

CLINICAL OUTCOMES OF COVID-19 AND IMPACT ON DISEASE COURSE IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE

P. Wetwittayakhleng¹, F. Albader¹, P. Golovics¹, G. Drügg Hahn¹, T. Bessissow¹, A. Bitton¹, W. Afif², G. Wild¹, P.L. Lakatos³

1. Gastroenterology, McGill University Health Centre, Montreal, QC, Canada; 2. Gastroenterology, McGill University, Montreal, QC, Canada; 3. IBD Centre, McGill University Health Center, Montreal, QC, Canada

Background: The impact of COVID-19 has been of great concern in patients with IBD worldwide, including an increased risk of severe outcomes and/or flare of IBD.

Aims: This study aims to evaluate prevalence, outcomes, the impact of COVID-19 in patients with IBD, and risk factors associated with severe COVID-19 or flare of IBD.

Methods: A consecutive cohort of IBD patients diagnosed with COVID was obtained between March 2020 - April 2021.

Results: A total of 3,516 IBD cohort patients were included. 82 patients (2.3%) were diagnosed with COVID infection (median age 39.0, 77% with Crohn's disease). The prevalence of COVID-19 in IBD was significantly lower compared to the general population in Canada and Quebec (3.5% vs. 4.3%, $p < 0.001$). Severe COVID occurred in 6 patients (7.3%); 2 patients (2.4%) died. A flare of IBD post-COVID infection was reported in 8 patients (9.8%) within 3 months. Age ≥ 55 years (OR 11.1, 95%CI:1.8–68.0), systemic corticosteroid use (OR:4.6, 95%CI:0.7-30.1), active IBD (OR:3.8, 95%CI:0.7-20.8) and comorbidity (OR:4.9, 95%CI:0.8-28.6) were associated with severe COVID. After initial infection, 61% received vaccinations.

Conclusions: The prevalence of COVID-19 among patients with IBD was lower than the general population. Severe COVID and flare of IBD were relatively rare. Older age, comorbidities, active IBD, and corticosteroid, but not biological therapy were associated with severe COVID.

Outcome of COVID-19 in IBD patients, disease course of IBD, and vaccination after COVID infection

COVID-19 outcomes	Number of patients (%) a
Mild COVID-19 symptoms	76 (92.7)
Hospitalization due to COVID-19	6 (7.3)
Duration of hospitalization (day), median (IQR)	10.5 (3.75-29.0)
Recovery day after admission, median (IQR)	12.5 (7.0-25.5)
COVID-19 pneumonia	5 (6.1)
Required mechanical ventilators	2 (2.4)
Required intensive care admission	2 (2.4)
Dead	2 (2.4)
C-reactive protein post-COVID (mg/l), median (IQR)	4 (2.0-12.8)

Fecal calprotectin post-COVID (mcg/g), median (IQR)	197 (57.5 – 653.5)
Flare of IBD disease after COVID-19 infection	8 (9.8)
- Duration after COVID (weeks), median (IQR)	9.5 (7.2-12.0)
- C-reactive protein during flare (mg/L), median (IQR)	8.0 (3.0-42.0)
- Fecal calprotectin during flare (mcg/g), median (IQR)	1,088.5 (562- 2,025)
Treatment care outcomes	
- Loss of follow-up	15 (18.3)
- Disruption of biologics	30 (36.6)
- Duration of holding biologics (week), median (IQR)	3.0 (2.0-5.0)
- Number of patients had delay endoscopy	7 (8.5)
COVID-19 Vaccination	
- 1 dose vaccine	39 (47.6)
- 2 doses vaccine	11 (13.4)

a Data are presented as number (%) unless indicated otherwise. CD; Crohn's disease, UC; Ulcerative colitis, NA; not available, IQR; interquartile range,

Baseline Characteristic of IBD patients with COVID-19 infection

Characteristics	Overall (n=82)	CD (n=63)	UC (n=19)
Age (years), median (IQR)	39.0 (27.8-48.0)	38.0 (27.0-47.0)	46.0 (34.0-58.0)
Female, n (%)	41 (50.0)	30 (47.6)	11 (57.9)
Body mass index [kg/m ²], mean (SD)	24.0 (22.0-28.0)	24.0 (22.0-28.0)	23.8 (21.3-29.5)
Active smoking, n (%)	5 (6.1)	5 (7.9)	0
Duration of IBD (year), median (IQR)	11.5 (6.0-20.2)	12.0 (7.0-21.0)	11.0 (2.0-20.0)
Concomitant therapy for IBD, n (%)			
5-Aminosalicylates	18 (22.0)	7 (11.1)	11 (57.9)
Thiopurines	3 (3.7)	3 (4.8)	0
Sulfasalazine	3 (3.7)	2 (3.2)	1 (5.3)
Systemic corticosteroids	9 (11.0)	4 (6.3)	5 (26.3)
- Steroid dose (mg/d), median (IQR)	20.0 (7.5-40.0)	7.5 (5.0-32.5)	20.0 (17.5-45.0)
Methotrexate	1 (1.2)	1 (1.6)	0
Biologics, n (%)	59 (72.0)	49 (77.8)	10 (52.6)
- Infliximab ^a	11 (18.6)	8 (16.3)	3 (30.0)
- Adalimumab	18 (30.5)	16 (32.7)	2 (20.0)
- Vedolizumab ^a	6 (10.2)	4 (8.2)	2 (20.0)
- Ustekinumab ^a	21 (35.6)	20 (40.8)	1 (10.0)
- Tofacitinib ^a	1 (1.7)	0	1 (10.0)
- Other biologics (clinical trial study) ^a	2 (3.4)	1 (2.0)	1 (10.0)
- Previous expose to biologics	29 (35.4)	27 (42.9)	2 (10.5)
Number of Comorbidities, n (%)			
None	54 (65.9)	43 (68.3)	11 (55.6)
1	18 (22.0)	12 (19.0)	6 (33.3)
2	7 (8.5)	5 (7.9)	2 (11.1)
3	1 (1.2)	1 (1.6)	0
≥ 4	2 (2.4)	2 (3.2)	0
Major Comorbidity, n (%)			
- Cardiovascular disease	8 (9.8)	8 (12.7)	0
- Chronic lung disease	7 (8.5)	4 (6.3)	3 (15.8)
- Diabetes Miletus	5 (6.1)	5 (7.9)	0
- Obesity (BMI > 30 kg/m ²)	14 (17.1)	10 (15.9)	4 (21.1)
- Immune-mediated diseases	6 (7.3)	4 (6.3)	2 (10.5)
- Malignancies	2 (2.4)	1 (1.6)	1 (5.3)
- Chronic renal disease	1 (1.2)	1 (1.6)	0
IBD characteristics, n (%)			
UC type			
- E1/ E2/ E3	NA	NA	1 (5.3)/9 (47.4)/9 (47.4)
- S1/ S2/ S3	NA	NA	5 (26.3)/13 (68.4)/1 (5.3)
CD type			
- L1/ L2/ L3/ L4	NA	12 (19.0)/18 (28.6)/30 (47.6)/3 (4.8)	NA
- B1/B2/B3	NA	38 (60.3)/21 (33.3)/4 (6.4)	NA
Previous intestinal resection	15 (18.3)	15 (23.8)	0
Perianal involvement/fistula	12 (14.6)	12 (19.0)	0
Extra-intestinal manifestation	18 (22.0)	14 (22.2)	4 (21.1)
IBD disease activity before COVID-19 diagnosis			
- HBI score for CD, median (IQR)	NA	2 (0-2)	NA
- Partial Mayo score for UC, median (IQR)	NA	NA	1 (0-2)
Patients with endoscopy before COVID, n (%)	39 (47.6)	28 (44.4)	11 (57.9)
- SES-CD for CD (median, IQR)	NA	1 (0-7)	NA
- Mayo endoscopic score for UC (median, IQR)	NA	NA	1 (0-2)
Patients with clinically active, n (%)	18 (22.0)	14 (22.2)	4 (21.1)
Patients with endoscopic active, n (%)	13 (15.9)	9 (14.3)	4 (22.1)
- SES-CD in active CD, median (IQR)	NA	9 (3-20)	NA
- Mayo endoscopic score in active UC, median (IQR)	NA	NA	2 (2-3)
Labs before diagnosis of COVID, median (IQR)			
- Hemoglobin, g/L	132.5 (122.0-146)	133.5 (122-146.5)	131.5 (119-143)
- Albumin, g/L	40.3 (38.0-44.0)	41.0 (37.2-43.5)	42.0 (38.0-45.0)
- C-reactive protein, mg/l	4.0 (1.0-8.0)	4.0 (2.0-8.0)	2.0 (0.8-13.5)
- Fecal calprotectin, mcg/g	165 (36.5-320)	165.5 (37.8-284.5)	165 (33.5-716)

^a percentage were calculated as in patients with biologics user

CD; Crohn's disease, UC; Ulcerative colitis, HBI; Harvey Bradshaw Index, SES-CD; Simplified Endoscopic activity Score for Crohn's Disease, NA; not available, UC classification; E1: ulcerative proctitis, E2: left-sided colitis, E3: extensive colitis, S1: mild, S2: Moderate, S3: Severe CD classification; L1: ileal CD, L2: colonic CD, L3: ileocolonic CD, L4: upper gastrointestinal CD, B1: non-stricturing, non-penetrating, B2: structuring, B3: penetrating

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