EMERGENCY ADMISSION PATTERNS IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE BEFORE AND DURING THE COVID-19 PANDEMIC: A SINGLE-CENTER RETROSPECTIVE COMPARATIVE STUDY

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EMERGENCY ADMISSION PATTERNS IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE BEFORE AND DURING THE COVID-19 PANDEMIC: A SINGLE-CENTER RETROSPECTIVE COMPARATIVE STUDY (Abstract): During the COVID-19 pandemic, restrictions on outpatient activities, along with logistical and psychological barriers, altered how IBD patients presented clinically. We **aimed** to assess three key impacts of the pandemic: changes in hospitalization patterns, length of hospital stays, and shifts in the demographic distribution of disease subtypes among hospitalized patients. **Materials and methods:** A retrospective, single-center study was conducted at the Sf. Spiridon County Emergency Hospital in Iași. The research analyzed 390 unique adult patients hospitalized with IBD, comprising 285 patients from the pre-pandemic period (2018–2019) and 105 from the pandemic period (2020–2021). Demographic and clinical variables were extracted from observation sheets. Comparisons used non-parametric tests, the chi-square and Fisher exact tests, and binary logistic regression, performed in Python (SciPy) at $\alpha = 0.05$. **Results:** Emergency admissions rose from 11.6% to 54.3% (OR = 9.07; 95% CI 5.28–15.11; $p < 0.001$), with comparable increases in ulcerative colitis (OR = 9.69) and Crohn's disease (OR = 8.17). In logistic regression, the pandemic period was the only independent predictor of emergency admission (adjusted OR = 9.33; 95% CI 5.46–15.95; $p < 0.001$); age, sex, and disease type were not significant. Median length of stay rose by one day (4 to 5 days; $p = 0.010$), and anemia was more frequent (28.1% to 39.0%; OR = 1.64; 95% CI 1.03–2.62; $p = 0.048$). The tripartite analysis revealed that both pandemic subgroups, whether or not patients carried SARS-CoV-2 co-infection, exceeded pre-pandemic emergency rates substantially, but the two subgroups did not differ significantly. **Conclusions:** Disruption of outpatient care emerged as a systemic factor independent of viral co-infection itself. So, when patients with IBD presented during the pandemic, their demographic profile and disease type distribution remained unchanged, even though presentation patterns shifted significantly. This suggests that protocols dedicated to IBD monitoring should be implemented before future health crises. **Keywords:** INFLAMMATORY BOWEL DISEASE, COVID 19 PANDEMIC, EMERGENCY ADMISSION, ULCERATIVE COLITIS, CROHN'S DISEASE.

INTRODUCTION

Inflammatory Bowel Diseases (IBD) are a group of chronic idiopathic immune-mediated conditions characterized by persistent inflammation of the gastrointestinal tract. The relapsing clinical course is marked by flares and remissions that require lifelong monitoring and management (1–3). The care of these patients depends on frequent outpatient monitoring, the use of biomarkers, and periodic endoscopic procedures to assess disease activity, surveillance for dysplasia, and surgical intervention in the event of complications (5, 6).

The therapeutic management of IBD currently focuses on immunomodulators, corticosteroids, and biological therapies to control inflammation, and patients require periodic, rigorous clinical, biological, and endoscopic monitoring (7).

Untreated chronic intestinal inflammation inevitably progresses to permanent damage and severe complications such as strictures, abscesses, and fistulas, which increase the need for major surgery and early use of biological therapies (4, 8).

The COVID-19 pandemic caused by the SARS-CoV-2 virus has had a significant negative impact on the care of patients with IBD, changing their presentation profile (8, 9).

The management of these cases has been severely affected by the postponement of elective surgeries and surveillance endoscopies to conserve medical resources and reduce the risk of viral transmission.

Patients with UC are particularly vulnerable, presenting a significantly higher risk of hospitalization and development of severe forms of COVID-19 compared with patients with Crohn's disease (CD) (1). SARS-CoV-2 infection has been associated with an increased likelihood of worsening of IBD-specific symptoms in the first 2 weeks post-infection, especially in male patients or those with a low body mass index (BMI) (10).

The reorganization of health systems has also contributed to marked underdiagnosis and critical delays in the diagnostic process, with data suggesting that a delay of more than a month in seeking medical care after symptom onset was directly correlated with a higher incidence of long-term adverse events (4, 10, 11).

In addition, the exacerbation of anxiety states, emotional stress, and feelings of social isolation or, conversely, interpersonal tensions during quarantine represented a psychological burden directly correlated with the worsening of functional gastrointestinal symptoms through the gut-brain axis and increased Crohn's disease activity (12, 13).

Diagnostic delays exceeding 12–16 months exacerbate medical challenges, and long latency periods are associated with an increased risk of emergency admissions (14).

Also, changes in therapeutic regimens, decreased use of systemic corticosteroids, or unjustified treatment interruptions due to fear of immunosuppression seem to have contributed to the exacerbation of disease activity during this period

This retrospective analysis from a single center aims to highlight the impact of the SARS-CoV-2 pandemic on the distribution of CD and UC across female and male populations in rural and urban areas.

MATERIALS AND METHODS

Study design. This is a retrospective comparative study, from January 1, 2018, to December 31, 2019, and the pandemic period, from January 1, 2020, to December

31, 2021, conducted in the Sf. Spiridon County Clinical Emergency Hospital, Iași, Romania.

The study protocol was reviewed and approved by the Institutional Ethics Committee of the Sf. Spiridon County Clinical Emergency Hospital, Iași, Romania (Approval No. 47/18.02.2025). The study was conducted in accordance with the Declaration of Helsinki and with applicable General Data Protection Regulation (GDPR) requirements.

Patients. The final analysis dataset comprised 390 unique adult patients hospitalized with IBD during the study periods. The pre-pandemic cohort included 285 patients (110 with Crohn disease, 175 with ulcerative colitis); the pandemic cohort included 105 patients (40 with Crohn disease, 65 with ulcerative colitis). Patients with IBD were identified from hospital discharge records using ICD-10 diagnostic codes for Crohn's disease and ulcerative colitis recorded either as the principal diagnosis or as a secondary diagnosis. Each patient was included only once in the dataset, and no repeated admissions of the same patient were analyzed. Among patients in the pandemic cohort, 13 had documented SARS-CoV-2 co-infection, and 92 had none.

Inclusion criteria were: age ≥18 years; hospital admission during one of the predefined study periods, namely 2018–2019 for the pre-pandemic cohort and 2020–2021 for the pandemic cohort; a documented diagnosis of inflammatory bowel disease, defined as Crohn's disease or ulcerative colitis recorded in the principal or secondary discharge diagnosis field; and availability of the minimum dataset required for analysis, including age, sex, area of residence, disease type, admission route, admission and discharge dates, and discharge status.

Exclusion criteria were: age <18 years; diagnosis of indeterminate colitis or other non-IBD colitis; admissions primarily related to other gastrointestinal disorders not attributable to Crohn's disease or ulcerative colitis; duplicate admissions of the same patient during the study interval; recent major abdominal surgery unrelated to IBD; missing essential data required for the primary outcome analysis; and absence of institutional consent or legal permission for the use of anonymized clinical data for research purposes.

Variables. These were obtained from the patients' clinical observation sheets. Demographic variables were age (years), sex, and area of residence (urban or rural). Clinical variables were disease type (Crohn disease or ulcerative colitis), admission type, length of stay, and in-hospital death. Admission type was dichotomized as emergency versus non-emergency. Length of stay was computed as the number of days between the admission and discharge dates. We determined the number of comorbidities by counting secondary diagnoses, excluding inflammatory bowel disease and SARS-CoV-2 infection. At the same time, we identified anemia based on the secondary diagnoses. SARS-CoV-2 co-infection was recorded only within the pandemic cohort.

The primary outcome was route of hospital admission, classified as emergency or non-emergency. Secondary outcomes were length of hospital stay, in-hospital mortality, anemia recorded during hospitalization, and, within the pandemic cohort, the association between documented SARS-CoV-2 co-infection and clinical outcomes.

Statistical analysis. Analyses used Python 13 (SciPy), with two-tailed tests at $\alpha =$

.05. Because the Shapiro–Wilk test rejected normality for every continuous variable, between-group comparisons used the Mann–Whitney U test (rank-biserial r; medians with interquartile ranges). Categorical associations used the chi-square test (Cramér's V) or, for sparse 2×2 tables, Fisher's exact test (odds ratio with Haldane-corrected 95% CI); p-values for the emergency-admission family were adjusted by the Benjamini–Hochberg procedure. The pandemic cohort was further split by co-infection status into three groups, compared by chi-square with Holm-corrected Fisher contrasts for emergency admission and by Kruskal–Wallis with Dunn post-hoc tests (ε^2) for length of stay. A binary logistic regression of period on emergency admission was adjusted for age, sex, and disease type.

RESULTS

Descriptive statistics. Continuous variables are summarized in first table and categorical variables in second table. Median age was comparable across periods (45 *vs.* 42 years), median length of stay was longer during the pandemic (5 *vs.* 4 days), and the median comorbidity count was four in both periods.

TABLE I.

Continuous variable profiles across study periods: age, length of stay, and comorbidity burden

Variable	Cohort	M (SD)	Mdn [IQR]	Min–Max	95% CI
Age (years)	Pre-pandemic	45.31 (15.80)	45.0 [32.0–58.0]	18–86	43.47, 47.15
	Pandemic	44.93 (15.57)	42.0 [32.0–56.0]	19–79	41.92, 47.95
Length of stay (days)	Pre-pandemic	4.96 (4.63)	4.0 [2.0–6.0]	0–45	4.43, 5.50
	Pandemic	6.17 (5.36)	5.0 [3.0–7.0]	0–32	5.13, 7.21
Comorbidities (n)	Pre-pandemic	4.25 (2.96)	4.0 [2.0–5.0]	0–18	3.91, 4.60
	Pandemic	4.83 (3.26)	4.0 [2.0–6.0]	0–14	4.20, 5.46

M - mean; SD - standard deviation; Mdn - median; IQR - interquartile range; CI - confidence interval for the mean

TABLE II.

Patient characteristics by study period: sex, residence, disease type, admission route, and in-hospital mortality

Variable	Level	Pre-pandemic (n = 285)	Pandemic (n = 105)
Disease type	Ulcerative colitis	175 (61.4%)	65 (61.9%)
	Crohn	110 (38.6%)	40 (38.1%)
Sex	M	145 (50.9%)	55 (52.4%)
	F	140 (49.1%)	50 (47.6%)
Residence	Urban	189 (66.3%)	63 (60.0%)
	Rural	96 (33.7%)	42 (40.0%)
Emergency admission	No	252 (88.4%)	48 (45.7%)
	Yes	33 (11.6%)	57 (54.3%)
In-hospital death	No	284 (99.6%)	103 (98.1%)
	Yes	1 (0.4%)	2 (1.9%)

Pre-Pandemic Versus Pandemic Comparison. The two cohorts were comparable at baseline: age, sex distribution, area of residence, and the Crohn-to-ulcerative-colitis ratio did not differ between periods (all $p \geq .299$) (tab. III).

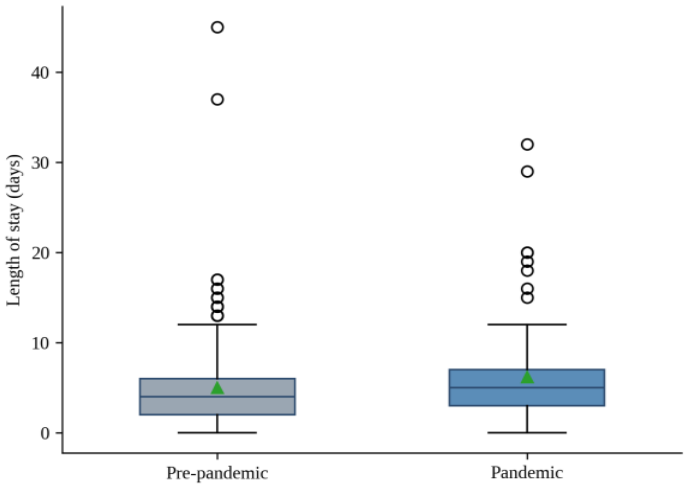

Fig. 1. Length of hospital stay by period: pandemic admissions were consistently longer

TABLE III.

Pre-pandemic versus pandemic outcomes: emergency admission, length of stay, anemia, and mortality

Comparison	Pandemic *vs.* pre	Statistic	Effect size	p	p (BH)
Emergency admission, overall	54.3% *vs.* 11.6%	Fisher exact	OR = 9.07 [5.28, 15.11]	< .001	< .001
Emergency admission, ulcerative colitis	56.9% *vs.* 12.0%	Fisher exact	OR = 9.69 [4.87, 18.37]	< .001	< .001
Emergency admission, Crohn	50.0% *vs.* 10.9%	Fisher exact	OR = 8.17 [3.37, 18.42]	< .001	< .001
Length of stay	Mdn 5 *vs.* 4	U = 17480	r = .17	.010	-
In-hospital death	1.9% *vs.* 0.4%	Fisher exact	OR = 5.51 [0.60, 35.12]	.178	-
Age	Mdn 42 *vs.* 45	U = 14770	r = .01	.846	-
Sex by period	-	$\chi^2(1) = 0.02$	V = .01	.881	-
Residence by period	-	$\chi^2(1) = 1.08$	V = .05	.299	-
Disease type by period	-	$\chi^2(1) = 0.00$	V = .00	> .999	-
Comorbidity count	Mdn 4 *vs.* 4	U = 16574.5	r = .11	.100	-
Anemia	39.0% *vs.* 28.1%	Fisher exact	OR = 1.64 [1.03, 2.62]	.048	-

OR = odds ratio (pandemic *vs.* pre-pandemic); M–W U = Mann–Whitney U;
r = rank-biserial correlation; V = Cramér's V. Brackets give 95% confidence intervals

Length of stay was longer during the pandemic (median 5 *vs*. 4 days; p = .010, r = .17), and anemia was recorded more often (39.0% vs. 28.1%; OR = 1.64, 95% CI 1.03–2.62; p = .048). Comorbidity counts did not differ between periods (median 4 in both; p = .100).

In-hospital death occurred in 1 of 285 pre-pandemic patients (0.4%) and 2 of 105 pandemic patients (1.9%; p = .178) (tab. III).

Three-group comparison by co-infection status. Splitting the pandemic cohort by co-infection status produced three groups: pre-pandemic (n = 285), pandemic without co-infection (n = 92), and pandemic with co-infection (n = 13).

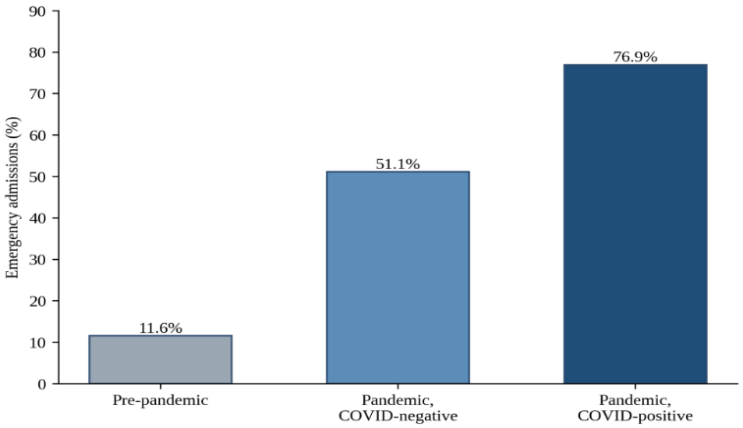

Fig. 3. Emergency admission rates by co-infection subgroup: both pandemic groups far exceeded the pre-pandemic baseline

TABLE IV.

Emergency admission and length of stay across three pandemic subgroups: pre-pandemic, COVID-negative, and COVID-positive.

Comparison	Statistic / rates	Effect	p
Emergency admission - omnibus	$\chi^2(2) = 83.12$	-	< .001
Pre-pandemic *vs*. Pandemic COVID-negative	11.6% *vs*. 51.1%	OR = 0.13	< .001
Pre-pandemic *vs*. Pandemic COVID-positive	11.6% *vs*. 76.9%	OR = 0.04	< .001
Pandemic COVID-negative *vs*. Pandemic COVID-positive	51.1% *vs*. 76.9%	OR = 0.31	.135
Length of stay - omnibus	H(2) = 8.02	ε^2 = .02	.018
Pre-pandemic *vs*. Pandemic COVID-negative	Mdn 4 *vs*. 5 d	-	.106
Pre-pandemic *vs*. Pandemic COVID-positive	Mdn 4 *vs*. 5 d	-	.106
Pandemic COVID-negative *vs*. Pandemic COVID-positive	Mdn 5 *vs*. 5 d	-	.244

Omnibus tests are the chi-square test (emergency admission) and the Kruskal–Wallis test (length of stay). Indented rows are pairwise post-hoc contrasts with Holm-adjusted p values; emergency-admission post-hoc odds ratios are oriented as the first group versus the second.

Emergency admission differed across the three groups, $\chi^2(2) = 83.12$, p < .001. Both pandemic groups exceeded the pre-pandemic emergency rate of 11.6% - 51.1% without co-infection and 76.9% with co-infection - and both pairwise contrasts

against the pre-pandemic group survived Holm correction ($p < .001$ and $p < .001$). The two pandemic groups did not differ from each other ($p = .135$). In-hospital death was rare in both pandemic subgroups (1 of 13 co-infected; 1 of 92 non-co-infected).

Length of stay also varied across the three groups (Kruskal–Wallis $H(2) = 8.02$, $p = .018$, $\varepsilon^2 = .02$), with medians of 4, 5, and 5 days respectively. After Holm-adjusted Dunn comparisons, no individual pair reached significance (all $p \geq .106$).

TABLE V.
Logistic regression for emergency admission: pandemic period as the sole independent predictor

Predictor	OR	95% CI	p
Pandemic period (*vs.* pre-pandemic)	9.33	[5.46, 15.95]	< .001
Age (per year)	0.99	[0.97, 1.00]	.095
Male (*vs.* female)	1.45	[0.85, 2.50]	.175
Ulcerative colitis (*vs.* Crohn)	1.09	[0.62, 1.90]	.774

Reference categories: pre-pandemic period, female sex, Crohn disease.
Model n = 390; McFadden pseudo-R^2 = .18; AUC = .76.

DISCUSSION

The two cohorts were demographically similar: age, sex, residence, and Crohn's-ulcerative colitis ratio showed no measurable changes between periods. In this stable context, the mode of presentation has changed. Emergency admissions increased almost fivefold, from 11.6% to 54.3%, and the increase was present in both types of illnesses, with odds ratios close to or above eight. Since the patient profile did not change, while the admission route did, this difference suggests that during the pandemic, the way in which patients with inflammatory bowel disease IBD arrived at the hospital changed, and not their characteristics. These data are consistent with results reported in the scientific literature. Malhi *et al.* (6) found that IBD patients were more likely to be admitted through the emergency department during the pandemic, linking this shift to the collapse of outpatient monitoring rather than to any change in disease severity at baseline. Taken together, these data suggest that what we observed in our study was not an isolated phenomenon tied to local circumstances, but part of a broader, geographically consistent failure of chronic disease management under pandemic conditions (16, 17).

Two other indicators trended in the same direction: hospital stays were extended by about a day on average, and anemia was documented more frequently during the pandemic. The number of comorbidities, on the other hand, remained unchanged, so that longer hospitalizations and higher frequency of anemia are not explained by a more comorbid population. The increase in the prevalence of anemia in the pandemic cohort warrants special attention. Anemia in IBD, reflects cumulative mucosal injury and tends to worsen when follow-up lapses. The fact that it was recorded more frequently in pandemic admissions (39.0% *vs.* 28.1%; OR = 1.64 suggests that patients presented to hospital with a more advanced inflam-

matory flare, consistent with the hypothesis of late presentation after a period of insufficient outpatient monitoring. Delayed diagnosis and prolonged gaps in IBD monitoring have been independently linked to higher disease activity at first medical contact (4, 14), and the pandemic created exactly those conditions on a large scale (18, 19).

The co-infection sub analysis clarifies the picture so that among hospitalizations during the pandemic, patients with SARS-CoV-2 were admitted as emergencies more often than those without, but the difference did not reach significance, and the confidence interval was wide, reflecting the small number of co-infected patients. Therefore, the increase in the number of emergencies was a feature of the entire pandemic cohort and was not limited to the subgroup of co-infected people. Unjustified interruption or modification of therapeutic regimens represents one of the plausible biological mechanisms that may explain the increased severity of presentations during this period. Fear of immunosuppression in a viral context led many patients - and some physicians - to reduce or discontinue corticosteroids and biological agents, removing the pharmacological brake on intestinal inflammation at a time when disease monitoring was already compromised (2, 15).

Comparison of the three groups explicitly emphasized the same thing: both pandemic subgroups exceeded the pre-pandemic emergency rate by a wide margin, while the pandemic co-infected and non-co-infected groups were statistically indistinguishable. Holding age, sex, and disease type constant, only the pandemic period predicted emergency admission, with the likelihood of admission being approximately nine times higher than in the pre-pandemic period, while none of the demographic or disease covariates had an independent weight. A recent systematic review and meta-analysis identified an increased incidence of both ulcerative colitis and Crohn's disease following COVID-19, with proposed mechanisms including viral-driven immune dysregulation and intestinal dysbiosis (9, 21).

The sex distribution we observed - female predominance in Crohn's disease, male predominance in ulcerative colitis - is consistent with patterns reported in the broader IBD literature (1, 2, 22). The urban concentration of women with Crohn's disease is harder to interpret. It may reflect differential access to specialized diagnostic services, which remain more available in urban settings, or it may partly capture environmental exposure differences between urban and rural populations - diet, microbiome composition, physical activity - that have been proposed as modulators of IBD risk (23-25).

The results obtained were limited by several constraints. The data come from a single center and a fixed number of admissions, with a single record per patient and no follow-up after discharge.

Given the previously mentioned small sample, our results encourage the conduct of multicenter studies to validate whether this pattern of emergency presentation was uniform nationwide.

CONCLUSIONS

The COVID-19 pandemic seems to have changed the course of IBD patients hospitalized in the Sf. Spiridon County Clinical Emergency Hospital in Iași, without altering their demographic profile and disease type distribution.

The change affected how they were presented-not their underlying IBD profile. A breakout analysis of three subgroups indicates that both COVID cohorts (with/without documented SARS-CoV-2 co-infection) overwhelmingly outstripped the percentage of emergencies, with no difference between them, and the average length of hospital stay increased by one day ($p= 0.010$).

These data support the need to develop protocols for tracking IBD patients during any future crisis, which can help mitigate a decline in ongoing care during urgent responses.

CONFLICT OF INTEREST AND FUNDING

The authors declare that there is no conflict of interest and that they received no funding regarding this scientific research.

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