

Title:

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The neutrophil-lymphocyte ratio as a predictor of steroid response in patients with severe ulcerative colitis: a retrospective cohort study

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Fernando Rubio-Acosta: conception and design of the study, analysis and interpretation of data, drafting the article.

Paulina Moctezuma-Velazquez: conception and design of the study, analysis and interpretation of data, drafting the article.

Emma Castro-Romero: acquisition of data, analysis of data.

Luis Uscanga-Dominguez: conception and design of the study, analysis and interpretation of data, final approval.

Kazuo Yamamoto Furusho: conception and design of the study, analysis and interpretation of data, final approval.

Carlos Moctezuma-Velazquez: conception and design of the study, analysis and interpretation of data, drafting the article, final approval.

Key words: Inflammatory bowel disease. Colitis ulcerative. Cyclosporine. Colectomy.

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Abbreviations:

UC: Ulcerative colitis

ASUC: Acute severe ulcerative colitis

CRP: C reactive protein

ESR: Erythrocyte sedimentation rate

NLR: Neutrophil to lymphocyte ratio

SNR: Steroid non-response

SR: Steroid response

AUROC: Area under the receiver operating characteristic

Neutrophil to lymphocyte ratio (NLR) is a simple way to detect clinical inflammation that has been evaluated in ulcerative colitis (UC) for that purpose (1), but never in the context of acute severe UC (ASUC), which was the aim of this study. We hypothesized that the NLR could be a predictor of steroid response in patients with ASUC. We reviewed the medical records of all patients with ASUC who received in-hospital management at our hospital between 2011 and 2021. Logistic regression was performed to determine variables associated with steroid non-response (SNR), defined as the use of cyclosporine, anti-TNF α , and/or colectomy. We included 89 patients, 21(24%) were SNRs. Baseline characteristics were similar between SNRs and SRs except for lower albumin levels in the former [2.6 g/dl (IQR 1.8-3.2) vs 3.4 g/dl (IQR 2.9-3.8), $p=0.001$] (Table1). On univariable analysis, bowel movements on day 3 (OR 1.28, 95%CI 1.04-1.57) and albumin on day 3 (OR 0.20, 95%CI 0.06-0.63) were associated with SNR. We used the Liu method for empirical cut point estimation and found NLR on day 3 (NLR-3) ≥ 6.1 as a suitable cutoff point to identify SNR (OR 3.44, 95%CI 1.22-9.66). Sensitivity, specificity, positive predictive value, negative predictive value, and AUROC of this cut-off point were 66.75 (95%CI 43-85.4%), 63.2% (95%CI 50.7-74.6%), 35.9% (95%CI 21.2-52.8%), 86% (95%CI 73.3-94.2%), and 0.650, respectively. On multivariable analysis, bowel movements on day 3 (OR 1.38, 95%CI 1.06-2.79), a NLR-3 ≥ 6.1 (OR 5.29, 95%CI 1.19-23.44), and albumin on day 3 (OR 0.23, 95%CI 0.07-0.71), were associated with SNR. A model including bowel movements, albumin levels, and a NLR-3 ≥ 6.1 had an AUC of 0.812 to predict SNR, with acceptable calibration (Figure 1A). A model including only bowel movements on day 3 and NLR-3 ≥ 6.1 had an AUC of 0.748 with good calibration (Figure 1B). In our population, the Oxford index (2) was not associated with SNR as others have reported (3). It is clear that we need new predictors. One limitation of the study is that 28 patients lacked information of albumin levels on day 3. This is the first study assessing the role of NLR on ASUC, and adds to previous reports of the NLR as a prognostic factor for endoscopically active UC (4) and as a marker of activity (1). If our findings are validated, this model could help decision-making in patients with this entity.

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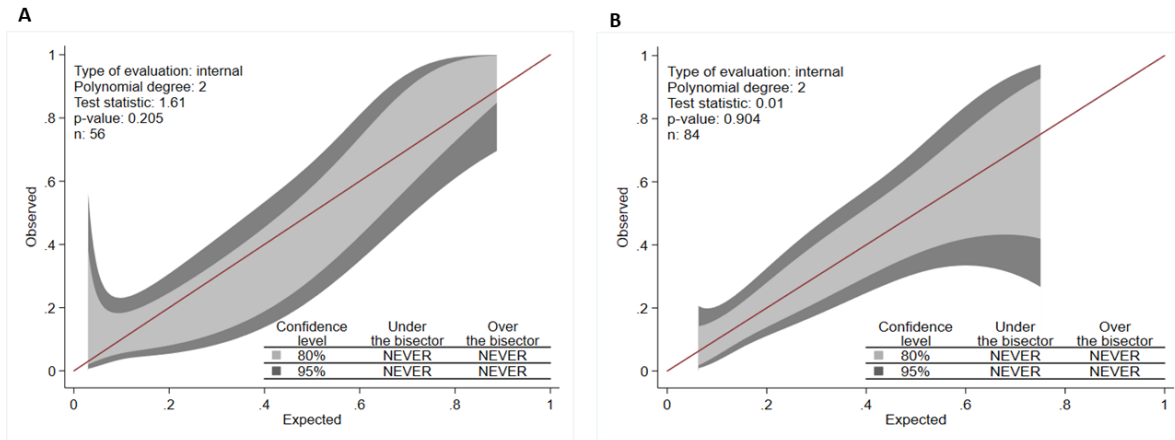


Fig. 1 A) Calibration belt of the model including high NLR, number of BMs, and albumin, on day 3 B) Calibration belt of the bowel movements and high neutrophil lymphocyte ratio on day 3