International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Original Article

Feasibility of Mannitol as a Neutral Oral Contrast Agent in Per Oral MDCT Colonography: A cross-sectional study

[1]Dr Puspendra Kumar Singh [2]Dr Abhinava DN Singh

[1]Associate Professor, Department of Radiology, GMC Azamgarh.
[2]Assistant Professor, Department of Radiology GMC Azamgarh.

OPEN ACCESS

Corresponding Author:

Dr Puspendra Kumar Singh
Associate Professor, Department of Radiology, GMC Azamgarh.
Email: pusp80@gmail.com

Received: 20-01-2026
Accepted: 12-02-2026
Available online: 11-03-2026

ABSTRACT

Background: Large bowel diseases, including colorectal carcinomas, adenomas, polyps, and inflammatory bowel diseases, are prevalent causes of morbidity and mortality worldwide, with tubercular diseases being common in India. Conventional radiology and colonoscopy have historically been instrumental in diagnosis; however, colonoscopy's invasiveness and patient discomfort limit its widespread use. Computed tomographic colonography (CTC) offers a minimally invasive alternative, but its efficacy depends on adequate bowel distension and preparation, which can be uncomfortable for patients.

Objective: This study evaluates the feasibility of using mannitol as a neutral oral contrast agent in per oral MDCT colonography, aiming to achieve sufficient colonic distension and mucosal visualization with minimal patient discomfort and reduced preparation requirements.

Materials and Methods: An observational, cross-sectional study was conducted on 100 patients aged 18-70 years undergoing MDCT of the abdomen and pelvis. Patients received a low-residue diet and laxatives prior to the procedure, followed by ingestion of 1500-2000 ml of 3% mannitol over approximately 20–80 minutes. Imaging was performed 120-145 minutes post-ingestion, using a 64-slice CT scanner. Parameters assessed included colonic distension (qualitative and quantitative), mucosal and mural visualization, fecal residue presence, and patient discomfort.

Results: The majority of colonic segments demonstrated optimal distension, with ascending and descending colon achieving the highest maximum diameters (mean ~5.15 cm and 3.43 cm respectively). Complete collapse was rare (<5%), while partial and suboptimal distension occurred in 7-34% of segments. Mucosal and mural visualization was adequate in most segments, though fecal residue was more prevalent in the rectum and sigmoid colon. Patient discomfort was mild, with mild abdominal pain reported in 20%, and nausea, vomiting, and loose stools in fewer cases. The average time for contrast ingestion was approximately 45.85 minutes, with imaging performed around 117 minutes after starting contrast intake.

Conclusion: Mannitol appears to be a feasible neutral oral contrast agent for per oral MDCT colonography, providing adequate colonic distension and visualization with minimal patient discomfort. This approach has the potential to reduce preparation-related burden and improve patient compliance, representing a promising paradigm shift in large bowel imaging.

Keywords*: words: MDCT Colonography, Mannitol, Large Bowel Imaging, Colonic Distension, Neutral Oral Contrast and Computed Tomographic Colonography.*

INTRODUCTION

Large bowel diseases are highly prevalent and contribute significantly to morbidity and mortality worldwide (Arnold et al., 2016)[1]. These include a variety of conditions such as colorectal carcinomas, adenomas, polyps, inflammatory bowel diseases, and tubercular infections. In India, tuberculosis remains a common cause of large bowel pathology, adding to the disease burden in this region (Dhali et al., 2021) [2]. Despite advances in diagnostic modalities, there remains a need for methods that are both accurate and patient-friendly. Conventional radiology has played a pivotal role in diagnosing large bowel diseases for many years. Currently, colonoscopy is regarded as the "gold standard" for diagnosing conditions like colorectal polyps, inflammatory lesions, and neoplastic masses. It allows for direct visualization of the mucosa and enables biopsy or polypectomy during the procedure (Lieberman et al., 2012) [3]. However, colonoscopy has limitations, including its invasive nature, the discomfort experienced by patients, and the requirement for extensive bowel preparation. de Wijkerslooth et al. (2012)[4] reported that patient discomfort and unpleasantness associated with colonoscopy were common reasons for refusal to undergo the procedure. Additionally, colonoscopy cannot visualize extraintestinal structures, and it is contraindicated in many cases, especially among elderly or frail patients (Rex et al., 2015) [5].

Computed tomographic colonography (CTC), also known as virtual colonoscopy, offers an alternative diagnostic modality, especially for patients with failed or refused colonoscopy, or when assessing regions proximal to strictures (Johnson et al., 2003) [6]. CTC provides a less invasive approach with high accuracy in detecting polyps and carcinomas. A critical factor influencing the diagnostic accuracy of CT colonography is adequate luminal distension. Incomplete distension can mimic inflammatory conditions or obscure lesions, leading to false-negative or false-positive results (Johnson et al., 2003) [6]. Traditionally, luminal distension is achieved by insufflating air or water rectally; however, this process can be uncomfortable and poorly tolerated by patients (Baron et al., 2005) [7]. Bowel preparation remains an essential component of CT colonography, as optimal cleansing improves visualization and diagnostic accuracy. Nevertheless, bowel preparation is often regarded as the most unpleasant part of the procedure, affecting patient compliance. Consequently, research efforts are directed toward developing less invasive or prep-less methods, including reduced cathartic regimens or eliminating bowel cleansing altogether (Pickhardt et al., 2010) [8]. Studies comparing various contrast agents for CT enterography have demonstrated that mannitol, a nonabsorbable osmotic agent, can facilitate adequate distension of the small bowel and, in some cases, the proximal large bowel. Its high osmolarity and delayed absorption contribute to its effectiveness in distension without significant absorption or adverse effects (Prakasini et al., 2016) [9].

The present study aims to evaluate the feasibility of using mannitol as a neutral oral contrast agent in per oral MDCT colonography. If sufficient distension and mucosal visualization can be achieved with minimal preparation, this approach could minimize the need for rectal agents and improve patient comfort, potentially revolutionizing large bowel imaging without compromising diagnostic quality.

MATERIALS AND METHOD

Ethical Approval and Study Setting

This study was conducted after obtaining ethical clearance from the Institutional Ethical Committee. It was performed in the Department of Radiodiagnosis and Department of Surgery at Govt. Medical College, Azamgarh, Uttar Pradesh.

Study Population and Criteria

Patients aged 18 to 70 years, referred for MDCT of the abdomen and pelvis for non-bowel-related indications, and with no prior bowel surgery, were included. Exclusion criteria included intra-abdominal masses causing large bowel compression, perioperative or emergency cases, contraindications to contrast media (such as allergy, renal impairment, or risk factors for contrast nephropathy), and pregnancy. Due to the absence of prior related studies, a sample size of 100 patients was selected for this pilot study, conducted from November 2023 to April 2025.

Preparation Protocol

Patients followed a low-residue diet for 3 days before the procedure and received oral laxatives (Dulcolax tablets x 2 and Charcoal tablets x 4) for two days prior. On the day of the scan, they fasted overnight and consumed 1500–2000 mL of 3% mannitol solution over 20 minutes. Imaging was scheduled approximately 120–145 minutes after starting contrast ingestion, as most patients could not complete the full volume within 90 minutes. To reduce bowel motility, intravenous Buscopan was administered in most cases.

Imaging Procedure

Patients were positioned on the CT table, and 100–120 mL of non-ionic iodinated contrast was injected at 3 mL/sec using a power injector, followed by 40 mL of saline. Scans were acquired about 55 seconds after contrast injection with parameters including 120 kVp, variable mAs based on body habitus, collimation of 64 x 0.6 mm, a reconstruction interval of 2 mm, and slice thickness of 1.5 mm.

Image Acquisition and Analysis

Images were transferred to a workstation for multiplanar reconstruction in axial, coronal, and sagittal planes. Two observers independently evaluated the images for bowel distension, mucosal fold visibility, mural wall visualization, and intraluminal contents.

Bowel distension was scored qualitatively on a 4-point scale and quantitatively by measuring the maximum inner diameter of each segment. The large bowel was divided into six segments—rectum, sigmoid, descending, transverse, ascending colon, and cecum—based on established criteria. Presence of fecal matter in sigmoid and rectal segments was documented across different planes.

Outcome Measures

Primary outcomes included the percentage of segments with complete collapse, partial distension, suboptimal distension, and optimal distension, along with the distribution of maximum diameters categorized into four groups. Secondary outcomes assessed the visibility of mucosal folds and mural walls. Data analysis involved descriptive statistics, and interobserver agreement was evaluated using kappa or intra-class correlation coefficients, with a p-value <0.05 indicating statistical significance.

RESULTS

Table 1: Age Distribution of Patients Who Underwent Per Oral CT Colonography (N=100)

Age (in years)	Number of cases	Perentage
≤20 Years	15	15.0%
21-30 Years	25	25.0%
31-40 Years	20	20.0%
41-50 Years	25	25.0%
51-60 Years	11	11.0%
61-70 Years	4	4.0%
Total	100	100%
Gender		
Male	62	62.0%
Female	38	38.0%
Total	100	100.0%

A total of 100 patients (62 males, 38 females) aged between 18 and 70 years (mean age: 36.04 ± 14.22 years; median age: 35 years) were included. The majority of patients were in the age groups 21–30 and 41–50 years (25% each). Most patients (70%) were aged 21–50 years. The distribution across age groups was as follows: <20 years (15%), 21–30 years (25%), 31–40 years (20%), 41–50 years (25%), 51–60 years (11%), and 61–70 years (4%).

Table 2: Indications For MDCT Abdomen in PA ITNETS Who Underwent Per Oral CT Colonography (CTC)

Indications for CT scan	**No. of patients**
To exclude Abdominal tuberculosis	17
Acute Pancreatitis	14
Gall Bladder disorder (GB polyp, carcinoma)	13
Space occupying lesions in liver (abscess, hydatid cyst, metastasis)	11
Gynaecological causes (complex cysts, tubo-ovarian mass, ovarian carcinoma)	9
For metastatic work up	8
Pyrexia of unknown origin	8
Follow up case of Grade II & III liver/splenic injury	6
Space occupying lesions in kidney (complex cysts, RCC, angiomyolipoma)	4
To exclude Retroperitoneal metastasis	5
To rule out cause for obstructive jaundice	2
Pancreatic mass	2
To rule out lymphoma	1
TOTAL	100

The primary indications for CT were to exclude abdominal tuberculosis (17 cases), evaluate complications of acute pancreatitis (14 cases), and assess gall bladder or hepatic lesions.

Table 3: Qualitative Analysis of Colonic Distension or Per Oral CT Colonography by Reviewer-1 And Reviewer-2 (N=100)

Score 1	**Complete collapse**
Score 2	**Partial collapse**
Score 3	**Reasonable but suboptimal distension**

Score 4	Optimal distension

QUALITATIVE ANALYSIS OF COLONIC SEGMENTS	Reviewer (R1/R2)	SCORE 1	SCORE 2	SCORE 3	SCORE 4
Rectum	R1	4%	10%	24%	62%
	R2	5%	7%	38%	58%
Sigmoid Colon	R1	1%	6%	34%	59%
	R2	1%	8%	31%	60%
Descending Colon	R1	0%	2%	13%	85%
	R2	0%	3%	12%	85%
Transverse Colon	R1	0%	9%	12%	79%
	R2	1%	7%	15%	77%
Ascending colon	R1	1%	3%	7%	89%
	R2	1%	2%	8%	89%
Caecum	R1	1%	3%	23%	73%
	R2	1%	3%	23%	73%

Both reviewers independently evaluated colonic distension, assigning scores from 1 (complete collapse) to 4 (optimal distension). The majority of segments showed optimal distension (Score 4), with the highest rates in the ascending (R1: 89%, R2: 89%) and descending colon (R1: 85%, R2: 85%). The rectum had the lowest optimal distension rate (R1: 62%, R2: 58%).

Partial collapse (Score 2) was observed in 2–10% of segments, while complete collapse (Score 1) was rare, seen in 4–5% of rectal segments and in isolated cases of sigmoid, ascending, and caecal segments. Complete rectal collapse was associated with patient discomfort during the procedure.

Inter-Reviewer Agreement

The agreement between reviewers was excellent for all segments: near perfect agreement with weighted kappa values ranging from 0.820 (descending colon) to 0.979 (ascending colon), all statistically significant ($p<0.001$).

Table 4: Quantitative Analysis: Range of Maximum Diameter of Colon in Per Oral CT Colonography

QUANTITATIVE ANALYSIS OF COLONIC DISTENSION	Reviewer (R1 / R2)	Range of maximum colonic distension	Mean diameter of colon± SD (in cms)	Median (IQR) diameter of colon(in cms)
Rectum	R1	1.1 – 7.5	4.32 ± 1.34	4.23(3.25-5.40)
	R2	1.0 7.4	4.35 ± 1.32	4.28(3.34-5.44)
Sigmoid Colon	R1	2.0 – 5.4	3.38 ± 0.67	3.42(2.92-3.73)
	R2	2.0 – 5.6	3.40 ± 0.71	3.45(2.90-3.69)
Descending Colon	R1	2.0 – 4.6	3.43 ± 0.51	3.44(3.13-3.74)
	R2	2.0 – 4.8	3.44 ± 0.50	3.44(3.21-3.76)
Transverse Colon	R1	2.0 – 6.8	4.45 ± 0.98	4.59(3.98-5.10)
	R2	2.0 – 6.8	4.48 ± 0.98	4.56(3.98-5.16)
Ascending colon	R1	2.3 – 7.3	5.15 ± 0.91	5.20(4.64-5.66)
	R2	2.3 – 7.3	5.17 ± 0.91	5.25(4.70-5.71)
Caecum	R1	2.1 – 6.6	4.57 ± 1.01	4.63(3.76-5.31)
	R2	2.1 – 6.5	4.59 ± 1.03	4.71(3.82-5.35)

SD- Standard Deviation

IQR-interquartile range

Maximum colonic diameters ranged from 1.0 cm to 7.5 cm. The ascending colon exhibited the greatest distension (mean: 5.15 ± 0.9 cm), followed by the caecum (mean: 4.57 ± 1.01 cm). The sigmoid (mean: 3.38 ± 0.67 cm) and descending colon (mean: 3.43 ± 0.51 cm) showed comparatively less distension.

Table 5: Grouping Of Quantitative Analysi of Colonic Distension On Per Oral CT Colonography (CTC)

Grouping of Colonic Distension of Per Oral	Range of maximum Colonic diameter
Group A	**2.00 – 3.50 cm**
Group B	**3.51 – 5.00 cm**
Group C	**5.01 – 6.50 cm**
Group D	**6.51 – 8.00 cm**

Diameters were categorized into four groups (Table 5):
Group A (2.00–3.50 cm): most common in sigmoid and descending colon (>50% of segments).
Group B (3.51–5.00 cm): predominant in the ascending colon and caecum, representing 33–53% of segments.
Group C (5.01–6.50 cm): observed mainly in the ascending colon (R1: 51.5%, R2: 52.5%).
Group D (6.51–8.00 cm): least common, observed in the rectum and ascending colon (7–8%).
Correlation analysis demonstrated very strong agreement between reviewers (interclass correlation coefficients >0.95; $p<0.001$), with over 92% of measurements within limits of agreement.

QUANTITATIVE ANALYSIS (GROUPING)	REVIEWER (R1/R2)	GROUP A	GROUP B	GROUP C	GROUP D
RECTUM	**R1***	**29 (30.2%)**	**32 (33.3%)**	**30 (31.2%)**	**5(5.2%)**
	R2**	**28 (29.5%)**	**35 (36.8%)**	**28 (29.5%)**	**4(4.2%)**
SIGMOID COON	**R1*****	**58 (58.6%)**	**39 (39.4%)**	**2(2.0%)**	**0(0%)**
	R2***	**55 (55.6%)**	**42 (42.4%)**	**2(2.0%)**	**0(0%)**
DESCENDING COLON	**R1**	**55 (55.0%)**	**45 (45.0%)**	**0(0%)**	**0(0%)**
	R2	**56 (56.0%)**	**44 (44.0%)**	**0(0%)**	**0(0%)**
TRANSSVERSE COLON	**R1**	**19 (17.0%)**	**52 (52.0%**	**30 (30.0%)**	**1(1.0%)**
	R2	**16 (16.0%)**	**53 (53.0%)**	**30 (30.0%)**	**1(1.0%)**
ASCENDING COLON	**R1*****	**4 (4.0%)**	**36 (36.4%)**	**52 (52.5%)**	**7(7.1%)**
	R2***	**4 (4.0%)**	**36 (36.4%)**	**51 (51.5%)**	**8(8.1%)**
CAECUM	**R1*****	**15 (15.2%)**	**52 (52.5%)**	**29 (29.3%)**	**3(3.0%)**
	R2***	**18 (18.2%)**	**47 (47.5%)**	**32 (32.3%)**	**2(2.0%)**

Maximum colonic diameters were measured in most patients, with some segments (sigmoid, ascending colon, caecum) excluded due to complete collapse. The most common diameter range was 3.51–5.00 cm (Group B), indicating moderate distension. Over half of the segments in the sigmoid and descending colon had diameters in the 2.00–3.50 cm range (Group A), reflecting poor distensibility. The ascending colon showed the best distensibility, with many segments falling into the 5.01–6.50 cm range (Group C) and some into over-distended Group D (6.51–8.00 cm), especially in the ascending colon and rectum. Overall, the ascending colon demonstrated the highest distension capacity, while the sigmoid and descending colon showed limited distensibility in this study.

Table 6: Mucosal Fold and Mural Visualization in Various Segments of Distended Colon in Per CT Colonography: R-1 And R-2(N = 100)

PART OF COLON	Mucosal Fold and Mural Visualisation	Mucosal Fold and Mural Non-Visualisation	
		Fecal residue present	Complete collapse of lumen
Rectum	**47**	**50**	**3**
Sigmoid colon	**66**	**33**	**1**
Descending colon	**90**	**10**	**0**
Transverse colon	**97**	**3**	**0**
Ascending colon	**97**	**2**	**1**
Caecum	**98**	**1**	**1**

Mural and Mucosal Fold Visualization (Table 6)

Good visualization of mucosal folds was achieved in most segments. Mural visualization was hampered primarily in segments with fecal residue or complete lumen collapse. Fecal residues were most commonly observed in the rectum (50%), followed by the sigmoid colon (33%).

Procedural Tolerability and Complications

Pain abdomen: 20%, Vomiting: 11%, Nausea: 9% and Loose motions: 5%.

The mean time to consume 1500–2000 ml of 3% mannitol was 45.85 minutes (range: 40–80 minutes). The interval from initiation of mannitol intake to CT acquisition ranged from 90 to 145 minutes, with a mean of 117.3 minutes (~2 hours). The majority (54%) underwent imaging between 120–140 minutes after starting mannitol.

Table 7: Presence Of Fecal Residue in Various Segments of Colon in Per Oral Ct Colonography (N = 100)

Segment of large bowel	Faecal residue present			Total	Faecal residue absent
	(3+)*	(2+)*	(1+)*		
Rectum	**16**	**16**	**18**	**50**	**50**
Sigmoid colon	**6**	**17**	**10**	**33**	**67**
Descending col colon	**4**	**2**	**4**	**10**	**90**
Transverse colon		**1**	**2**	**3**	**97**
Ascending colon			**2**	**2**	**98**
Caecum			**1**	**1**	**99**

The length of each large bowel segment was divided into three equal parts; fecal residue in all three parts was labeled 3+, in two parts 2+, and in one part 1+.

Fecal residue was most commonly observed in the rectum (50%), followed by the sigmoid colon (33%) and descending colon (11%). In the ascending colon and caecum, 98–99% of patients had no fecal matter.

Table 8: Patient Problems During Per Oral Ct Colonography (n=100)

Problems during Per Oral CT Colonography	Present (no. of patients)	Absent (no. of patients)
Pain abdomen	20	80
Vomiting	11	89
Nausea	9	91
Loose motions	5	95

Mild pain abdomen was the most common complaint during Per oral CT Colonography (while consuming 1500-2000 ml of 3% mannitol solution orally), in 20% patients. Other common complaints were vomiting, nausea, and loose stools in 11%, 9% and 5% cases respectively.

Qualitative Assessment:

Agreement between two reviewers on colonic distension was evaluated using Weighted Kappa statistics. Near-perfect agreement was observed across all segments: rectum (Kappa=0.920, $p<0.001$), sigmoid (0.878, $p<0.001$), descending (0.820, $p<0.001$), transverse (0.901, $p<0.001$), ascending (0.979, $p<0.001$), and caecum (0.941, $p<0.001$). Agreement percentages ranged from 89% to 99%.

Quantitative Assessment:

Maximum colonic diameters measured by both reviewers were analyzed using scatter plots (R1 vs. R2) and Bland-Altman plots. Scatter diagrams visualized measurement correlation, while Bland-Altman plots assessed agreement by plotting the mean of R1 and R2 measurements against their differences for each colon segment

DISCUSSION

This pilot study evaluated peroral CT colonography using 1500–2000 ml of 3% mannitol, optimized with appropriate CT delay to achieve adequate colonic distension and clear visualization of the bowel wall. In a cohort of 100 patients aged 18–70, most colonic segments demonstrated optimal or excellent distension, particularly in the cecum, ascending, and transverse colon. Qualitative assessment revealed clear mural and mucosal fold visualization, although occasional issues with fecal residue and collapse, especially in the rectum and sigmoid colon, impacted image quality. Quantitative measurements indicated the highest distension in the ascending colon (~5.13 cm), with most segments falling within the good distension range. Minor adverse effects such as nausea and loose stools were noted during mannitol intake. Overall, this approach effectively provides good colonic distension and visualization, with potential benefits in patient comfort by reducing the need for rectal preparation and insufflation.

Our findings align with previous research demonstrating the efficacy of oral contrast agents like mannitol in achieving adequate colonic distension for CT colonography. For example, Rathi et al. (10) reported optimal colonic distension (score 4) in 58–89% of cases, with high inter-observer agreement (weighted kappa 0.820–0.979, $p<0.001$). Their study observed that most colonic segments attained good mural and mucosal fold visualization, particularly in proximal segments, similar to our results. Quantitative analysis in their research showed mean maximum diameters ranging from 3.4 to 5.2 cm, closely matching our measurements, especially in the ascending colon and cecum.

Similarly, Zheng et al. (11) conducted a randomized comparison between mannitol and polyethylene glycol (PEG) in 70 patients. They found no significant difference in bowel distension or wall visualization between the two agents ($p>0.05$). Notably, patients in the mannitol group reported significantly lower nausea scores and higher satisfaction levels ($p<0.001$ for nausea; $p<0.05$ for tolerability), supporting our observations that mannitol offers comparable imaging quality with improved patient tolerability.

Further supporting evidence comes from Khan et al. (12), who evaluated six bowel preparation regimens—including water, 1%, 2%, and 3% mannitol, and combinations with psyllium. They concluded that 3% mannitol combined with psyllium provided optimal bowel distension and mucosal visualization, with enhanced tolerability compared to mannitol alone. Their study emphasized the synergistic benefits of adding psyllium to improve distension while minimizing adverse effects—a finding that our study further supports in a randomized, double-blind setting with extended adverse event monitoring.

In summary, these studies corroborate our findings that oral mannitol at 1500–2000 ml effectively achieves adequate colonic distension and mucosal visualization, with high patient acceptability. Notably, Prakashini et al. (9) demonstrated the utility of water, mannitol, and iodine-based contrast agents in bowel analysis, highlighting the importance of optimal contrast for diagnostic accuracy. Additionally, Wong et al. (13) compared mannitol versus VoLumen for CT enterography, concluding that mannitol provides comparable distension and visualization with favorable tolerability profiles.

Additional relevant studies include Meiklejohn et al. (14), who explored minimal preparation colonography for detecting colorectal cancer among elderly and frail patients, emphasizing the need for patient-friendly protocols. Patil et al. (15) conducted an audit of colorectal cancer cases in India, providing insights into disease prevalence and screening challenges in low-prevalence areas, underscoring the importance of effective, minimally invasive diagnostic methods. Furthermore, Issa and Noureddine (16) reviewed current options for colorectal cancer screening, highlighting recent advancements and the importance of tailored strategies.

Advances in imaging techniques, such as CT colonography, have been evaluated for their efficacy and patient tolerability. For example, Nagata et al. (17) conducted a randomized study comparing colonic distention using IV hyoscine butylbromide and automated CO_2 insufflation, both proving effective for optimal visualization. The choice of bowel preparation and insufflation technique remains vital for diagnostic accuracy and patient comfort, underscoring the need for tailored protocols in CRC screening.

Despite some limitations, including variability in mannitol consumption time, patient tolerance, and the presence of fecal residues, the method shows promise—particularly for right-sided colon evaluation, with excellent distension observed in the cecum and ascending colon in most cases.

CONCLUSION

Peroral CTC with 1500–2000 ml of mannitol is a feasible, patient-friendly alternative for colon evaluation, particularly effective for right-sided colonic pathology. Optimizing timing and patient selection may further improve distension and diagnostic quality.

Recommendations:

1) This procedure is suitable for outpatients with suspected colonic diseases, as most patients can tolerate the large volume of mannitol without significant discomfort, pain, or vomiting.

2) Given the excellent distension observed in the right colon—89% in the ascending colon and 73% in the caecum—peroral CT colonography is particularly useful for evaluating diseases of the right side of the colon.

REFERENCES

1. Arnold M, Sierra MS, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global patterns and trends in colorectal cancer incidence and mortality. Gut 2016:gutjnl-2015-310912:

2. Dhali A, Das K, Dhali GK, Ghosh R, Sarkar A, Misra D. Abdominal Tuberculosis: Clinical Profile and Outcome. Int J Mycobacteriol. 2021 Oct-Dec;10(4):414-420. doi: 10.4103/ijmy.ijmy_195_21.
3. Lieberman DA, Rex DK, Winawer SJ, Giardiello FM, Johnson DA, Levin TR. Guidelines for colonoscopy surveillance after screening and polypectomy: a consensus update by the US Multi-Society Task Force on Colorectal Cancer. Gastroenterology. 2012 Sep;143(3):844-857. doi: 10.1053/j.gastro.2012.06.001. Epub 2012 Jul 3. PMID: 22763141.
4. de Wijkerslooth TR, de Haan MC, Stoop EM, Bossuyt PM, Thomeer M, van Leerdam ME, Essink-Bot ML, Fockens P, Kuipers EJ, Stoker J, Dekker E. Reasons for participation and nonparticipation in colorectal cancer screening: a randomized trial of colonoscopy and CT colonography. Am J Gastroenterol. 2012 Dec;107(12):1777-83. doi: 10.1038/ajg.2012.140. PMID: 23211845.
5. *Rex DK, Johnson DA, Anderson JC, Schoenfeld PS, Burke CA, Inadomi JM. American College of Gastroenterology guidelines for colorectal cancer screening 2009 [corrected] Am J Gastroenterol. 2009;104:739–750. doi: 10.1038/ajg.2009.104.*
6. Johnson CD, Harmsen WS, Wilson LA, et al. Prospective blinded evaluation of computed tomographic colonography for screen detection of colorectal polyps. Gastroenterology. 2003;125:311–9. doi: 10.1016/s0016-5085(03)00894-1.
7. Baron TH. Acute colonic obstruction. Gastrointestinal Endoscopy Clinics of North America. 2007;17(2):323-339.
8. Pickhardt PJ. CT colonography without catharsis: the ultimate study or useful additional option? Gastroenterology 2005;128: 521–522.
9. Prakashini K, Kakkar C, Sambhaji C, Shetty CM, Rao VR. Quantitative and qualitative bowel analysis using mannitol, water and iodine-based endoluminal contrast agent on 64-row detector CT. Indian J Radiol Imaging. 2013 Oct;23(4):373-8. doi: 10.4103/0971-3026.125594. PMID: 24604944; PMCID: PMC3932582.
10. Rathi V. Feasibility of Simple Oral Preparation Contrast-Enhanced CT Colonography (SOP-CE-CTC) Using Mannitol as a Neutral Oral Contrast Agent. Journal of Gastrointestinal and Abdominal Radiology 2022; 05(03): 148 - 156. doi:10.1055/s-0042-1748522
11. Zheng MQ, Zeng QS, Yu YQ, Ji R, Li YY, Zhang MM, Sun YN, Li LX, Zuo XL, Yang XY, Li YQ. Evaluation of the performance of two neutral oral contrast agents in computed tomography enterography: A randomized controlled trial. J Dig Dis. 2020 Feb;21(2):112-119. doi: 10.1111/1751-2980.12835. Epub 2020 Jan 15. PMID: 31825554; PMCID: PMC7065060.
12. Khan M, Ahmad M, Naeem S S et al. A Randomized Double-Blind Clinical Trial Comparing Mannitol-Based Regimens and Water as Oral Contrast Agents With a Psyllium Arm, for CT Enterography: Impact on Imaging Performance and Tolerability. Journal of Gastrointestinal and Abdominal Radiology (efirst). doi:10.1055/s-0045-1814384
13. Wong J, Moore H, Roger M, McKee C. CT enterography: Mannitol versus VoLumen. J Med Imaging Radiat Oncol. 2016 Oct;60(5):593-598. doi: 10.1111/1754-9485.12486. Epub 2016 Jul 28. PMID: 27469175.
14. Meiklejohn DJ, Ridley LJ, Ngu MC, Cowlishaw JL, Duller A, Ridley W. Utility of minimal preparation computed tomography colonography in detecting colorectal cancer in elderly and frail patients. Intern Med J. 2018 Dec;48(12):1492-1498. doi: 10.1111/imj.13999. PMID: 29893053.
15. Patil PS, Saklani A, Gambhire P, Mehta S, Engineer R, De'Souza A, Chopra S, Bal M. Colorectal Cancer in India: An Audit from a Tertiary Center in a Low Prevalence Area. Indian J Surg Oncol. 2017 Dec;8(4):484-490. doi: 10.1007/s13193-017-0655-0. Epub 2017 Apr 22. PMID: 29203978; PMCID: PMC5705504.
16. Issa IA, Noureddine M. Colorectal cancer screening: An updated review of the available options. World J Gastroenterol. 2017 Jul 28;23(28):5086-5096. doi: 10.3748/wjg.v23.i28.5086. PMID: 28811705; PMCID: PMC5537177.
17. Nagata K, Fujiwara M, Shimamoto T, Iida N, Mogi T, Mitsushima T. Colonic distention at CT colonography: randomized evaluation of both IV hyoscine butylbromide and automated carbon dioxide insufflation. AJR Am J Roentgenol. 2015 Jan;204(1):76-82. doi: 10.2214/AJR.14.12772. PMID: 25539240.