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Correlation Of Clinical Severity And Extent Of Disease With Colonic Malignancy Trends Over Time In Ulcerative Colitis: A Study From North Karnataka

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ABSTRACT

Background: Ulcerative colitis (UC) is a chronic inflammatory bowel disease associated with variable clinical severity and an increased long-term risk of colorectal cancer (CRC), particularly in patients with extensive colonic involvement and persistent endoscopic inflammation. Indian data on long-term outcomes, especially malignancy risk, remain limited.

Aim: To evaluate the correlation between disease extent, Mayo endoscopic severity, and the development of colonic malignancy in a cohort of UC patients from North Karnataka.

Methods: A retrospective analysis was conducted on 122 UC patients over a 15-year period. Demographic characteristics, disease extent, clinical Mayo score, Mayo Endoscopic Score (MES), and CRC occurrence were recorded. UC diagnosis was confirmed by colonoscopy, contrast-enhanced CT (CECT), and histopathological examination. CRC diagnosis was similarly established through colonoscopy, imaging, and tissue biopsy.

Results: The cohort included 77 males (63.1%) and 45 females (36.9%), with a mean age at diagnosis of 47 ± 11 years. Pancolitis was the most prevalent disease pattern (67.2%), followed by proctosigmoiditis (16.4%). Most patients presented with moderate-to-severe disease activity, with 54.1% having Mayo 3 scores and 49.2% having MES 3. Over the study period, 9 patients (7.4%) developed CRC 6 males and 3 females all of whom had long-standing pancolitis and severe endoscopic inflammation (MES 3).

Conclusion: This North Karnataka cohort demonstrated a predominance of extensive and severe UC. Colonic malignancy occurred exclusively in patients with long-standing pancolitis and high inflammatory burden. These findings highlight the importance of early inflammation control and long-term surveillance in high-risk UC populations

Keywords: *Ulcerative colitis; Mayo score; Mayo Endoscopic Score; Pancolitis; Colitis-associated colorectal cancer; Inflammatory bowel disease; North Karnataka; Endoscopic severity; UC malignancy risk*

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1. INTRODUCTION

Ulcerative colitis (UC) is a chronic idiopathic inflammatory bowel disease characterized by continuous mucosal inflammation of the colon and rectum. The disease exhibits a heterogeneous clinical course, ranging from mild distal disease to extensive pancolitis with severe endoscopic activity. Patients with long-standing UC particularly those with extensive colonic involvement and persistent mucosal inflammation are known to be at increased risk for developing colitis-associated colorectal cancer (CRC).[1–3] Endoscopic severity, often assessed using the Mayo Endoscopic Score

(MES), has emerged as a key predictor of adverse outcomes such as hospitalization, colectomy, and long-term neoplastic transformation.[4] Persistent severe inflammation (e.g., MES 3) has been shown to significantly correlate with cumulative inflammatory burden and subsequent dysplasia or cancer.[3,5] Additionally, disease duration beyond 8–10 years substantially amplifies the risk of neoplastic progression.[2]

While Western cohorts have defined much of the current understanding of UC-associated CRC, Indian data remain limited and regionally variable due to differences in genetic makeup, environmental exposures, dietary patterns, diagnostic practices, and healthcare access. The North Karnataka region represents a unique demographic that has not been extensively studied with respect to UC severity patterns and malignancy outcomes. This study seeks to evaluate disease extent, clinical and endoscopic severity, and their association with colonic malignancy in a tertiary-care UC cohort from North Karnataka. Improved understanding of these variables may help refine local risk stratification and strengthen early intervention and surveillance strategies.

2. MATERIALS AND METHODS

Study Design: This retrospective observational study was conducted at a tertiary-care gastroenterology center in North Karnataka. Medical records of patients diagnosed with ulcerative colitis (UC) over a 15-year period (January 2009–December 2024) were reviewed.

Study Population: A total of 122 patients with a confirmed diagnosis of UC were included in the analysis.

Inclusion Criteria

Age ≥18 years

Confirmed diagnosis of ulcerative colitis

Minimum follow-up of 1 year

Availability of complete diagnostic, clinical, and endoscopic records

Exclusion Criteria

Diagnosis of Crohn's disease or indeterminate colitis

Previous colectomy prior to UC diagnosis

Incomplete clinical or pathological data

Diagnostic Criteria

Diagnosis of Ulcerative Colitis: Ulcerative colitis was diagnosed based on combined clinical, endoscopic, radiologic, and histopathological criteria, with confirmation requiring concordance across at least two modalities. Colonoscopy was performed to assess mucosal inflammation, ulceration, loss of vascular pattern, disease extent, and endoscopic severity using the Mayo Endoscopic Score (MES). Contrast-enhanced CT (CECT) of the abdomen was used to evaluate colonic wall thickening, mural enhancement, vascular engorgement, and disease-related complications. Histopathological examination of colonic biopsies demonstrated chronic mucosal inflammation, crypt distortion, cryptitis or crypt abscesses, with absence of granulomas. Final diagnosis was confirmed by an experienced gastroenterologist and pathologist.

Diagnosis of Colorectal Malignancy: Colorectal malignancy was diagnosed using colonoscopy, imaging, and histopathology. Colonoscopy identified suspicious lesions such as masses, strictures, or polyps, followed by targeted biopsies. CECT of the abdomen and pelvis was performed to assess lesion extent, local invasion, lymphadenopathy, and staging. Only histologically confirmed adenocarcinomas were included in the analysis.

Data Collection: Data were extracted from electronic medical records and colonoscopy databases. Recorded variables included demographic details (age, sex, smoking status, and family history of IBD or colorectal cancer), disease characteristics (extent of disease, Clinical Mayo Score, Mayo Endoscopic Score, and disease duration), and malignancy outcomes (number of colorectal cancer cases, age and sex distribution, and disease phenotype with endoscopic severity among cancer cases).

3. RESULTS

Table 1. Baseline Demographic Characteristics (n = 122)

Parameter	Value
Total patients	122

Male	77 (63.1%)
Female	45 (36.9%)
Mean age at diagnosis	47 ± 11 years
Mean disease duration	12.8 ± 6.4 years
Smoking status	11.5% smokers
Family history of CRC/IBD	4.90%

A total of 122 patients diagnosed with ulcerative colitis were included in this study. The cohort demonstrated a male predominance (63.1%), with a mean age at diagnosis of 47 ± 11 years. The mean disease duration was 12.8 ± 6.4 years, and 11.5% of patients reported active smoking. Family history of IBD or colorectal malignancy was present in 4.9% of subjects.

Disease Extent and Severity

Table 2. Disease Extent and Clinical Severity

Disease Feature		n	%
Disease Extent	**Pancolitis**	82	67.2%
	Proctosigmoiditis	20	16.4%
	Proctitis	11	9%
	Left-sided colitis	9	7.4%
Clinical Mayo Score	**Mayo 3**	66	54.1%
	Mayo 2	35	28.7%
	Mayo 1	15	12.3%
	Mayo 0	6	4.9%

Graph 1. Disease Extent and Clinical Severity

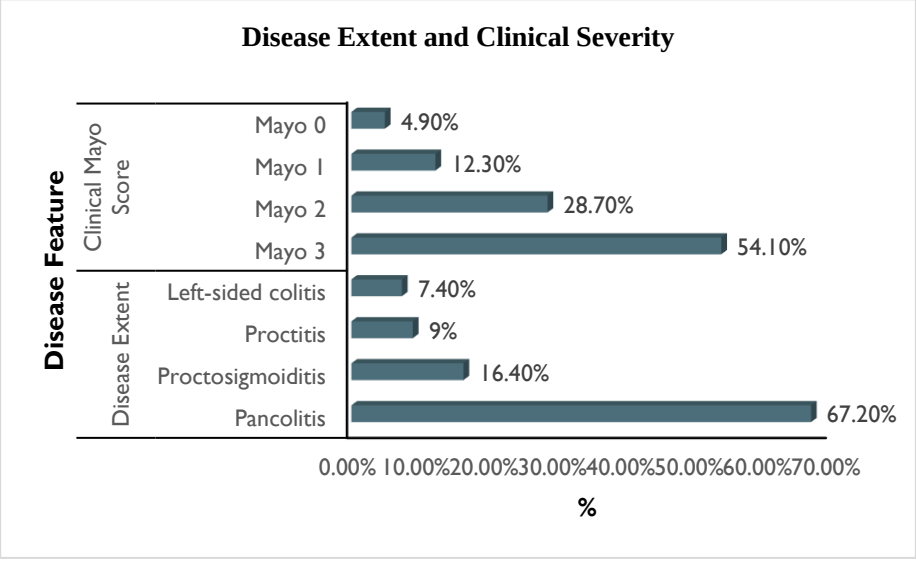
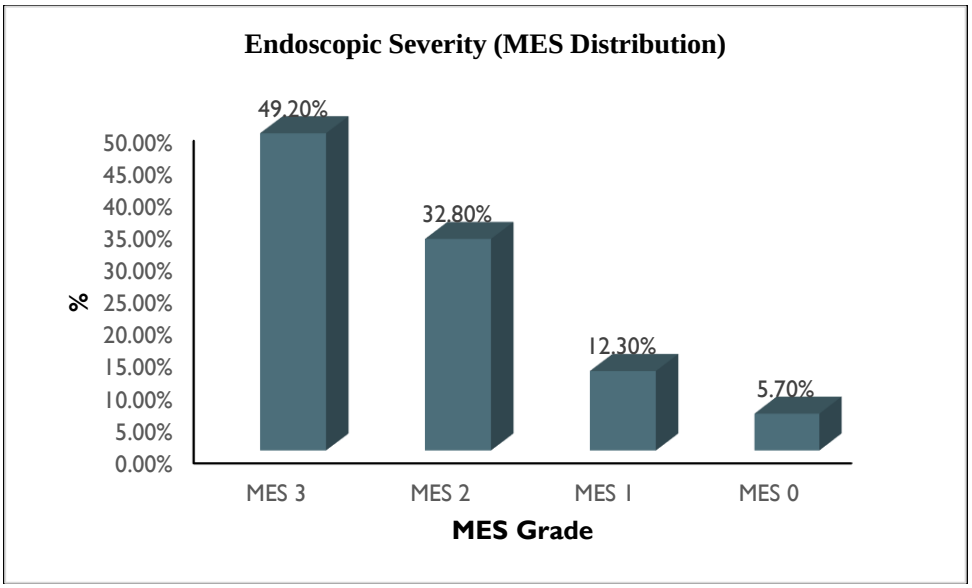


Table 3. Endoscopic Severity (MES Distribution)

MES Grade	n	%
MES 3	60	49.20%
MES 2	40	32.80%
MES 1	15	12.30%
MES 0	7	5.70%

Graph 2. Endoscopic Severity (MES Distribution)



Pancolitis was the most common disease pattern, seen in 82 patients (67.2%), followed by proctosigmoiditis (16.4%), proctitis (9.0%), and left-sided colitis (7.4%). Clinical disease severity at diagnosis was moderate-to-severe in most patients, with Mayo 3 in 54.1% and Mayo 2 in 28.7%. Endoscopic severity paralleled clinical scores, with MES 3 observed in 49.2% of patients.

Colonic Malignancy

Table 4 - Colonic Malignancy Characteristics in the UC Cohort

Parameter	Value
Total UC patients	122
Total CRC cases	9 (7.4%)
Male patients with CRC	6 (66.7%)
Female patients with CRC	3 (33.3%)
Overall M:F ratio in CRC	02:01
Disease characteristics in CRC cases	All had pancolitis, MES 3, and disease duration >10 years

Over the follow-up period, 9 patients (7.4%) developed colorectal cancer (CRC). Among these, 6 were male (66.7%) and 3 were female (33.3%), yielding a 2:1 male-to-female ratio. Importantly, all CRC cases occurred in patients with:

Pancolitis

MES 3 at baseline

Disease duration >10 years

No malignancy was observed in patients with limited disease or mild endoscopic inflammation.

Treatment Trends

All patients received mesalamine therapy, with steroids required in 72% of cases. Immunomodulators (AZA) were used in 34%, while biologic therapy was necessary in only 4.4%. Colectomy was performed in 3.2% of patients.

Overall, the cohort demonstrates a predominantly extensive and severe UC phenotype, with colonic malignancy confined to the subgroup with the highest inflammatory burden.

4. DISCUSSION

The present study offers important insights into the clinical spectrum of ulcerative colitis (UC) in a North Karnataka cohort, with findings that parallel both global and Indian trends. A notable observation was the predominance of pancolitis (67.2%), which is higher than that reported in several Western cohorts but consistent with Indian studies demonstrating more extensive disease at presentation.[1–3] Amarapurkar et al. reported pancolitis in 55–70% of Indian UC patients, while Sood et al. similarly found that nearly two-thirds of cases involved extensive colitis and were associated with higher disease severity.[1,2] The high proportion of severe endoscopic inflammation in our cohort (MES 3 in 49.2%) mirrors data from the IOCC cohort, where up to half of patients had moderate-to-severe mucosal disease.[3] Persistent mucosal inflammation is a well-established driver of neoplastic transformation, and several studies have emphasized that cumulative inflammatory burden is a more important predictor of colorectal cancer (CRC) risk than disease duration alone.[4–6] The CRC incidence of 7.4% in our study aligns with high-risk Indian tertiary-center data; for example, the AIIMS Delhi cohort reported a CRC rate of 6.5% among long-standing UC patients, with risk highest in those with pancolitis and prolonged disease duration.[8] Importantly, all CRC cases in our cohort occurred in individuals with long-standing pancolitis and severe inflammation (MES 3), reinforcing the central role of inflammation in carcinogenesis. In addition to disease-specific factors, advancing age is an independent risk factor for colitis-associated CRC, as older individuals demonstrate increased susceptibility to epithelial dysplasia owing to cumulative oxidative stress, impaired DNA repair, and cellular senescence.[5–7] Multiple international and Indian studies, including the AIIMS cohort, have shown that patients above 50 years of age carry a significantly higher CRC risk, particularly when combined with extensive colitis.[7,8] Despite the high burden of severe and extensive disease, biologic therapy usage in our cohort remained low (4.4%), consistent with patterns seen in Indian practice where factors such as cost constraints and reliance on mesalamine and corticosteroids influence treatment choices.[2,3] While many patients respond well to conventional therapy, delayed escalation may perpetuate inflammation and increase long-term malignancy risk. Overall, the findings of this study highlight that extensive disease, persistent endoscopic inflammation, and advancing age are the strongest predictors of CRC in UC, underscoring the need for earlier diagnosis, aggressive inflammation control, timely therapeutic optimization, and individualized surveillance strategies for high-risk Indian patients.

Overall, the study emphasizes that extent of disease and cumulative inflammatory burden remain the strongest predictors of malignancy, and early optimal control of inflammation should be prioritized to modify long-term outcomes.

5. CONCLUSION

This study demonstrates that patients with UC in North Karnataka commonly present with extensive and severe disease. Colonic malignancy was observed exclusively in individuals with long-standing pancolitis and severe endoscopic inflammation, reaffirming the central role of cumulative inflammatory burden in driving cancer risk. Enhancing early detection, optimizing inflammation control, and implementing structured long-term monitoring strategies may substantially reduce malignancy risk in high-risk UC populations. Further prospective studies from India are warranted to better define regional risk factors and refine surveillance protocols

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