

The Usefulness of Inflammatory Biomarkers to Predict Anastomotic Leakage after Colorectal Surgery: Systematic Review and Meta-Analysis

Nuno Rama¹⁻⁵, Marlene Lages^{2,3}, Cândida G. Silva^{2,3}, Patrícia Motta Lima¹, Inês Campos Gil¹, Maria Guarino^{2,3}, Pedro Oliveira⁴, Maria Dixe^{2,3}, Anabela Rocha⁴, Fernando Castro-Poças⁴ and João Pimentel⁵

¹Colorectal Disease Division, Leiria Hospital Centre, Leiria, Portugal

²School of Health Sciences, Polytechnic of Leiria, Leiria, Portugal

³Center for Innovative Care and Health Technology (ciTechCare), Polytechnic of Leiria, Leiria, Portugal

⁴School of Medicine and Biomedical Sciences, University of Oporto, Porto, Portugal

⁵Montes Claros Clinic, Coimbra, Portugal

ABSTRACT

Aim: Anastomotic leakage (AL) is a severe postoperative complication in colorectal surgery, but its preclinical diagnosis may improve outcomes and increase anastomotic salvage. This study aimed to assess the added value of serum biomarkers for early detection of colorectal AL.

Method: We performed a comprehensive literature review, and a qualitative and quantitative analysis of papers retrieved from MEDLINE, Embase, PubMed, Web of Science, Scopus and the Cochrane Library. We included all studies published before September 2021 assessing the serum biomarkers white blood cells (WBC), C-reactive protein (CRP), procalcitonin (PCT) and calprotectin (CLP) for the early diagnosis of AL.

Results: Fifteen studies that evaluated three different systemic biomarkers in the context of AL were identified, including 5150 patients. Diagnostic test accuracy was estimated for CRP and PCT. On postoperative day (POD) 5, the highest AUC (87.1%) and specificity (80.2%) values were estimated for CRP. Random-effects meta-analysis and total effect sizes estimation for the biomarkers CRP, PCT and WBC were performed according to POD. The concentration of serum biomarkers is significantly higher in patients presenting AL. Regarding the qualitative analysis, there was significant heterogeneity in the inclusion of different subcategories of the consensus definition of colorectal AL in each paper's definition.

Conclusion: The serum biomarkers CRP and PCT are moderate predictors for AL, showing a high heterogeneity among the studies. Combinations of these biomarkers might improve predictive accuracy, but more studies will be necessary to conduct a quality metaregression.

Key words: anastomotic leakage, colorectal, surgery, biomarkers, C-reactive protein, calprotectin