



Profile of Surgeons Who Treat Inflammatory Bowel Diseases in Brazil

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Abstract

Objective To describe the profile of surgeons who treat patients with inflammatory bowel disease as well as the characteristics of inflammatory bowel disease care, unmet demands, and difficulties.

Methods The research participants answered a Google Forms questionnaire.

Results Of the 99 surgeons who participated in the survey, 84.5% were coloproctologists, 40% were from the southeastern region of Brazil, and 77.7% were male and had been working for more than 19 years. Regarding the healthcare sector, 63.6% of surgeons worked in both public and private clinics, and most clinically cared for up to 50 patients with inflammatory bowel disease and operated on up to 5 cases per year.

Conclusion This is the first national study that aimed to identify the profile of surgeons working with inflammatory bowel disease in Brazil. The vast majority are experienced male coloproctologists, located in the southern and southeastern regions, who perform clinical and surgical treatment of these pathologies, with major surgeries being performed in large centers by a small number of surgeons.

Keywords

- inflammatory bowel disease
- Crohn disease
- colitis
- ulcerative
- incidence
- prevalence

Introduction

Inflammatory bowel diseases (IBD), including Crohn's disease (CD) and ulcerative colitis (UC), are chronic recurrent inflammatory diseases that affect the digestive tract. Although their etiology remains unknown, it is believed

that these diseases have multifactorial causes, resulting in an inadequate inflammatory response in the gut microbiota of genetically susceptible individuals.¹

Although IBD is more common in Northern Europe and North America, its incidence and prevalence have increased in the last two decades in newly industrialized countries, such as China, India, and Brazil. The incidence rates of UC and CD in Brazil are now similar to those in North America and Europe.²

This work was conducted at the Brazilian Crohn's Disease and Colitis Organization (GEDIIB).

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These diseases mainly affect young individuals and, because they are chronic and recurrent, they lead to structural damage that compromises quality of life and increases morbidity and mortality. Despite advances in clinical treatment, including new drugs with new mechanisms of action, surgery still plays an important role in the management of these diseases. The probability that a patient with CD will have to undergo a surgical procedure during the first 10 years of the disease is 50%.² In patients with UC, the cumulative 5- to 10-year risk of colectomy is 10–15%, mainly in patients with moderate to severe activity.³ Predictors of severity include early age (< 40 years) at diagnosis, extensive disease, severe endoscopic activity (large and/or deep ulcers), extra-intestinal manifestations, early need for corticosteroids, and high inflammatory markers, among others.⁴

In multidisciplinary healthcare teams, the participation of qualified and experienced IBD surgeons is of vital importance, as is access to medications and complementary segment examinations. Management by a team of gastroenterologists, surgeons of the digestive system, and/or specialized coloproctologists can reduce the length of hospital stay, reduce complication rates, and allow more accurate surgical indications within the correct window.^{1,5,6}

This study aimed to evaluate the professional profile of surgeons who treat patients with IBD in Brazil, including performance and management data.

Methods

The surgery committee and executive board of the Brazilian Organization for Crohn’s Disease and Colitis (GEDIIB) prepared and sent a questionnaire to physicians registered in the group’s regional committees. Eligible participants were all physicians who surgically treat IBD and were members of the GEDIIB and the Brazilian Society of Coloproctology, with a target population of 200 surgeons. The 20 variables analyzed were: sex, state, time since graduation from medical

school, medical specialty, years of experience in the specialty, work environment, treatment type offered, healthcare sector, the number of clinical consultations with CD patients, and the number of clinical consultations with UC patients, in addition to the number of consultations and mean follow-up visits in the past 5 years for: perianal CD, bowel resection for CD stenosis, partial colectomy for CD, abdominal fistulas for CD, total colectomy for CD, total proctocolectomy for CD, total colectomy with ostomy in urgent surgery for UC, total proctocolectomy with ileoanal pouch for UC, and total colectomy with ileorectal anastomosis for UC.

The research participants answered a Google Forms questionnaire. The link to the online survey was sent by email twice to each surgeon, with an interval of 3 weeks between emails. Responses were received over a 7-month period (April to October 2021). A descriptive analysis was performed using absolute and relative frequencies for categorical variables and median and interquartile range for continuous variables. Data analysis was performed using IBM SPSS, version 25.0.

The study was approved by the ethics committee of the Brazilian Crohn’s Disease and Colitis Organization (GEDIIB) (protocol number PCE0145-PO2021) and conducted in accordance with the ethical standards of Resolution 466/2012 of the Brazilian Ministry of Health’s National Health Council and the Declaration of Helsinki. All participants provided written informed consent prior to inclusion in the study.

Results

Of 200 surgeons invited to participated in the survey, 99 surgeons from 55 cities, including 24 from state capitals, responded to the survey, for a total response rate of 49.5%. The regional distribution was as follows: 5 from the north (5.1%), 16 from the northeast (16.2%), 13 from the midwest (13.1%), 40 from the southeast (40.4%), and 25 from the south (25.3%) (► Fig. 1). The sample included 71 men (71.7%) and 28 women (28.3%).

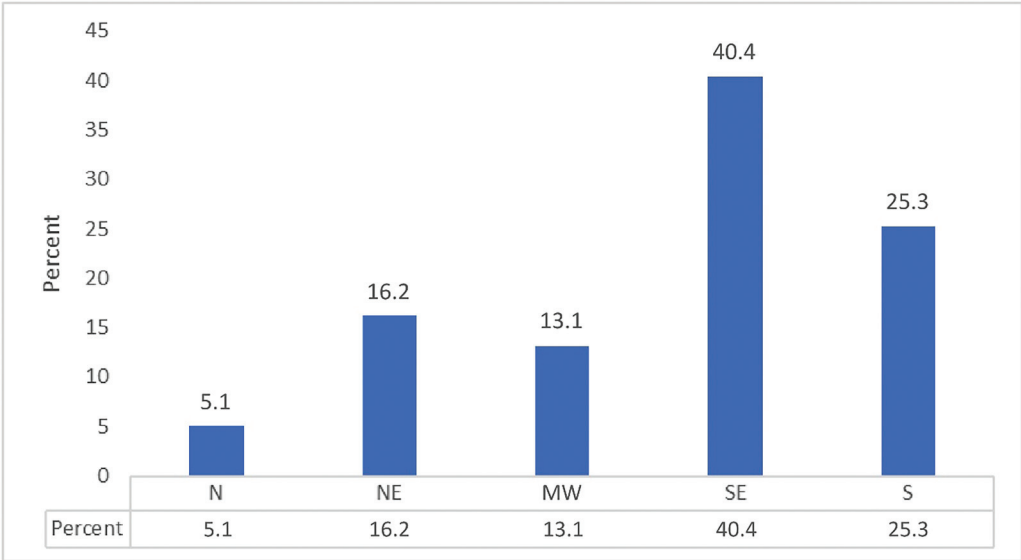


Fig. 1 Regional distribution of the participating surgeons in Brazil.

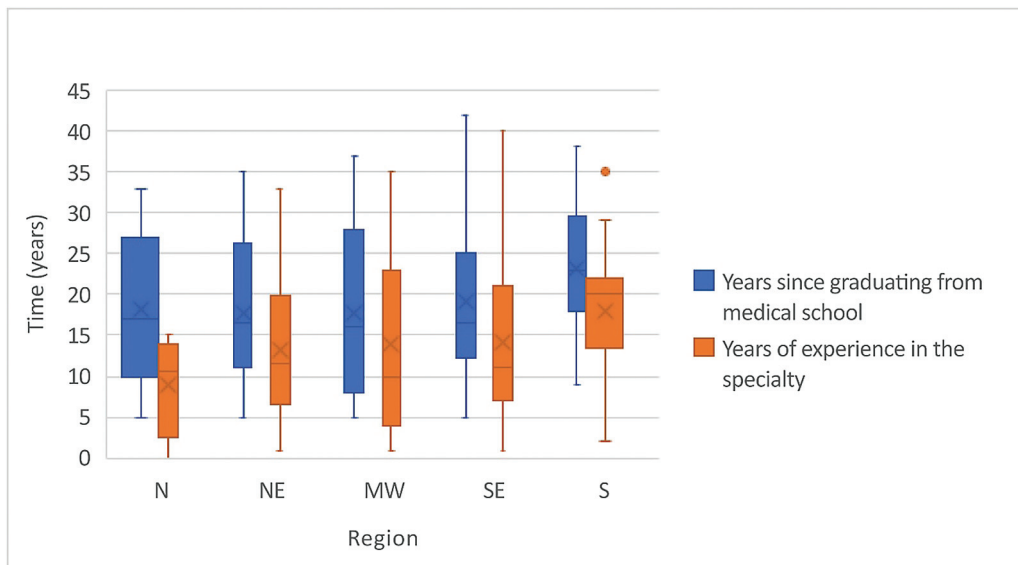


Fig. 2 Experience level of the participating surgeons.

The median time since graduation from medical school was 19 (IQR 5–42) years. The mean years of experience in the specialty was 15 (IQR 0–40) (►**Fig. 2**). The specialties included coloproctology (85 surgeons; 85.9%), gastroenterology (11 surgeons; 11.1%), pediatrics (2 surgeons; 2.0%), and general surgery (1 surgeon; 1.0%).

The question about the work environment was a multiple-choice question where respondents could choose more than one answer from a list of settings (both public and private, for example), and for this reason the number of different work environments exceeds 99. Working in a private clinic specifically for IBD was chosen by 13 respondents, working in a public outpatient clinic was chosen by 40, working in a public outpatient clinic specifically for IBD was chosen by 27, working in a private clinic by 92, working a private hospital by 83, and working in a public hospital by 60.

Regarding treatment type, 81 surgeons provided both clinical and surgical management, while 18 provided surgery alone.

Regarding health care sector, 63.6% of the surgeons worked in both the public and private sector, 33% worked in the private sector alone, and 3% worked in the public sector alone. The regional distribution of the participants is shown in ►**Fig. 3**.

Clinical consultations with CD patients were distributed as follows: 0 (6 surgeons), 1–10 (31 surgeons), 11–50 (37 surgeons), 51–100 (12 surgeons), 101–200 (4 surgeons), and >200 (9 surgeons). Clinical consultations with UC patients were distributed as follows: 0 (6 surgeons), 1–10 (29 surgeons), 11–50 (35 surgeons), 51–100 (16 surgeons), 101–200 (6 surgeons), and >200 (7 surgeons) (►**Fig. 4**).

In the past 5 years, the mean number of surgical procedures for CD was distributed as follows (►**Fig. 5**):

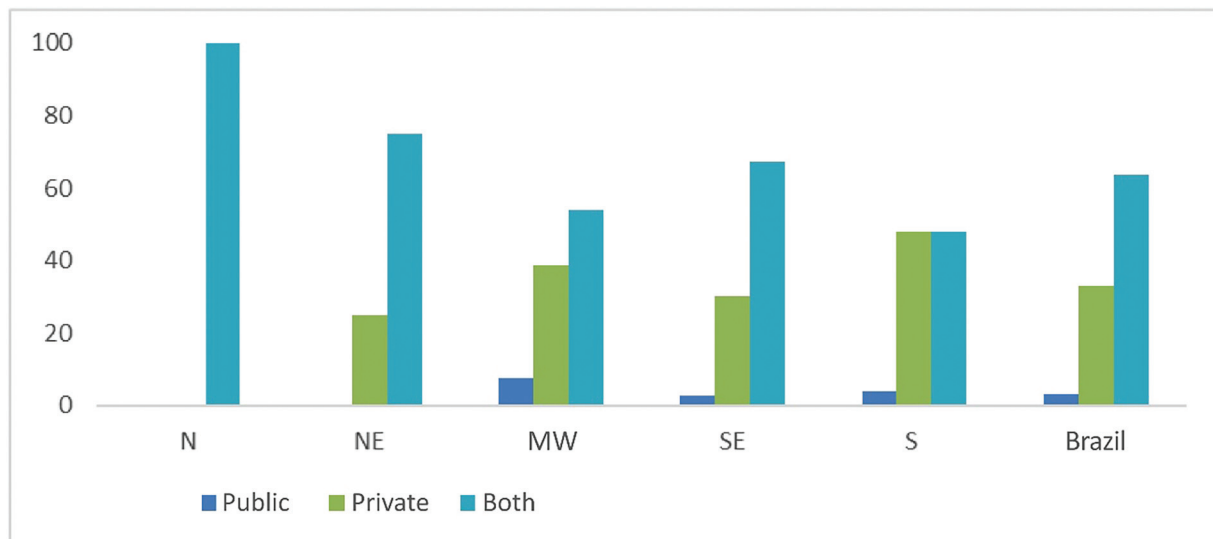


Fig. 3 Health care sector of the respondents according to region.

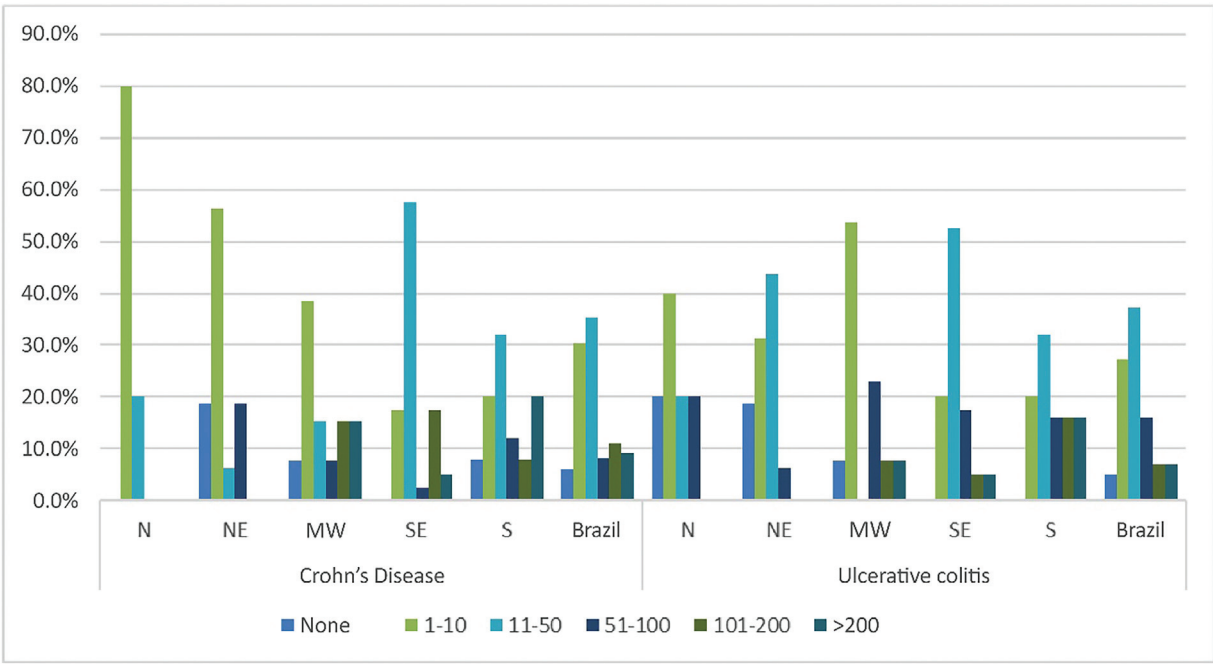


Fig. 4 Percentage of patients treated clinically according to region.

- a) Total proctocolectomy: 0 (57 surgeons), 37 surgeons (1–5), 3 surgeons (6–10), 0 surgeons (11–20), 1 surgeon (21–30), 0 surgeons (> 30).
- b) Total colectomy: 0 (43 surgeons), 1–5 (48 surgeons), 6–10 (4 surgeons), 11–20 (1 surgeon), 21–30 (1 surgeon), > 30 (0 surgeons).
- c) Abdominal fistulas: 0 (22 surgeons), 1–5 (54 surgeons), 6–10 (16 surgeons), 11–20 (2 surgeons), 21–30 (1 surgeon), > 30 (3 surgeons).
- d) Partial colectomy: 0 (14 surgeons), 1–5 (58 surgeons), 6–10 (13 surgeons), 11–20 (6 surgeons), 21–30 (3 surgeons), > 30 (5 surgeons).
- e) Bowel resection surgery for stricture: 0 (8 surgeons), 1–5 (55 surgeons), 6–10 (19 surgeons), 11–20 (8 surgeons), 21–30 (3 surgeons), > 30 (6 surgeons).
- f) Surgery for perianal CD: 0 (4 surgeons), 1–5 (34 surgeons), 6–10 (22 surgeons), 11–20 (22 surgeons), 21–30 (1 surgeon), > 30 (16 surgeons).

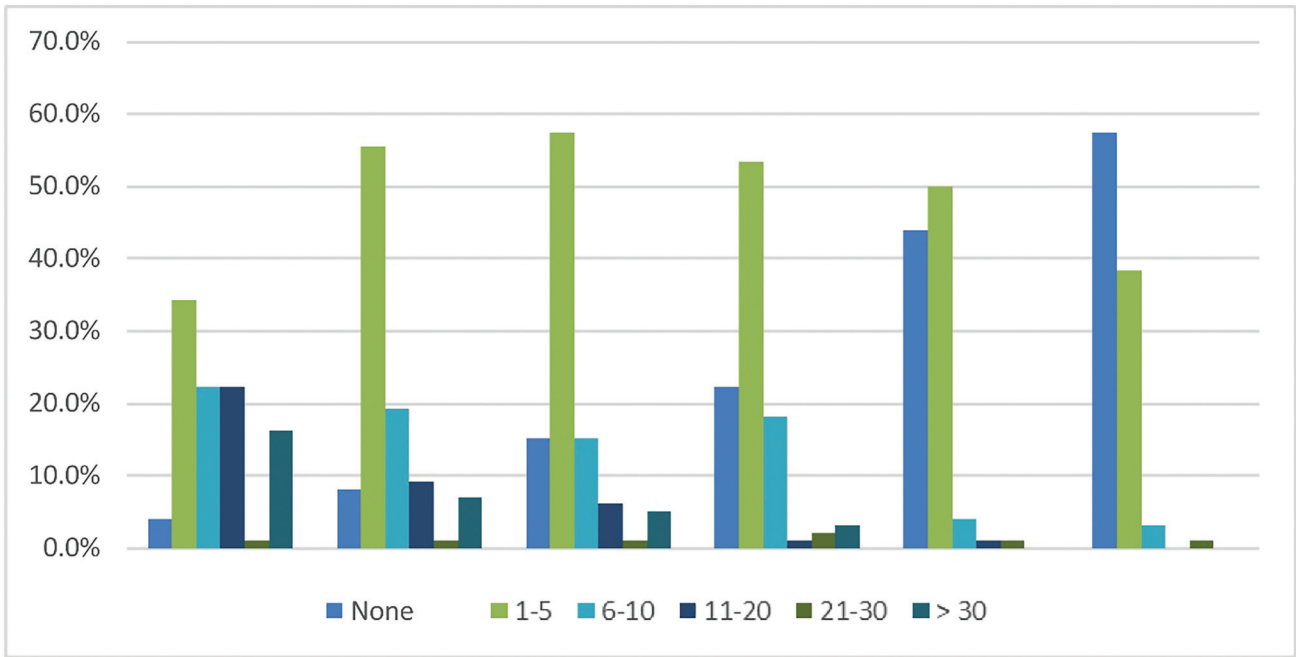


Fig. 5 Surgical procedures performed nationwide for Crohn's disease.

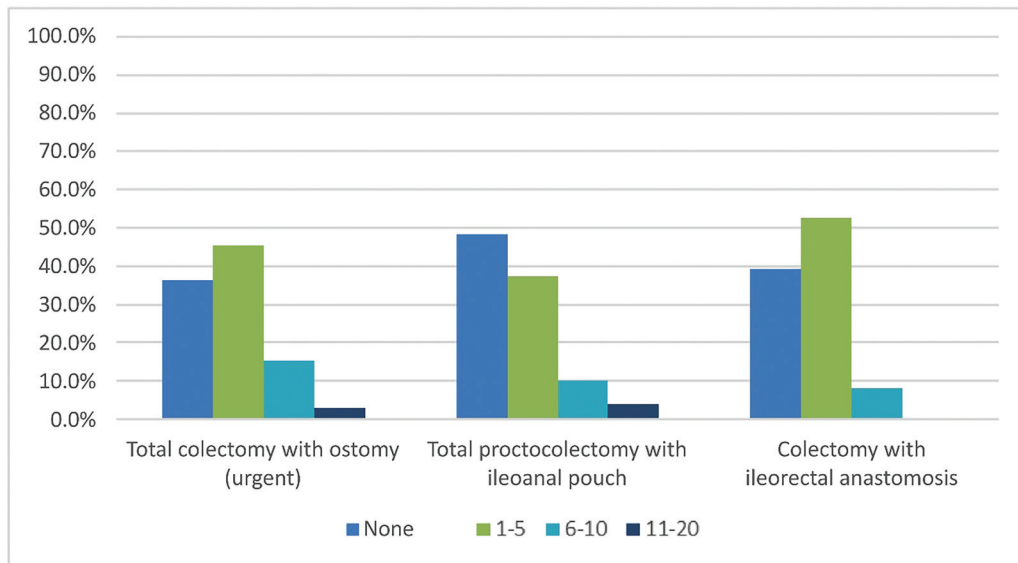


Fig. 6 Surgical procedures performed nationwide for ulcerative colitis.

When surgical procedures for CD were analyzed according to region, surgeries for resection and perianal CD were more common in the northern region, with fewer major surgeries. In the northeastern region, fewer major surgeries, such as total proctocolectomy and total colectomy, were performed, while a higher proportion of surgeries for perianal CD were performed. In contrast, in the midwestern region, both major and minor surgeries were performed, with total proctocolectomy being the least performed type. Major and minor surgeries were also performed in the southeastern region. The least performed surgery in the southern and the midwestern regions was total proctocolectomy. The most commonly performed procedure was perianal CD management.

In the past 5 years, the mean number of surgical procedures for UC was distributed as follows (►Fig. 6):

- Total colectomy with ostomy in the emergency room: 0 (35 surgeons), 1–5 (46 surgeons), 6–10 (13 surgeons), 11–20 (3 surgeons), 21–30 (0 surgeons), > 30 (0 surgeons).
- Total proctocolectomy with ileoanal pouch: 0 (48 surgeons), 1–5 (38 surgeons), 6–10 (9 surgeons), 11–20 (1 surgeons), 21–30 (3 surgeons), > 30 (0 surgeons).
- Colectomy with ileorectal anastomosis: 0 (39 surgeons), 1–5 (51 surgeons), 6–10 (8 surgeons), 11–20 (1 surgeons), 21–30 (0 surgeons), > 30 (0 surgeons).

In the northern region (►Fig. 7), 20% of surgeons performed ≤ 5 total proctocolectomies with ileal pouch in the past 5 years, while the vast majority performed ≤ 10 such procedures in this period. In the northeastern region, > 60% of surgeons performed 0 total proctocolectomies with ileal

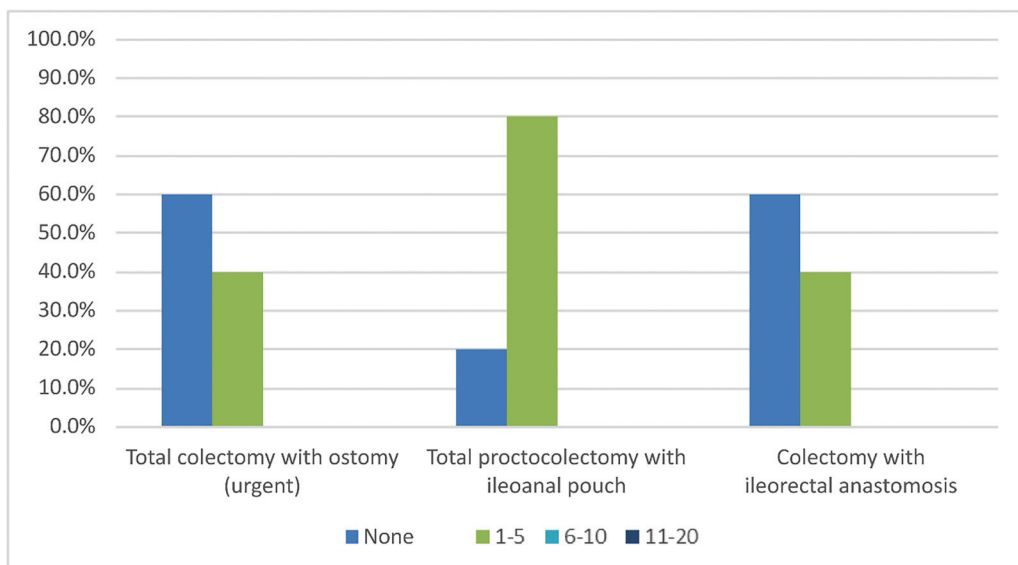


Fig. 7 Surgical procedures performed in northern Brazil for ulcerative colitis.

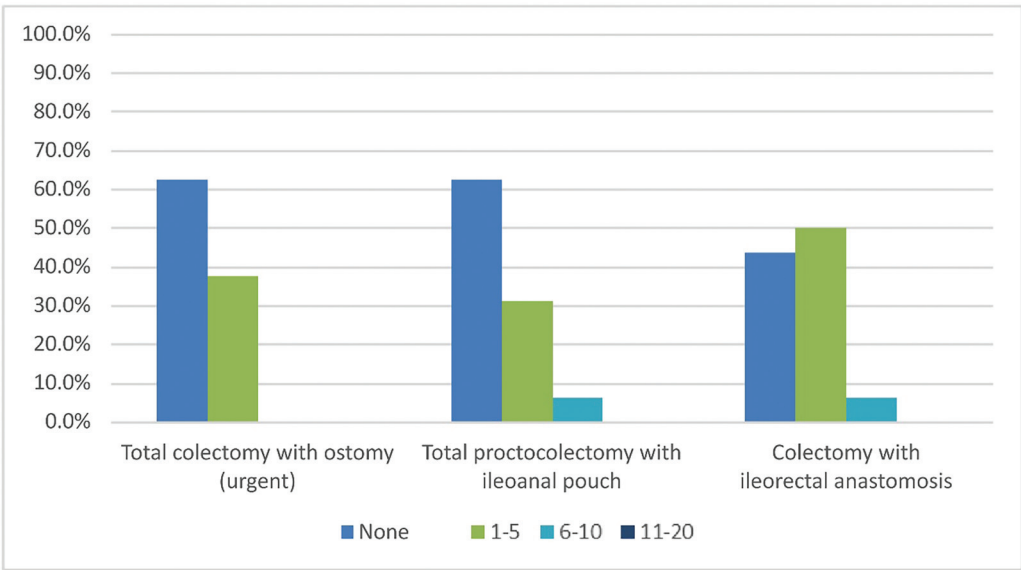


Fig. 8 Surgical procedures performed in northeastern Brazil for ulcerative colitis.

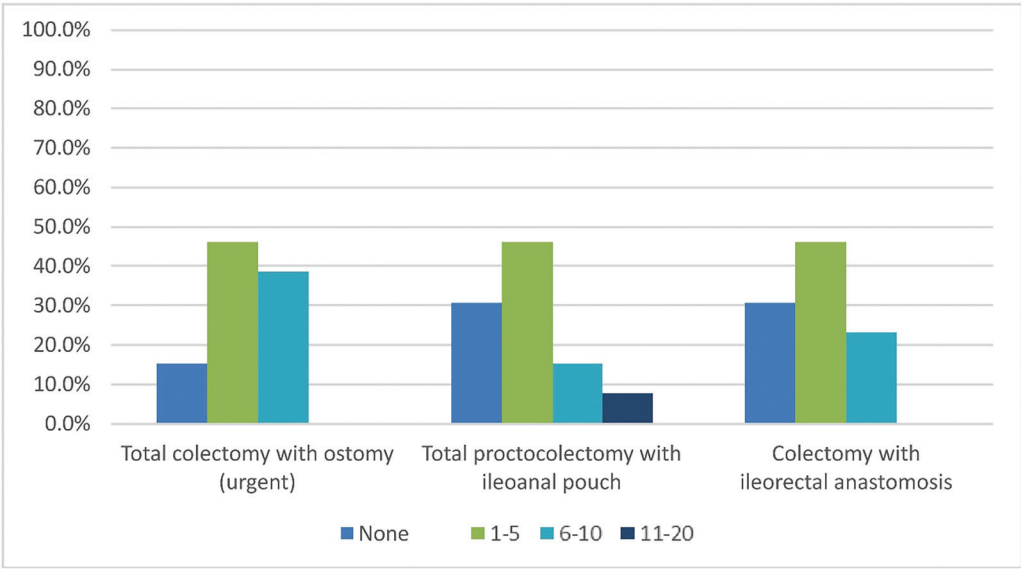


Fig. 9 Surgical procedures performed in midwestern Brazil for ulcerative colitis.

pouch; the most common procedure in this state was total colectomy with ileorectal anastomosis. (►Fig. 8). In the midwestern region, the three surgical procedures were performed in similar proportions (►Fig. 9). In the southeastern region, 40% of surgeons performed ≤ 10 total proctocolectomies with ileal pouch in the past 5 years (►Fig. 10). In the southern region, almost 60% of surgeons performed 0 total proctocolectomies in the past 5 years, while in the northeastern region, total colectomy with ileorectal anastomosis was the most common type of elective surgery (►Fig. 11).

Regarding activity and topics of interest, 94.9% of the surgeons showed interest in participating in groups to discuss IBD cases. The most common topics suggested for future discussion at scientific events are shown in ►Fig. 12.

Discussion

This study was based on a questionnaire developed by the GEDIIB’s surgery committee, which was answered by 99 surgeons working in 55 cities in 19 of Brazil’s 26 states, in addition to the federal district. No responses were received from the following states: Acre, Amapá, Rio de Janeiro, Rio Grande do Norte, Rondônia, Roraima, or Tocantins. Currently, the GEDIIB has 900 registered physicians: 40% of whom are surgeons and 60% of whom are clinicians; thus, almost 30% of the registered surgeons responded to the survey.

The highest concentration of responses was from the southeastern region, followed by the southern region, which may reflect the greater number of surgeons working with IBD in these areas, as well as a greater concentration of

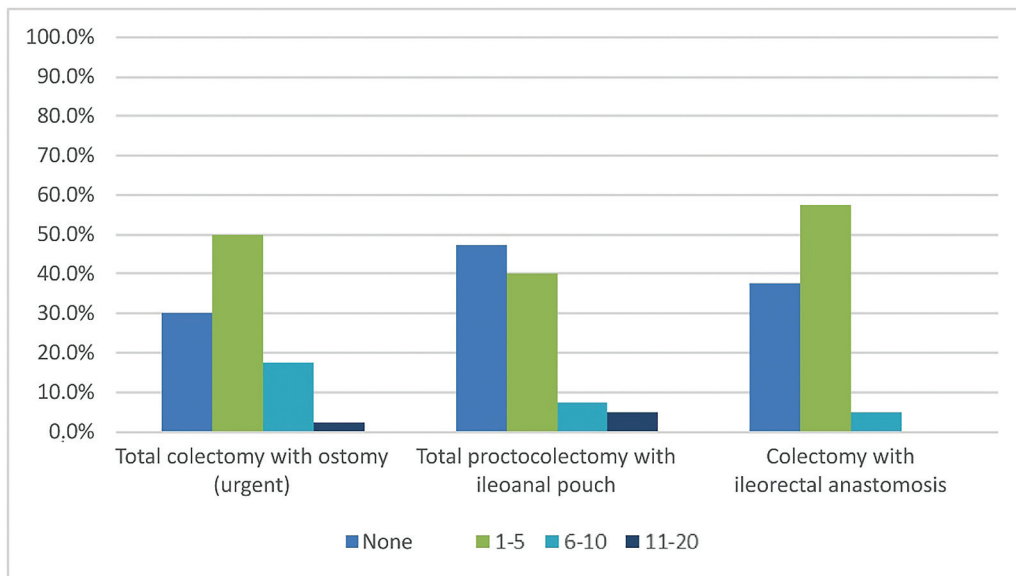


Fig. 10 Surgical procedures performed in southeastern Brazil for ulcerative colitis.

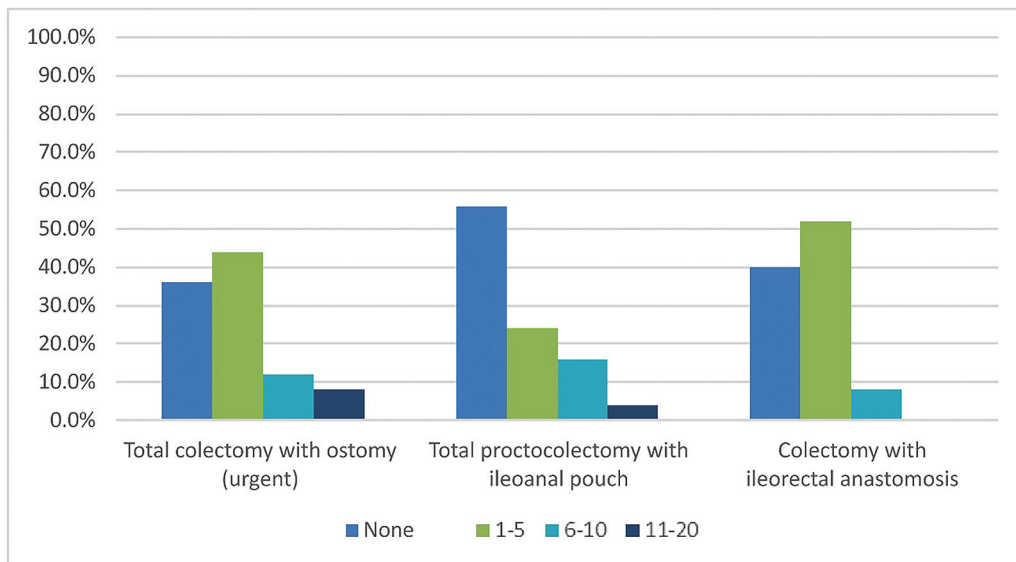


Fig. 11 Surgical procedures performed in southern Brazil for ulcerative colitis.

physicians in general. Another factor that could explain these results is a higher incidence of CD and UC in the southeastern and southern regions of Brazil.⁷

The southeastern region has the highest proportion of physicians per 1000 inhabitants (3.15), followed by the mid-western (2.74) and southern (2.68) regions, while the northern region had the lowest proportion (1.30/1000 inhabitants).⁸

The vast majority of respondents were men (71.7%), with a mean of 19 years of training and a mean of 15 years as a specialist. The Brazilian Society of Coloproctology (*Sociedade Brasileira de Coloproctologia*, SBCP; <https://sbcp.org.br/>) provided us the information that far more coloproctologists are men than women (70% vs 30%). Regarding training time, surgical procedures for IBD are often quite complex, requiring advanced anatomical knowledge and greater expertise.

The vast majority of surgeons working with IBD are coloproctologists (84.5%), followed by gastroenterologists (12%), pediatricians (2%) and general surgeons (1%). This can be explained by the fact that these specialties have the greatest affinity and interest in the subject. In Brazil, unlike Europe and North America, most surgeons (81.8%) engage in patient care during the clinical treatment stage of IBD. Thus, the delay in indicating surgical procedures tends to be shorter and is better accepted by patients. In Europe, it is common for gastroenterologists to suggest surgery only as a final option. A recent study by Spinelli et al. of 425 patients with IBD from Italy, England, France, Germany, and the Netherlands examined patient perceptions of surgical indication, finding a lack of participation by surgeons in IBD treatment decisions. After surgery, however, patient

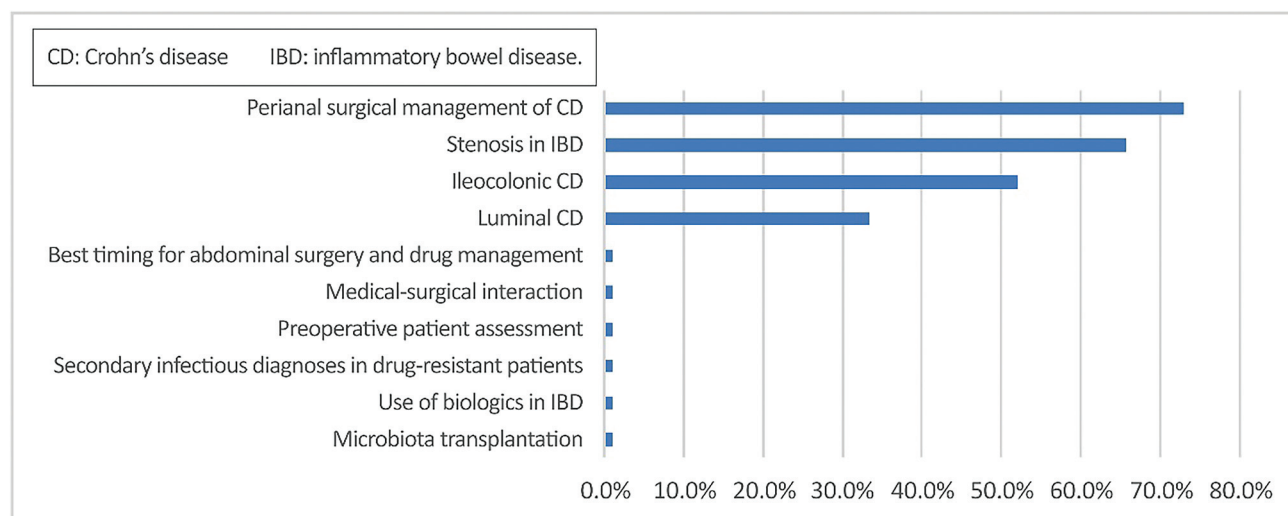


Fig. 12 Suggested discussion topics for scientific events.

evaluations were favorable, including the need for ostomies and improved quality of life.^{9,10}

The vast majority of the participants performed ≤ 20 surgeries for perianal CD in the past 5 years, while 15 performed > 30 . The vast majority of surgeons have up to 50 patients who are undergoing clinical treatment for either CD or UC, which shows that Brazilian coloproctologists are interested in clinical management of the disease rather than surgery alone. However, surgery for IBD is performed by a small group of coloproctologists/gastroenterologists in Brazil, and standardized training is still lacking.

Perianal surgeries for CD involve fistulas, abscesses, ulcers, and inflammatory skin tags. For patients with perianal CD who cannot tolerate an outpatient proctological examination, it is performed under anesthesia.¹¹ Although perianal CD directly affects patient quality of life, few studies have addressed the prevalence of fistulas, abscesses, and inflammatory skin tags in patients with CD. A recent Danish study of 1800 patients with CD found perianal involvement in 19%, and more than half had perianal fistulas.¹⁰

Regarding the work environment, the fact that 63.6% of the respondents work in both the public and private sectors highlights a phenomenon observed in Brazil since the 1980s, ie, taking multiple jobs due to salary reductions. Most of the respondents work in the private sector (clinics and hospitals), which may be specifically related to IBD treatment due to the need for high-cost medications and multidisciplinary teams. Because we compiled the responses by option selected rather than by respondent, we do not have the data combined by respondent to describe in detail those who work in more than one environment. In a recent study on physician perspectives on IBD, more than 70% reported difficulty accessing biological medicines.¹

Regarding abdominal surgeries in the past 5 years, more than 50% of the respondents performed ≤ 5 intestinal resections for CD with a stenosing/penetrating phenotype. The same was observed for partial colectomies for CD. These data may be explained by the fact that with the advent of

biological therapy, the number of elective surgeries for IBD has decreased.

Ten years after diagnosis, more than 50% of patients will present intestinal fistulas and stenoses, which often require surgical intervention.^{12,13} Although indication for surgery due to clinical treatment failure has decreased in the past 60 years, a recent meta-analysis found that it still remains high: 47% 5 years after diagnosis.^{14,15} Patients who are intolerant to or with poor adherence to clinical treatment, with corticosteroid dependency, refractory to drug treatment, or with primary or secondary treatment failure may benefit from surgical treatment.¹⁴

Patients with colonic CD have a 2–3 times greater risk of colorectal cancer, for which the risk factors include: extensive disease, disease duration, family risk of colorectal cancer, and primary sclerosing cholangitis. Colorectal cancer may or may not be preceded by dysplasia.¹⁴ Despite the increased incidence of high-grade dysplasia, many surgeons did not perform a total colectomy (43.4%) or total proctocolectomy (57.5%) in the past 5 years. Many surgeons performed ≤ 5 total colectomies (48.4%) and total proctocolectomies (37.3%) in the past 5 years. Among patients with colonic CD who underwent total proctocolectomy with ileal pouch, 15% failed when previously diagnosed with CD and 51% failed when diagnosed with CD after surgical complications (prior diagnosis of UC).¹⁴

The numbers in UC differ from those in CD: 38.3% of the respondents performed ≤ 5 total proctocolectomies with ileal pouch in the past 5 years. A total of 51.5% of the surgeons performed ≤ 5 total colectomies with ileorectal anastomosis, and 9% performed ≤ 10 , the vast majority in large centers in the south, southeast, and northeast regions. The choice of surgical technique is based on the surgeon's preference and experience, in addition to sphincter function and the presence of dysplasia or colorectal cancer. Patients who are candidates for total proctocolectomy with ileal pouch should be referred to reference centers, which perform ≥ 10 surgeries per year.^{16–18} These numbers may

reflect the decreasing number of surgical indications in UC, including reservoirs.

Data from the literature show that 20–30% of patients with UC will require early or late surgery. However, patient selection must be individualized. Some indications for elective surgery are cure or relief of symptoms, clinical intractability, risk of colorectal cancer, and improved quality of life.^{16,19} In emergency surgery for UC, 46.4% of the respondents performed total colectomies with ileostomy, with 13.13% performing ≤ 10 in the past 5 years. According to a British study, the rate of elective colectomy decreased after 2008, while emergency surgery indications remained static.²⁰ We must remember that, in Brazil, emergency surgeries are generally performed by physicians on duty, who have no training in IBD. Perhaps this is why our survey of specialist surgeons found a lower rate of indications for emergency surgeries than the literature.

The use of biologics has changed surgical indications for IBD.²¹ A retrospective study from 2015 that included 250,000 patients with IBD found that in the first year that biologics were used, the surgery rate was high, perhaps due to delays in starting medication, and the fact that patients had already been indicated for surgery due to IBD complications. However, overall, biologics have reduced the number of indications for intestinal resections in CD and colectomies in UC.²²

The main unmet themes/needs reported by the respondents were participation in groups or meetings to discuss clinical cases and the surgical management of perianal CD, stenoses in IBD, ileocolonic CD, and luminal CD.

These data corroborate the GEDIIB surgery committee's initiative to produce updated material on the most prevalent themes in the surgical management of IBD.

Since this is a pioneering study on the topic, we found no national or international articles to correlate our data. Hopefully, this study will encourage further research on the topic in other regions.

Conclusions

This is the first national study to investigate the profile of surgeons who work with IBD in Brazil. The vast majority are experienced male coloproctologists who perform clinical and surgical treatment of these pathologies.

The highest concentration of surgeons is in the southern and southeastern regions of the country, where the highest percentage of minor procedures are performed. Major surgeries, on the other hand, are performed by fewer surgeons who are concentrated in large centers.

Ethical Approval

The study was approved by the Ethics Committee of the Brazilian Crohn's Disease and Colitis Organization (GEDIIB) under protocol number PCE0145-PO2021. All procedures were conducted in accordance with the ethical standards of Resolution 466/2012 of the Brazilian Ministry of Health's National Health Council and the Declaration of Helsinki.

Informed Consent

All participants provided written informed consent prior to inclusion in the study.

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Conflict of Interest

None.

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References

- Vilela EG, Rocha HC, Moraes AC, et al. Inflammatory bowel disease care in Brazil: how it is performed, obstacles and demands from the physicians' perspective. *Arq Gastroenterol* 2020;57(04):416–427. Doi: 10.1590/S0004-2803.202000000-77
- Kotze PG, Damião AOMC. Research in inflammatory bowel disease in Brazil: a step forward towards patient care. *Arq Gastroenterol* 2020;57(03):225–226. Doi: 10.1590/S0004-2803.202000000-43
- Feuerstein JD, Isaacs KL, Schneider Y, Siddique SM, Falck-Ytter Y, Singh SAGA Institute Clinical Guidelines Committee. AGA Clinical Practice Guidelines on the Management of Moderate to Severe Ulcerative Colitis. *Gastroenterology* 2020;158(05):1450–1461. Doi: 10.1053/j.gastro.2020.01.006
- Dassopoulos T, Cohen RD, Scherl EJ, Schwartz RM, Kosinski L, Regueiro MD. Ulcerative Colitis Care Pathway. *Gastroenterology* 2015;149(01):238–245. Doi: 10.1053/j.gastro.2015.05.036
- Law CC, Sasidharan S, Rodrigues R, et al. Impact of Specialized Inpatient IBD Care on Outcomes of IBD Hospitalizations: A Cohort Study. *Inflamm Bowel Dis* 2016;22(09):2149–2157. Doi: 10.1097/MIB.0000000000000870
- Hartford LB, Allen LJ, Lennox H, Jairath V, Van Koughnett JAM. The Impact of Multidisciplinary Conferences on Treatment Plans for Patients With Inflammatory Bowel Disease in a Tertiary Canadian Centre. *J Can Assoc Gastroenterol* 2021;4(06):284–289. Doi: 10.1093/jcag/gwab004
- Zaltman C, Parra RS, Sasaki LY, et al. Real-world disease activity and sociodemographic, clinical and treatment characteristics of moderate-to-severe inflammatory bowel disease in Brazil. *World J Gastroenterol* 2021;27(02):208–223. Doi: 10.3748/wjg.v27.i2.208
- Scheffer M, Cassenote A, Guerra A, et al. Demografia Médica no Brasil 2020. São Paulo: Faculdade de Medicina da USP, Conselho Federal de Medicina; 2020
- Spinelli A, Carvello M, Adamina M, et al. Patients' perceptions of surgery for inflammatory bowel disease. *Colorectal Dis* 2021;23(10):2690–2698. Doi: 10.1111/codi.15813
- Wewer MD, Zhao M, Nordholm-Carstensen A, Weimers P, Seidelin JB, Burisch J. The Incidence and Disease Course of Perianal Crohn's Disease: A Danish Nationwide Cohort Study, 1997–2015. *J Crohn's Colitis* 2021;15(01):5–13. Doi: 10.1093/ecco-jcc/ijaa118
- Adamina M, Bonovas S, Raine T, et al. ECCO Guidelines on Therapeutics in Crohn's Disease: Surgical Treatment. *J Crohn's Colitis* 2020;14(02):155–168. Doi: 10.1093/ecco-jcc/ijz187
- Chan WPW, Mourad F, Leong RW. Crohn's disease associated strictures. *J Gastroenterol Hepatol* 2018;33(05):998–1008. Doi: 10.1111/jgh.14119
- Aniwan S, Park SH, Loftus EV Jr. Epidemiology, Natural History, and Risk Stratification of Crohn's Disease. *Gastroenterol Clin North Am* 2017;46(03):463–480. Doi: 10.1016/j.gtc.2017.05.003

- 14 Lightner AL, Vogel JD, Carmichael JC, et al. The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for the Surgical Management of Crohn's Disease. *Dis Colon Rectum* 2020; 63(08):1028–1052. Doi: 10.1097/DCR.0000000000001716
- 15 Baelum JK, Qvist N, Ellebaek MB. Ileorectal anastomosis in patients with Crohn's disease. Postoperative complications and functional outcome—a systematic review. *Colorectal Dis* 2021;23(10):2501–2514. Doi: 10.1111/codi.15839
- 16 Fornaro R, Casaccia M, Caristo G, et al. Elective surgery for ulcerative colitis, ileo-rectal anastomosis or restorative proctocolectomy An Update. *Ann Ital Chir* 2019;90:565–573
- 17 de Buck van Overstraeten A, Brar MS, Khorasani S, Dossa F, Myrelid P. Ileorectal Anastomosis Versus IPAA for the Surgical Treatment of Ulcerative Colitis: A Markov Decision Analysis. *Dis Colon Rectum* 2020;63(09):1276–1284. Doi: 10.1097/DCR.0000000000001686
- 18 Holubar SD, Lightner AL, Poylin V, et al; Prepared on behalf of the Clinical Practice Guidelines Committee of the American Society of Colon and Rectal Surgeons. The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for the Surgical Management of Ulcerative Colitis. *Dis Colon Rectum* 2021;64(07):783–804. Doi: 10.1097/DCR.0000000000002037
- 19 Zisman TL, Bronner MP, Rulyak S, et al. Prospective study of the progression of low-grade dysplasia in ulcerative colitis using current cancer surveillance guidelines. *Inflamm Bowel Dis* 2012;18(12):2240–2246. Doi: 10.1002/ibd.22912
- 20 Worley G, Almoudaris A, Bassett P, et al. Colectomy rates for ulcerative colitis in England 2003–2016. *Aliment Pharmacol Ther* 2021;53(04):484–498. Doi: 10.1111/apt.16202
- 21 Heriot A, Smart P. Current Status of Segmental Colectomy in Select Crohn's Disease Patients. *Clin Colon Rectal Surg* 2019;32(04):249–254. Doi: 10.1055/s-0039-1683906
- 22 Khoudari G, Mansoor E, Click B, et al. Rates of Intestinal Resection and Colectomy in Inflammatory Bowel Disease Patients After Initiation of Biologics: A Cohort Study. *Clin Gastroenterol Hepatol* 2022;20(05):e974–e983. Doi: 10.1016/j.cgh.2020.10.008