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ORIGINAL ARTICLE

Correlation of inflammatory marker and simple endoscopic score Crohn's disease (SES-CD) in patients having crohn's inflammatory bowel disease.

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ABSTRACT… Objective: To determine the correlation between inflammatory markers (fecal calprotectin and CRP) and Simple Endoscopic Score for Crohn's Disease (SES-CD) in patients with Crohn's disease. **Study Design:** Cross-sectional study. **Setting:** Department of Medicine, Liaquat University of Medical and Health Sciences. **Period:** 24th August 2024 to 24th February 2025. **Methods:** Thirty-three patients with endoscopically diagnosed Crohn's disease were enrolled. Blood samples for CRP and first-morning stool samples for fecal calprotectin were collected. SES-CD was calculated during endoscopic evaluation. Demographic and clinical data were recorded using standardized proformas. Spearman's correlation coefficient was used to assess relationships between variables. **Results:** The study included 33 patients with a median age of 44.00 years (IQR: 34.00-52.50) and mean BMI of 25.86 ± 2.30. The median SES-CD score was 8.00 (IQR: 6.00-13.00), and mean CRP level was 14.00 ± 6.48 mg/L. Spearman correlation analysis revealed strong positive correlations between SES-CD and both fecal calprotectin ($\rho = 0.994$, $p < 0.001$) and CRP levels ($\rho = 0.993$, $p < 0.001$). A significant correlation was also found between SES-CD and BMI ($\rho = 0.882$, $p < 0.001$). No significant correlations were observed between SES-CD and age ($\rho = 0.048$, $p = 0.791$), gender ($\rho = -0.102$, $p = 0.571$), or disease duration ($\rho = -0.017$, $p = 0.925$). **Conclusion:** Both fecal calprotectin and CRP demonstrated strong correlations with endoscopic disease activity in Crohn's disease, suggesting their potential utility as reliable non-invasive biomarkers for monitoring disease severity and guiding treatment decisions.

Key words: Crohn's Disease, C-reactive Protein, Endoscopic Activity, Fecal Calprotectin, Inflammatory Markers, Simple Endoscopic Score for Crohn's Disease.

INTRODUCTION

Inflammatory bowel disease (IBD) is a complex collection of chronic inflammatory disorders that mostly affect the gastrointestinal tract, although other organs may also be impacted. Despite fresh insights into its etiology, the actual reason remains unclear.[1] IBD incidence and prevalence have grown dramatically internationally over the last two to four decades, particularly in Asian countries such as Taiwan. This development might be attributed to improved understanding of the illness and a westernized lifestyle.[2]

Endoscopic examination is an important component of IBD diagnosis, therapeutic monitoring, and management.[3] Endoscopic ultrasound, capsule endoscopy, and balloon-assisted enteroscopy are examples of advanced modalities that have expanded diagnostic capabilities in IBD3, though traditional techniques such as colonoscopy, flexible sigmoidoscopy, and esophagogastroduodenoscopy remain necessary. Ileocolonoscopy with biopsy remains the gold standard for diagnosing IBD, and it is especially important for differentiating between Crohn's disease (CD) and ulcerative colitis (UC), which have different treatment modalities and prognosis implications4. However, due to diagnostic uncertainty, approximately 15% of IBD patients remain unclassified.[4]

Measurable laboratory indicators used to assess IBD activity include C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), leukocytes, platelets, and acute phase proteins.[5,6] CRP and fecal calprotectin (FC) are two of the most often

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utilized biomarkers in clinical practice(5). Recent studies have found strong associations between FC concentrations and clinical markers, as well as endoscopic and histological activity in IBD.[7,8] Notably, Schoepfer et al. found substantial relationships between the Simple Endoscopic Score for Crohn's Disease (SES-CD) and both calprotectin ($r = 0.75$) and CRP ($r = 0.53$)(8). Furthermore, endoscopic and histological IBD activity is strongly associated with calprotectin levels.[9]

The aim of this study was to determine the correlation between common biological markers such as fecal calprotectin and CRP with endoscopic score activity in Crohn's disease.

METHODS

This cross-sectional study was carried out in the Department of Medicine at Liaquat University of Medical and Health Sciences from August 24th, 2024 to February 24th, 2025. Schoepfer et al. reported a correlation coefficient ($r=0.53$) between SES-CD and CRP, therefore the research population included 50 patients.[8] Patients aged 15 to 60 years old, both genders, with endoscopically diagnosed IBD were recruited via non-probability sequential sampling. Patients with chronic liver illness, inflammatory or gastrointestinal disorders, or who refused to participate were excluded.

All individuals received endoscopic assessment after being approved by the institutional ethical committee (IRB No: LUMHS-REC-236 approved on 1-08-2023) and providing signed informed permission. Blood samples (5 mL) were obtained and promptly processed for CRP analysis at the hospital's diagnostic laboratory. To avoid urine contamination, stool samples were collected in the morning for FC measurement, and patients were instructed to empty beforehand. A standardized proforma was used to capture the Simple Endoscopic Score for Crohn's illness (SES-CD), body mass index (BMI), age, gender, illness duration, CRP and FC levels, and other clinical and demographic information.

The statistical analysis was carried out using SPSS version 23.0. The Shapiro-Wilk test was performed to determine the normality of the data. Descriptive statistics for regularly distributed data included means and standard deviations, while medians and interquartile ranges were used for non-normal distributions. Categorical variables were represented using frequencies and percentages. The Spearman's rank correlation coefficient was used to assess the relationship between inflammatory markers (FC and CRP) and SES-CD. Subgroup analyses were conducted using age, gender, BMI, and illness duration, and post-stratification correlation coefficients were calculated. Statistical significance was determined at $p < 0.05$.

RESULTS

A total of 33 patients were included in the study. Table-I normality test, which employed the Shapiro-Wilk test, showed that the variables BMI ($p = 0.297$), Faecal Calprotectin ($p = 0.125$), and CRP Level ($p = 0.093$) had a normal distribution, but the variables Age of Patients ($p = 0.020$), Duration of Disease ($p = 0.007$), and SES-CD ($p = 0.023$) did not have a normally distribution.

Variable	Shapiro-Wilk Statistic	Degrees of Freedom (df)	P-Value
Age of Patients	0.921	33	0.020
BMI	0.962	33	0.297
Duration of Disease	0.905	33	0.007
Faecal Calprotectin	0.949	33	0.125
CRP Level	0.945	33	0.093
SES-CD	0.924	33	0.023

Table-I. Normality testing using shapiro-wilk test

Bold indicates non-normal distribution.

According to Descriptive statistics in Table-II, The mean BMI of the cohort was 25.86 ± 2.30, its mean duration of disease was 12.00 ± 8.57 years, and its mean CRP level was 14.00 ± 6.48 mg/L. The median SES-CD score was 8.00 (IQR: 6.00–13.00), the median duration of disease was 9.00 years (IQR: 4.50–20.00), and the median age of patients was 44.00 years (IQR: 34.00–52.50).

Variable	N	Mean	Std. Deviation	Median	25th Percentile	75th Percentile
Age	33	-	-	44.00	34.00	52.50
BMI	33	25.86	2.30	-	-	-
Duration of Disease	33	12.00	8.57	9.00	4.50	20.00
CRP Level	33	14.00	6.48	-	-	-
SES-CD	33	-	-	8.00	6.00	13.00

Table-II. Descriptive statistics of study variables

Note: Mean and standard deviation are reported for normally distributed variables, while median and interquartile range (IQR) are reported for non-normally distributed variables.

Table-III showed Spearman correlation analysis, which demonstrates a strong positive relationship between SES-CD and both CRP level ($\rho = 0.993$, $p < 0.001$) and fecal calprotectin ($\rho = 0.994$, $p < 0.001$). In contrast, SES-CD did not significantly correlate with age ($\rho = 0.048$, $p = 0.791$), duration of disease ($\rho = -0.017$, $p = 0.925$), gender ($\rho = -0.102$, $p = 0.571$), or BMI ($\rho = 0.882$, $p = 0.000$). A visual summary of the relationship between fecal calprotectin, CRP, and SES-CD is also provided in Figure-1.

Variable	Correlation Coefficient (ρ)	P-Value
Age of Patients	0.048	0.791
BMI	0.882	<0.001
Gender	-0.102	0.571
Duration of Disease	-0.017	0.925
Faecal Calprotectin	0.994	<0.001
CRP Level	0.993	<0.001

Table-III. Spearman correlation of SES-CD with study variables

Note: Significant correlations ($p < 0.05$) are highlighted in bold.

DISCUSSION

This study investigated the association between fecal calprotectin (FC), C-reactive protein (CRP), and the Simple Endoscopic Score for Crohn's Disease. SES-CD had significant positive correlations with FC ($\rho = 0.994$, $p < 0.001$) and CRP ($\rho = 0.993$, $p < 0.001$), suggesting that they might be employed as non-invasive biomarkers to assess endoscopic disease activity in Crohn's disease (CD). These results are consistent with prior research, which has shown that FC and CRP are good indicators of mucosal inflammation and CD severity.[1,2]

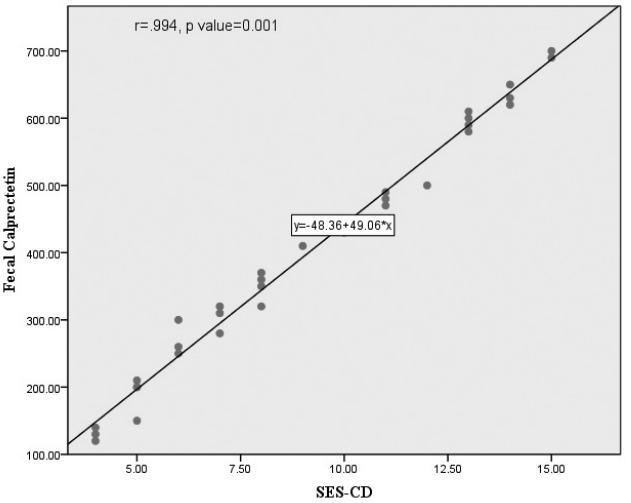

Figure :1a

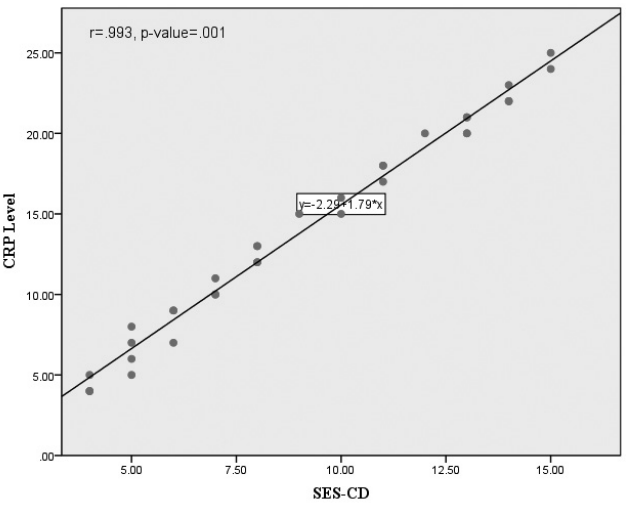

Figure :1b

Figure-1 (a). Correlation matrix between SES-CD and Fecal Calprotectin, (b): Correlation matrix between SES-CD and CRP levels

However, the lack of substantial associations between SES-CD and clinical or demographic parameters including age, gender, BMI, and length of disease raises the possibility that these variables do not independently affect the severity of endoscopic disease, a finding that merits more

research.

This study demonstrated a strong connection between FC and SES-CD, which is consistent with prior findings. Similar associations were found in research by Schoepfar AM et al.[9], Li J et al.[10], Arai Tet al.[11], Monteiro S et al.[12], Romero-Mascarell C et al.[13], and Buisson A et al.[14] FC values above 250 μg/g often indicate moderate to severe endoscopic activity. FC, a protein generated by neutrophils that is extremely specific to intestinal inflammation, is an effective tool for monitoring disease activity and dictating medication options. As a surrogate marker for SES-CD, this study's near-perfect correlation (rho = 0.994, p value = 0.001) shows its dependability, especially in cases when frequent endoscopic evaluation is not practicable. Similarly, systemic inflammation has a role in CD, especially in patients with colonic or ileocolonic involvement, as seen by the high connection between CRP and SES-CD (ρ = 0.993). Numerous research by Yang DH et al. and Solem CA et al. have revealed similar results.[15,16] However, according to Laryushina EM et al.[17] systemic inflammation may be less noticeable in isolated small bowel disease, which could restrict the usefulness of CRP.

No significant correlations were found between SES-CD and age, gender, BMI, or disease duration. This is in contrast to some research that found links between the length of the disease and the severity of endoscopic examinations.[18,19]

The study's limitation includes the lack of correlation can be due to the cohort's heterogeneity or relatively small sample size. Non-parametric tests like Spearman correlation were also required since the results might have been affected by the non-normal distribution of factors like age and disease duration. These results emphasize that more extensive and varied research is required to fully understand the connection between endoscopic disease activity and demographic characteristics.

CONCLUSION

Both fecal calprotectin and CRP demonstrated strong correlations with endoscopic disease activity in Crohn's disease, suggesting their potential utility as reliable non-invasive biomarkers for monitoring disease severity and guiding treatment decisions.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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REFERENCES

1. Matsuoka K, Kobayashi T, Ueno F, Matsui T, Hirai F, Inoue N, et al. **Evidence-based clinical practice guidelines for inflammatory bowel disease.** J Gastroenterol. 2018; 53(3):305-53.

2. Su HJ, Chiu YT, Chiu CT, Lin YC, Wang CY, Hsieh JY, et al. **Inflammatory bowel disease and its treatment in 2018: Global and Taiwanese status updates.** J Formos Med Assoc. 2019; 118(7):1083-92.

3. Spiceland CM, Lodhia N. **Endoscopy in inflammatory bowel disease: Role in diagnosis, management, and treatment.** World J Gastroenterol. 2018; 24(35):4014-20.

4. Bharadwaj S, Narula N, Tandon P, Yaghoobi M. **Role of endoscopy in inflammatory bowel disease.** Gastroenterol Rep. 2018; 6(2):75-82.

5. Chang S, Malter L, Hudesman D. **Disease monitoring in inflammatory bowel disease.** World J Gastroenterol. 2015; 21(40):11246.

6. Sands BE. **Biomarkers of inflammation in inflammatory bowel disease.** Gastroenterol. 2015; 149:1275-85.

7. Sipponen T, Savilahti E, Kärkkäinen P, Kolho KL, Nuutinen H, Turunen U, et al. **Fecal calprotectin, lactoferrin, and endoscopic disease activity in monitoring anti-TNF-alpha therapy for Crohn's disease.** Inflamm. Bowel Dis. 2008; 14(10):1392-8.

8. Schoepfer AM, Beglinger C, Straumann A, Trummler M, Vavricka SR, Bruegger LE, et al. **Fecal calprotectin correlates more closely with the Simple Endoscopic Score for Crohn's disease (SES-CD) than CRP, blood leukocytes, and the CDAI.** Am J Gastroenterol. 2010; 1;105(1):162-9.

9. Lehmann FS, Burri E, Beglinger C. **The role and utility of faecal markers in inflammatory bowel disease.** Therap Adv Gastroenterol. 2015; 8(1):23-36.

10. Bjarnason I. **The use of fecal calprotectin in inflammatory bowel disease.** J. Gastroenterol. Hepatol. 2017; 13(1):53-6.

11. Arai T, Takeuchi K, Miyamura M, Ishikawa R, Yamada A, Katsumata M, et al. **Level of fecal calprotectin correlates with severity of small bowel crohn's disease, measured by balloon-assisted enteroscopy and computed tomography enterography.** Clin Gastroenterol Hepatol. 2017 Jan; 15(1):56-62.

12. Monteiro S, Barbosa M, Cúrdia Gonçalves T, Boal Carvalho P, Moreira MJ, Rosa B, et al. **Fecal calprotectin as a selection tool for small bowel capsule endoscopy in suspected crohn's disease.** Inflamm Bowel Dis. 2018 Aug 16; 24(9):2033-2038.

13. Romero-Mascarell C, Fernández-Esparrach G, Rodríguez-De Miguel C, Masamunt MC, Rodríguez S, Rimola J, et al. **Fecal calprotectin for small bowel crohn's disease: Is it a cutoff issue?** Diagnostics (Basel). 2022 Sep 15; 12(9):2226.

14. Buisson A, Mak WY, Andersen MJ, Lei D, Pekow J, Cohen RD, et al. **Fecal calprotectin is highly effective to detect endoscopic ulcerations in crohn's disease regardless of disease location.** Inflamm Bowel Dis. 2021 Jun 15; 27(7):1008-1016.

15. Yang DH, Yang SK, Park SH, Lee HS, Boo SJ, Park JH, et al. **Usefulness of C-reactive protein as a disease activity marker in Crohn's disease according to the location of disease.** Gut Liver. 2015 Jan; 9(1):80-6.

16. Solem CA, Loftus EV, Tremaine WJ, Harmsen WS, Zinsmeister AR, Sandborn WJ. **Correlation of C reactive protein with clinical, endoscopic, histologic, and radiographic activity in inflammatory bowel disease.** Inflamm Bowel Dis. 2005; 11(8):707-712.

17. Laryushina EM, Samoilova-Bedych N, Turgunova L, Rakhmetova V, Marchenko A. **Relationship of the biomarkers fecal calprotectin, C-reactive protein, and TMAO with Crohn's disease activity.** Farm Kazakhst. 2024; 4:297-305.

18. Liu Z, Bai X, Zhang H, Wang Z, Yang H, Qian J. **Sex-specific comparison of clinical characteristics and prognosis in Crohn's disease: A retrospective cohort study of 611 patients in China.** Front Physiol. 2022; 13:972038

19. Sarter H, Savoye G, Marot G, Ley D, Turck D, Hugot JP, et al. **A novel 8-predictors signature to predict complicated disease course in pediatric-onset Crohn's disease: a population-based study.** Inflamm Bowel Dis. 2023; 29(11):1793-1804.

AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Shereen:** Manuscript writing, data analysis, final drafting, proof reading.
2	**Shuaib Ansari:** Data collection, analysis, proof reading, critical analysis, drafting.