX-Unicamp.

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