Obesity is Associated with an Increased Risk of Colorectal Neoplasia in Patients with Inflammatory Bowel Disease

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Introduction

Obesity is associated with an increased risk of colorectal neoplasia, but this relationship has not been studied in patients with inflammatory bowel disease (IBD). Both IBD and obesity induce a chronic inflammatory state, so the combination of the two could have an additive or synergistic effect on risk of colorectal neoplasia. Given the increased baseline incidence of dysplasia among IBD patients, identifying modifiable risk factors, such as obesity, could have a significant impact on long term cancer-related outcomes.

Methods and Materials

- Design: Retrospective case-control study of IBD colitis patients at an academic IBD Center between January 2006 and February 2022
- Data Acquisition: Demographic and disease-related data, known risk factors for dysplasia, and median BMI during the follow-up period were obtained
- Inclusion Criteria: Only patients with at least 5 years of colonoscopy reports were included
- Case = Biopsy proven dysplasia—indefinite, low-grade, or high-grade—during the study period
- Control = Absence of biopsy-proven dysplasia during the study period
- Obesity = BMI of 30 or greater
- Univariate analysis: T-test for continuous variables and chi-square for categorical variables
- Multivariate analysis: Logistic regression to model dysplasia risk

Tables / Figures

Table 1. Univariate Analysis

		Dysplasia		No Dysplasia		
		N = 106	%	N = 125	%	p
Number of colonoscopies	Mean	5.29		3.90		< 0.001
IBD Subtype						0.016
	Crohns	34	32.1	54	43.2	
	UC	72	67.9	66	52.8	
	Unknown	0	0.0	5	4.0	
Active colitis		86	81.1	101	80.8	0.541
Maximum disease extent						0.271
	L1	8	7.5	10	8.0	
	L2	15	14.2	17	13.6	
	L3	8	7.5	13	10.4	
	E1	12	11.3	4	3.2	
	E2	17	16.0	5	4.0	
	E3	29	27.4	6	4.8	
	Other	17	16.0	34	27.2	
Maximum histological severity						0.127
	Inactive	17	16.0	20	16.0	
	Mild	28	26.4	38	30.4	
	Moderate	25	23.6	40	32.0	
	Severe	31	29.2	21	16.8	
Maximum endoscopic severity						
	Inactive	23	21.7	34	27.2	0.423
	Mild	31	29.2	32	25.6	
	Moderate	32	30.2	44	35.2	
	Severe	18	17.0	14	11.2	
Strictures		13	12.3	16	12.8	0.903
Pseudopolyps		46	43.4	43	34.4	0.162
Any short tubular colon		1	0.9	0.0	0.0	0.276
IBD duration	Mean (years)	17.6	16.6	13.85	11.1	0.098
Sex					0.0	0.180
	Female	50	47.2	70.00	56.0	
	Male	56	52.8	55.00	44.0	
Age	Mean (years)	54.1	51.0	46.28	37.0	0.000
Smoking history						0.048
	Never	59	55.7	88.0	70.4	
	Former	43	40.6	34.0	27.2	
	Current	4	3.8	2.0	1.6	
Diagnosis of PSC		4	3.8	3.0	2.4	0.559
History of Diabetes		15	14.2	14.0	11.2	0.500
History of non-melanomatous neoplasia		22	20.8	19.0	15.2	0.310
FH of CRC in 1st degree relative		16	15.1	14.0	11.2	0.393
Prior dysplasia		21	19.8	7.0	5.6	0.002
Medication exposure						0.233
	Never	11	10.4	22.0	17.6	
	Former	32	30.2	30.0	24.0	
	Current	62	58.5	73.0	58.4	
BMI	Median (kg/m^2)	27.32	25.8	25.45	20.4	0.008

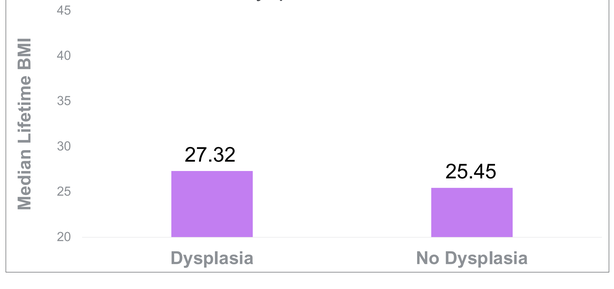
Comparing demographic and IBD-related risk factors for developing colorectal dysplasia in a cohort of 231 IBD patients; *p* values <0.2 were included in the multivariable logistic regression and are bolded. Abbreviations: BMI = body mass index, FH = family history, IBD = inflammatory bowel disease, PSC = primary sclerosing cholangitis. Medication Exposure = 5-ASA; immunomodulators - AZA/6MP, MTX; biologics - IFX, ADA, CTZ, GOL, UST, VEDO; small molecules - TOFA)

Tables / Figures

Table 2. Multivariate Analysis

	OR	Std. Err.	z	p	95% CI
IBD Subtype	1.373	0.452	0.960	0.335	0.721- 2.618
Histologic Severity	1.063	0.196	0.330	0.740	0.741 - 1.526
Pseudopolyp	1.309	0.503	0.700	0.483	0.616 - 2.779
IBD Duration	0.997	0.013	-0.210	0.831	0.971 - 1.024
Sex	1.351	0.477	0.850	0.395	0.676 - 2.701
Age	1.023	0.012	1.890	0.058	0.999 - 1.048
Smoking History	1.256	0.437	0.660	0.512	0.635 - 2.485
Prior Dysplasia	3.980	2.381	2.310	0.021	1.232 - 12.855
Obesity	2.899	1.294	2.390	0.017	1.209 - 6.954
Number of Colonoscopies	1.260	0.102	2.860	0.004	1.076 - 1.477

Figure 1. Median Lifetime BMI in Dysplasia vs. non-Dysplasia Patients



Results

- 106 cases had biopsy-proven colorectal dysplasia (64 IND, 36 LGD, 10 HGD); 125 controls had no dysplasia.
- Univariate Analysis: Number of colonoscopies ($p < 0.001$) IBD subtype ulcerative colitis ($p = 0.016$), maximum histologic severity ($p = 0.127$), pseudopolyps ($p = 0.162$), IBD duration ($p = 0.098$), sex ($p = 0.18$), age ($p < 0.001$), smoking history ($p = 0.048$), prior dysplasia ($p < 0.001$), and obesity ($p < 0.001$) were associated with dysplasia (See table 1).
- Multivariate Analysis: Number of colonoscopies (OR 1.26, 95% CI 1.08 - 1.48, $p = 0.004$), prior dysplasia (OR 3.98, 95% CI 1.23 - 12.86, $p = 0.021$), and obesity (OR 2.90, 95% CI 1.21 - 6.95, $p = 0.017$) were each independently associated with increased dysplasia risk (See table 2).

Notable Finding: Individuals with IBD and Obesity were 2.9 x more likely to develop colorectal dysplasia than individuals with IBD alone.

Conclusions

Patients with IBD have an increased risk of colorectal neoplasia, but a variety of comorbid states may exacerbate this risk. Notably, we identified obesity as an independent risk factor for dysplasia. Further research is needed to determine whether this risk functions synergistically with IBD or just as an independent risk factor. Targeted weight-loss interventions may reduce the incidence of dysplasia among patients with IBD.

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