

Perception and Practices of Colonoscopy Procedure: A Nationwide Survey of Indian Gastroenterologists

Jitendra Mohan Jha¹ Sethu Babu¹

¹Department of Medical Gastroenterology, KIMS, Secunderabad, Telangana, India

Address for correspondence Jitendra Mohan Jha, Department of Medical Gastroenterology, KIMS, Secunderabad, Telangana, India (e-mail: jitendramohanjha@gmail.com).

J Digest Endosc:2020;11:253–257

Abstract

Introduction There is a lack of data and consensus about the practices and policies regarding performing colonoscopy in India. We surveyed gastroenterologists to assess their practices and policies of performing colonoscopy.

Methodology A questionnaire was presented to gastroenterologists all over India regarding their preference of bowel preparation and method of sedation, completeness of cecal and ileal intubation rates, preferences for inflation, use of carbon dioxide and nitrous oxide, and complications faced.

Results Of the 350 surveys, 307 had completely responded (88%). Only 18% of the centers were conducting more than 100 colonoscopies a month and 46% denied following a colon cancer screening policy. Two bottles of liquid polyethylene glycol were the most preferred preparation. A total of 21% did not prefer any sedation at all. Nitrous oxide was used by only 5.6% of doctors. Ileal intubation rate was >96% in 34% of centers and cecal intubation rate >96% in 58% of centers. Air was used for inflation by 58%, while 39% used CO₂. A total of 40% of the respondents believe CO₂ inflation would improve cecal intubation rate, while 9.4% believed otherwise. While one third found CO₂ inflation unnecessary and 14% not cost-effective, three fourths were still interested in setting up a CO₂ facility. Reasons for not using nitrous oxide were practical/administrative difficulty (46.6%), side effects (20%), and cost (16%). Still more than half surveyed would consider using Entonox in future. Perforation was the most noted complication faced by respondents.

Conclusions This survey of real-world clinical practices will help to formulate practice guideline regarding colonoscopy in India.

Keywords

- ▶ colonoscopy
- ▶ colon cancer
- ▶ screening
- ▶ survey

Introduction

Colonoscopy is a widely used procedure in the endoscopy units in India. Since it is a painful procedure, it requires sedation. Propofol is a commonly used anesthetic agent, though many newer agents have been added in recent times.¹ One of the most feared complication of colonoscopy is perforation.² The choice of the anesthetic agent has been linked not only to the perforation rate³ but to the adenoma detection rate as well.⁴ In addition, technicalities like use of gas insufflation, preferred preparation, and time taken for the procedure have been reported to have varied effects on the colonoscopy-induced

pain and detection rates.⁵ Unfortunately, there is a lack of consensus about the practices and policies regarding performing colonoscopy in India. In addition, there is no survey that reflects the preferences and practices of colonoscopy centers in India. Obtaining such information will help us in determining the popular practices related to colonoscopy and reasons for them, which should help to formulate guidelines for performing safe and efficient routine colonoscopy procedures. We surveyed gastroenterologists to assess their practices and policies of performing colonoscopy in their day-to-day clinical gastroenterology practice.

DOI <https://doi.org/10.1055/s-0040-1721223>
ISSN 0976-5042.

© 2020. Society of Gastrointestinal Endoscopy of India.

This is an open access article published by Thieme under the terms of the Creative Commons Attribution-NonDerivative-NonCommercial-License, permitting copying and reproduction so long as the original work is given appropriate credit. Contents may not be used for commercial purposes, or adapted, remixed, transformed or built upon. (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)

Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India

Methodology

A survey assessing the current practices and perceptions toward colonoscopy was developed. The survey questionnaire was modified after an initial pilot study involving five gastroenterologists at our institution, thereby establishing internal validity of our survey. The questionnaire was then presented to 350 gastroenterologists all over India using standard print format. The gastroenterologists were initially explained the purpose thus avoiding opinion bias. A consent for participation in the survey and an abbreviated nonresponse form (for those who did not wish to participate in the full survey) were obtained. To maintain anonymity of the respondents, each survey was assigned a unique code and the responses remained anonymous to the study investigators. The survey comprised of a total of 15 questions of both closed ended and open-ended type. The respondents were able to select from one or more predefined answers or offer written responses. At the end of the survey, there was an opportunity to make further comments. The study was approved by the Institutional Ethics Committee.

The responses were coded in a spreadsheet (Microsoft Excel for Mac, version 15.12) and analyzed. Thematic analysis was used to assess written responses. Predefined responses were analyzed and tabulated.

Results

Of the 350 mailed surveys, 307 responded (88%). Only 18% of the centers were conducting more than 100 colonoscopies a month and 46% denied following a policy of screening those above the age of 40 or 50 years for colon cancer (►Table 1). Approximately two-thirds of the surveyed gastroenterologists preferred two bottles of liquid polyethylene glycol (PEG) for preparation, while 26% preferred one pack of PEG powder and the remaining 11% preferred two bottles PEG as split preparation (►Table 2). Of the surveyed gastroenterologists, 21% preferred no sedation at all, while 19% preferred to sedate all their patients. Midazolam was the most commonly used sedative (49%). Next most common was midazolam and fentanyl and ~11% preferred propofol. Sedation administered by an anesthesiologist was preferred by 59%, while 22% preferred administering it themselves. Nitrous oxide was used by only 5.6%

Table 1 Characteristics of the institution that participated in the survey

Number of colonoscopies/month performed	Frequency	Percent
Less than 50	130	42.3
50–100	121	39.4
100–200	27	8.8
200–500	29	9.4
Do you have a policy that all people above 40 or 50 should be screened?	Frequency	Percent
Yes	164	53.4
No	143	46.6

of the surveyed gastroenterologists. Ileal intubation rate was more than 96% in 34% of centers and cecal intubation rate was more than 96% in 58% of centers (►Table 3). Less than 80% ileal and cecal intubation rates were reported by 4.2 and 3.9% of the centers, respectively. Mean time to complete the procedure was 10 to 20 minutes at 60% of the centers.

Air was used for inflation by 58%, while 39% used CO₂ (►Table 4). However, 40% of the respondents believe CO₂ inflation would improve cecal intubation rate, and 9.4% believed otherwise. Although one third found CO₂ inflation unnecessary and 14% reported to be not cost-effective, three fourths were still interested in setting up a CO₂ facility (►Table 5). Reasons for not using nitrous oxide were practical/administrative issues (46.6%), side effects (20%), and cost (16%). Still, more than half of the surveyed would consider using Entonox in future. Perforation was the most common complication faced by respondents of the survey (66%) (►Table 6). However, no one reported the incidence of perforation at their center. Other complications experienced by the respondents were post procedure pain (6%), patient anxiety (3.3%), bleeding (1%), distension (0.3%), improper bowel wash (0.3%), and prolonged procedure (0.3%).

Table 2 Distribution of responses according to the preference of preparation and sedation

Preferred preparation	Frequency	Percent
1 Pack of polyethylene glycol powder	80	26.1
2 Bottles of liquid polyethylene glycol	192	62.5
2 Bottles of split prep	35	11.4
Preference of sedation	Frequency	Percent
No sedation	66	21.5
As demands with pain	61	19.9
Less than 50% of the times	79	25.7
More than 50% of the times	43	14
Always sedation	58	18.9
Medication used for sedation	Frequency	Percent
Midazolam	151	49.2
Midazolam + Fentanyl	74	24.1
Midazolam+pentazocine	3	1
Midazolam+tramadol	5	1.6
Midaz+butrom	1	0.3
Nitrous oxide	7	2.3
Nitrous oxide + IV sedation	10	3.3
Propofol	33	10.7
Any other(fentanyl)	9	2.9
Not applicable	14	4.6
Sedation/anesthesia administered by?		
Anesthesiologist	181	59
Gastroenterologist	68	22.1
Not applicable	13	4.2
Nurse assistant	45	14.7

Table 3 Intubation rates and time taken for colonoscopy at different centers

Ileal intubation rate	Frequency	Percent
Less than 80	13	4.2
81–85	20	6.5
86–90	12	3.9
91–95	91	29.6
96–100	106	34.5
Not known	65	21.2
Cecal intubation rate	Frequency	Percent
Less than 80	12	3.9
81–85	17	5.5
86–90	8	2.6
91–95	58	18.9
96–10	178	58
Not known	34	11.1
Average time taken for completing the procedure	Frequency	Percent
Less than 10 min	69	22.5
10–20 min	185	60.3
More than 20 min	53	17.3

Table 4 Distribution of responses with respect to inflation during colonoscopy

Used for inflation	Frequency	Percent
Air	171	55.7
CO ₂	120	39.1
CO ₂ + saline	1	0.3
Saline	15	4.9
Does CO ₂ improve cecal intubation rate?	Frequency	Percent
No	29	9.4
Not cost-effective	43	14
Not required	113	36.8
Yes	122	39.7
Patient reported discomfort	Frequency	Percent
Less with CO ₂ gas +sedation	1	0.3
Less with CO ₂ gas alone	107	34.9
Less with Entonox	10	3.3
Less with IV medication	120	39.1
Less with no sedation or no CO ₂ inflation	23	7.5
Not applicable	5	1.6
Similar with/without CO ₂	40	13
Yes with IV medication	1	0.3

Discussion

The present study is a first of its kind, which was conducted to understand the clinical practices and perceptions of gastroenterologists across India toward colonoscopy of the surveyed, 21% preferred no sedation at all, while 19%

Table 5 Distribution of responses according to the use of CO₂ and N₂O

Interested in setting up CO ₂ facility	Frequency	Percent
Already have	4	1.3
No	75	24.4
Yes	228	74.3
Why nitrous oxide is not used routinely in your center?	Frequency	Percent
Cost	49	16
Current success rate high	42	13.7
Not aware	1	0.3
Practical difficulty	143	46.6
Side effects	62	20.2
All of the above	1	0.3
Others (cannot comment)	9	2.9
Would consider using Entonox	Frequency	Percent
Yes	160	52.1
No	147	47.9

Table 6 Distribution of responses according to the complication reported

Complications if any	Frequency	Percent
Bleeding	3	1
Distension	1	0.3
Improper bowel wash	1	0.3
None	70	22.8
Patient anxiety requiring counselling	10	3.3
Perforation	203	66.1
Post procedure pain	18	5.9
Prolonged time during procedure	1	0.3
Total	307	100

preferred to sedate all their patients, midazolam being the most commonly used sedative. This proportion is relatively low from what has been reported from other parts of the world. In a survey of members of the Canadian Association of Gastroenterology and members of the Canadian Society of Colon and Rectal Surgeons, most endoscopists reported using sedation for more than 90% of colonoscopies, the most common sedation regimen being a combination of midazolam and fentanyl.⁶ More than 80% of the respondents in the their survey used a combination of a benzodiazepine and a narcotic, of which midazolam and fentanyl were most preferred. This pattern is similar to that reported in the United States, where more than 98% of colonoscopies are performed with intravenous sedation and more than three-quarters use midazolam and fentanyl.⁷ Approximately two-thirds of Swiss gastroenterologists also reported to use sedation for colonoscopy for more than 75% of cases.⁸ However, countries such as Japan and Italy have pursued unsedated colonoscopy with great success.⁹ Some experts feel that experienced

endoscopists are likely to succeed in unsedated colonoscopies as they can maneuver the colon without causing pain and discomfort to patients. Furthermore, only 5.6% of our surveyed gastroenterologists used nitrous oxide with or without sedation. A double-blind, randomized, placebo-controlled trial found that the patient-reported pain was similar in the group receiving nitrous oxide and in the control group.¹⁰ Also, patients in the nitrous oxide group received intravenous sedatives and analgesics equally often and in similar doses. In a study comparing administration of continuous 50% nitrous oxide and patient-maintained, target-controlled propofol, Maslekar et al¹¹ found similar patient satisfaction and analgesic and sedative effects in the two groups. The conflicting evidence might be explained by the different methods of nitrous oxide administration (continuous versus on demand).

From our survey, it was reported that cecal intubation rate was more than 96% in 58% of centers. Level and type of training can affect the endoscopist performance and it has been shown that poor cecum intubation rate is correlated to increased risk of postcolonoscopy colorectal cancer.¹² Some guidelines differentiate between minimum standards for cecal intubation rate, depending on whether it is in screening (95%) or clinics (90%).¹³ European guidelines do not differentiate between the indication for colonoscopy and recommend 90% intubation rates for all cases.¹⁴ Unfortunately, such guidelines are missing in India and a need for developing a consensus about colonoscopy quality indicators among Indian gastroenterologists is needed.

The use of CO₂ was initially proposed by Becker in 1953, but endoscopists began to consider CO₂ insufflation to reduce postprocedure pain in 1980s.¹⁵ In our survey, air was used for inflation by 58%, while 39% used CO₂. However, 40% of the respondents believe CO₂ inflation would improve cecal intubation rate, and 9.4% believed otherwise. A recent meta-analysis evaluated the effectiveness of CO₂ insufflation for colonoscopy and compared with conventional air insufflation.¹⁶ The authors found that CO₂ insufflation resulted in reduced procedural pain and also postprocedural pain at 1 hour and 6 and 24 hours. CO₂ insufflation was also associated with faster cecal intubation but the cecal intubation rate was similar in both colonic insufflation techniques suggesting individual expertise as the success factor.

Role of nitrous oxide in obstetric and dental practice is long established, but its introduction into colonoscopy practice has occurred relatively recently. Lindblom et al are the first ones to conduct randomized studies describing the use of Entonox (50:50 combination of nitrous oxide and oxygen that is inhaled using a demand valve) during colonoscopy.¹⁷ Cochrane review has deemed Entonox to be safe, well tolerated, and reducing discharge times compared with intravenous sedatives.¹⁸ Our survey revealed a very low utilization rate of nitrous oxide among gastroenterologists for colonoscopy and reasons for not using nitrous oxide included practical/administrative issues (46.6%), side effects (20%), and cost (16%). Still, more than half of the surveyed centers considered using Entonox in future. A survey of colonoscopists within the English Bowel Cancer Screening Program

revealed that although Entonox was available to 74.5%, only 47.3% of respondents used Entonox during 20% of procedures.¹⁹ Respondents avoided using Entonox in females, patients with high anxiety, and previous abdominal surgery. Of the 25.5% respondents for whom Entonox was not available, 38.4% indicated that this was due to practical difficulties, 28.8% due to being satisfied with current analgesics and sedation, 13.4% due to cost, 11.5% did not consider Entonox, 3.8% due to lack of efficacy, and 1.9% due to side effects.

Our survey respondents reported perforation to be the most common complication. This survey could not decide the real incidence perforation as it needs a direct question and further study on the outcome of perforation. Other complications experienced by the respondents were post-procedure pain, patient anxiety, and bleeding. Kim et al reviewed recent literature and found the perforation rate to range from 0.005 to 0.085% (as reported in large studies \geq 50,000 colonoscopies).²⁰ The trend in the overall perforation rate in the past 15 years has not changed significantly. However, bleeding is a more common adverse event than perforation as recent large studies (\geq 50,000 colonoscopies) have reported postcolonoscopy bleeding occurring in 0.001 to 0.687% of cases.

There are a few limitations of this study. First, even with a high response rate (88%), it being survey based, the results are prone to nonresponse bias. The number of professionals surveyed is very small but the study has given an idea to formulate a larger group for better understanding and recommendations. Second, all surveys are subject to recall bias, as documentary evidence for various responses was not sought. Finally, the original study design was descriptive in nature and comparisons among groups were not prespecified. So, posthoc comparative analysis was not performed based on the level of training and years of experience of the respondent and the geographical location of the center and its characteristics (level of care, private vs. government). It is also possible a high-volume center or low-expertise professionals could make significant change. The current study is regarding the practice of sedation, bowel preparation, and the gas used for insufflation among a selected group of gastroenterologists who responded to the survey. Other outcomes such as cecal/ ileal intubation rates, procedure duration, and complications are highly prone to recall bias.

Participants were chosen randomly and not zone-wise. It included gastroenterologists working at tertiary care center and teaching in hospitals. Almost 10% gastroenterologists in India were surveyed. It is a limitation that we did not include each one.

Conclusion

The success of colonoscopy procedure has significantly increased the detection of various colonic diseases in Indian gastroenterology practice and also played a key role in early detection of colorectal cancer, and helped early and successful surgery. Our survey of real-world clinical practices highlights the preferences of gastroenterologists from across

India while conducting colonoscopies. It is hoped that this data will help to formulate practice guideline for a successful and safe colonoscopy in India.

Conflict of Interest

None.

References

- Wernli KJ, Brenner AT, Rutter CM, Inadomi JM. Risks associated with anesthesia services during colonoscopy. *Gastroenterology* 2016;150(4):888–894, quiz e18
- Lüning TH, Keemers-Gels ME, Barendregt WB, Tan AC, Rosman C. Colonoscopic perforations: a review of 30,366 patients. *Surg Endosc* 2007;21(6):994–997
- Adeyemo A, Bannazadeh M, Riggs T, Shellnut J, Barkel D, Wasvary H. Does sedation type affect colonoscopy perforation rates? *Dis Colon Rectum* 2014;57(1):110–114
- Katherine MH, Jennifer LH, Glenn ME. More large polyps are seen on screening colonoscopy with deep sedation compared with moderate conscious sedation. *Gastrointest Endosc* 2009;69:AB119–AB20
- Falt P, Liberda M, Smajstrla V, et al. Combination of water immersion and carbon dioxide insufflation for minimal sedation colonoscopy: a prospective, randomized, single-center trial. *Eur J Gastroenterol Hepatol* 2012;24(8):971–977
- Porostocky P, Chiba N, Colacino P, Sadowski D, Singh H. A survey of sedation practices for colonoscopy in Canada. *Can J Gastroenterol* 2011;25(5):255–260
- Cohen LB, Wechsler JS, Gaetano JN, et al. Endoscopic sedation in the United States: results from a nationwide survey. *Am J Gastroenterol* 2006;101(5):967–974
- Heuss LT, Froehlich F, Beglinger C. Changing patterns of sedation and monitoring practice during endoscopy: results of a nationwide survey in Switzerland. *Endoscopy* 2005;37(2):161–166
- Leung FW, Aljebreen AM, Brocchi E, et al. Sedation-risk-free colonoscopy for minimizing the burden of colorectal cancer screening. *World J Gastrointest Endosc* 2010;2(3):81–89
- Løberg M, Furholm S, Hoff I, Aabakken L, Hoff G, Bretthauer M. Nitrous oxide for analgesia in colonoscopy without sedation. *Gastrointest Endosc* 2011;74(6):1347–1353
- Maslekar S, Balaji P, Gardiner A, Culbert B, Monson JR, Duthie GS. Randomized controlled trial of patient-controlled sedation for colonoscopy: Entonox vs modified patient-maintained target-controlled propofol. *Colorectal Dis* 2011;13(1):48–57
- Baxter NN, Sutradhar R, Forbes SS, Paszat LF, Saskin R, Rabeneck L. Analysis of administrative data finds endoscopist quality measures associated with postcolonoscopy colorectal cancer. *Gastroenterology* 2011;140(1, Suppl. 40):65–72
- Rex DK, Schoenfeld PS, Cohen J, et al. Quality indicators for colonoscopy. *Gastrointest Endosc* 2015;81(1):31–53
- von Karsa L, Patnick J, Segnan N, et al; European Colorectal Cancer Screening Guidelines Working Group. European guidelines for quality assurance in colorectal cancer screening and diagnosis: overview and introduction to the full supplement publication. *Endoscopy* 2013;45(1):51–59
- Hussein AM, Bartram CI, Williams CB. Carbon dioxide insufflation for more comfortable colonoscopy. *Gastrointest Endosc* 1984;30(2):68–70
- Sajid MS, Caswell J, Bhatti MI, Sains P, Baig MK, Miles WF. Carbon dioxide insufflation vs conventional air insufflation for colonoscopy: a systematic review and meta-analysis of published randomized controlled trials. *Colorectal Dis* 2015;17(2):111–123
- Lindblom A, Jansson O, Jeppsson B, Törnebrandt K, Benoni C, Hedenbro JL. Nitrous oxide for colonoscopy discomfort: a randomized double-blind study. *Endoscopy* 1994;26(3):283–286
- Aboumarzouk OM, Agarwal T, Syed Nong Chek SA, Milewski PJ, Nelson RL. Nitrous oxide for colonoscopy. *Cochrane Database Syst Rev* 2011;(8):CD008506
- Ball AJ, Campbell JA, Riley SA. Nitrous oxide use during colonoscopy: a national survey of English screening colonoscopists. *Frontline Gastroenterol* 2014;5(4):254–259
- Kim SY, Kim HS, Park HJ. Adverse events related to colonoscopy: Global trends and future challenges. *World J Gastroenterol* 2019;25(2):190–204