Association of Preoperative Neutrophil to Lymphocyte Ratio (NLR) with Difficult Laparoscopic Cholecystectomy Among Patients with Cholecystitis

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Introduction

Gallbladder pathologies constitute one of the most frequently seen disease groups in daily practice, the most common of which is cholelithiasis. Severe cholecystitis carries a significantly high mortality rate, which has been reported to be between 15% and 50% Thus, prompt detection and proper management of patients at risk of severe cholecystitis are essential in preventing associated complications. However, severe cholecystitis has been identified as a risk factor for difficult laparoscopic cholecystectomy due to the extensive inflammation. Neutrophil to lymphocyte ratio has been established as a biomarker for severe inflammation, making it a potential biomarker for severe cholecystitis and consequently, a difficult laparoscopic cholecystectomy as well. The main objective of this study is to determine the association of preoperative neutrophil to lymphocyte ratio with difficult laparoscopic cholecystectomy among patients with cholecystitis.

Methodology

It is designed as a single-center retrospective cohort study conducted at Asian Hospital and Medical Center.Initial complete blood count, specifically the lymphocytes, neutrophils, and WBC were recorded. Each patient's NLR was calculated as the absolute neutrophil count divided by the absolute lymphocyte count, using data from their standard complete blood count test preoperatively. Patients were divided into two groups; the first group included patients with easy laparoscopic cholecystectomy and the second group included patients with difficult laparoscopic cholecystectomy intraoperatively based on their operative techniques.

Chi squared test was used to determine the predictors of difficult laparoscopic cholecystectomy. A cut-off value for the neutrophil to lymphocyte ratio that will determine to know if a patient will undergo difficult laparoscopic cholecystectomy was determined using the receiver operating curve (ROC).

Results

Using the ROC, a preoperative NLR cut-off value of 4.8 in predicting difficult laparoscopic cholecystectomy was found. Results of this study showed that higher preoperative NLR was significantly associated with difficult laparoscopic cholecystectomy. Age and the male gender were also significantly associated with difficult laparoscopic cholecystectomy.

Table 1. Correlation between Neutrophil: Lymphocyte Ratio and Operative Techniques

	Easy Laparoscopic Cholecystectomy (n=76) %	Difficult Laparoscopic Cholecystectomy (n=71) %	p-value
	Mean ± SD		
Neutrophils	60.76±10.52	73.95±13.36	0.925
Lymphocyte	29.31±8.88	18.13±10.87	0.373
N:L ratio	2.55±2.06	7.23±6.97	**0.003***

Conclusion

Using this cut-off value, sensitivity and specificity obtained were 95.0% and 70.0%, respectively. This can be used to predict the difficulty of operative techniques among patients who will undergo laparoscopic cholecystectomy. Using this cut-off value, surgeons will be able to prepare and stratify patients pre-operatively. NLR >4.8 may be used a guide for increased likelihood of a difficult operation and potential complications, which can help the operating surgeon to plan and operate with appropriate help and expertise around as well as appraise their patients accordingly.