

How to Cite:

Gomaa, A., Amer, M. Z. A., & Hassan, A. A. (2022). Evaluation of the value of using simple elastic abdominal binder during colonoscopy. *International Journal of Health Sciences*, 6(S6), 5886–5893. <https://doi.org/10.53730/ijhs.v6nS6.11108>

Evaluation of the value of using simple elastic abdominal binder during colonoscopy

AmerAbdalhamid Gomaa

Department of Tropical Medicine, Faculty of Medicine, El-Azhar University, Egypt

Mohammed Zakaria Abu Amer

Department of Tropical Medicine, Faculty of Medicine, El-Azhar University, Egypt

Abdelrahman Abuelela Hassan

Department of Tropical Medicine, Faculty of Medicine, El-Azhar University, Egypt

Corresponding author email: Abdelrahman4u@gmail.com

Abstract---Background: Colonoscopy is a well-established endoscopic procedure widely used for screening, diagnosis, and treatment. Colonoscopy is the endoscopic examination of the large bowel and the distal part of the small bowel, using some techniques that allow for more frequent cecal intubation, quicker time to cecum, or less pain. One obstacle that must be overcome during this procedure is looping of the colonoscope shaft. Objective: The aim of the work is to evaluate the use of simple elastic abdominal binder during colonoscopy and its outcome on the ease, safety, duration and success of the procedure. Successful colonoscopy means demonstration of the ileocecal valve (cecal intubation). Duration of colonoscopy means time in minutes since insertion of tip of colonoscope shaft through anus till reaching ileocecal valve. Patients and methods: This study was carried out on 120 patients undergoing elective colonoscopy (during period from April 2018 to August 2019) who were enrolled from Hepatology, Gastroenterology & Tropical Medicine department in Al Azhar University Hospitals (El-Hussein and BAB El-Shaarea). Results: It was shown that rate of complete procedure (cecal intubation) was higher in group I (96.6%) than group II (83.3%), There was statistically significant increase in reposition of patients in group II (30%) in comparison to group I (10%), there was also increase of increase in use of manual pressure in group II than group I, Also the mean duration for complete procedure from insertion of tip of the shaft of colonoscopy till cecal intubation was significantly less in group I 8.11sec (± 1.91) than Group II 9.21sec (± 2.11). Conclusion: It has been found that abdominal binder provides some benefits and help endoscopist to achieve high quality colonoscopy in

shorter duration with higher rates of cecal intubation and lower rates of repositioning of patients.

Keywords---colonoscopy, cecal intubation, duration of colonoscopy, looping of colonoscope.

Introduction

Colonoscopy is a well-established endoscopic procedure widely used for screening, diagnosis, and treatment. Colonoscopy is the endoscopic examination of the large bowel and the distal part of the small bowel with a charge-coupled device (CCD) camera or a fiber optic camera on a flexible tube passed through the anus. It can provide a visual diagnosis (e.g., ulceration, polyps) and grants the opportunity for biopsy or removal of suspected colorectal cancer lesions ⁽¹⁾. Colonoscopy technology continues to evolve. Changes that effect function in a way that will allow for more frequent cecal intubation, quicker time to cecum, or less pain include scope diameter and the capability to vary the stiffness of the scope. One obstacle that must be overcome during this procedure is looping of the colonoscope shaft. Looping occurs in up to 90% of all colonoscopies ⁽²⁾. Looping can have a variety of effects ranging from extended procedure times, incomplete examinations, or even perforation of the colon wall and splenic injury. It also increases pain and discomfort for the patient ⁽³⁾.

Patients and Methods

This was a case control study which was done at Al Azhar University Hospitals (El-Hussein and BAB El-Shaarea).

Study population

This study was carried out on 120 on patients undergoing elective colonoscopy for evaluating the value of application of elastic abdominal binder during colonoscopy, during period from April 2018 to August 2019, who were enrolled from Hepatology, Gastroenterology & Tropical Medicine department

The enrolled patients were divided into 2 groups

- **Group I:** including patients underwent colonoscopy with use of abdominal binder (AB).
- **Group II:** including patients underwent colonoscopy without use of AB.

The patients were distributed randomly among the studied groups

The study was approved by Ethical committee of faculty of medicine, Al-Azhar University. Written informed consents were taken from all participants in the study, and also they were informed by any probable side effects that may happen to them.

Inclusion criteria

Patients undergoing elective colonoscopy and age >18 yrs old.

Exclusion Criteria

Patients refused to undergo the procedure or to sign consent, age younger than 18 years, patients with history of colonic surgery and patients who have contraindication of application of abdominal binder like COPD or other chest diseases (abdominal breathing).

Initial evaluation: All the studied subjects were subjected

- **Complete history taking and clinical assessment:** Full history taking including epidemiological data, symptoms as jaundice, abdominal pain, fever and previous abdominal surgery, hemorrhagic diathesis, diarrhea constipation or co-morbid conditions such as liver disease, ischemic heart or renal impairment diabetes mellitus and hypertension. All patients signed an informed written consent before the procedures, after receiving an explanation on the risks, benefits and alternatives of colonoscopy and associated therapeutic procedures. Full general and abdominal examinations.
- **Laboratory evaluation:** Complete blood count (CBC), liver function tests: AST, ALT, S.Albumin and renal function tests: S.Creatinine, S.Urea
Colonoscopy was performed under sedation with the patient in the left-lateral position.
During the procedure, all endoscopic data were reported, and any adverse event or complications occurred were documented in a colonoscopy data sheet that was designed for all patients undergoing the procedure.

Data management and statistical analysis

Data were collected, coded, revised and entered to the Statistical Package for Social Science (SPSS) version 20. The data were presented as number and percentages for the qualitative data, mean, standard deviations and ranges for the quantitative data with parametric distribution and median with inter quartile range (IQR) for the quantitative data with non-parametric distribution.

- **Chi-square test** was used in the comparison between two groups with qualitative data
- **Fisher exact test** was used instead of the Chi-square test when the expected count in any cell found less than 5.
- **Independent t-test** was used in the comparison between two groups with quantitative data and parametric distribution
- **Mann-Whitney test** was used in the comparison between two groups with quantitative data and non-parametric distribution.

The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following: $P > 0.05$: Non significant (NS), $P < 0.05$: Significant (S) and $P < 0.01$: Highly significant (HS)

Results

Table 1
Comparison between group I & group II as regards demographic data

		Group I (No.=60)		Group II (No.=60)		Chi square test	
		No	%	No	%	X ² /t*	P value
Gender	Male	29	48.3%	34	56.7%	0.835	0.361
	Female	31	51.7%	26	43.3%		
Age	Mean $\pm$ SD	59.18 $\pm$ 9.50		51.71 $\pm$ 14.83		3.622	0.065

t- Independent Sample t-test; # x2: Chi-square test

There were no statistically significant differences regarding demographic data between the studied groups.

Table 2
Comparison between studied groups regarding endoscopic finding

		Group I (No.=60)		Group II (No.=60)		Chi square test	
		No	%	No	%	X ²	P value
Normal		25	41.6%	22	36.6%	1.004	0.985
Erythematous colitis		11	18.3%	10	16.6%		
Polyp		5	8.3%	7	11.6%		
mass		3	5%	4	6.6%		
Diverticulosis		4	6.6%	5	8.3%		
Angiodysplasia		4	6.6%	5	8.3%		
Heamorrhd INT.		8	13.3%	7	11.6%		

There were no statistically significant differences regarding endoscopic finding between studied groups; normal colonoscopy was the commonest finding in 47 cases.

Table 3
Comparison between studied groups regarding successful cecal intubation (CI)

		Group I (No.=60)		Group II (No.=60)		Chi square test	
		No	%	No	%	X ²	P value
Successful CI	Successful	58	96.6%	50	83.3%	5.926	0.014
	Unsuccessful	2	3.3%	10	16.6%		

Successful cecal intubation was significantly increased in patients who underwent colonoscopy with use of abdominal binder (group I) in comparison to group II.

Table 4
Comparison between studied groups regarding repositioning of patients

		Group I (No.=60)		Group II (No.=60)		Chi square test	
		No	%	No	%	X ²	P value
Reposition	Repositioning	6	10%	18	30%	7.500	0.006
	no repositioning	54	90%	42	70%		

Patients repositioning was significantly increased in patients who underwent colonoscopy without use of abdominal binder.

Table 5
Comparison between studied groups regarding manual pressure and duration of procedure

		Group I (No.=60)		Group II (No.=60)		Chi square test	
		No	%	No	%	X ² /t*	P value
Manual pressure	Used	16	26.7%	27	45.0%	4.385	0.036
	Not used	44	73.3%	33	55.0%		
Duration in minutes	Mean $\pm$ SD	8.11 $\pm$ 1.91		9.21 $\pm$ 2.11		0.249	0.034

Manual pressure was significantly increased in patients who underwent colonoscopy without use of abdominal binder. The duration of procedure was significantly increased in patients who underwent colonoscopy without use of abdominal binder.

Discussion

In this study, we used a fitted abdominal corset to exert pressure to prevent stretch of the mesentery and formation of sigmoid looping. This corset is inexpensive and easy to obtain. The 'classical solution' manual compression needs uninterrupted assistance and may result in uncontrolled applied pressure. This work was carried out on 120 patients with dyspeptic symptoms (patients selected within six months) who were enrolled from Tropical Medicine department at El-Hussein and BAB EL-Shaarea University Hospitals. In our study, we used a fitted abdominal corset to exert pressure to prevent stretch of the mesentery and formation of sigmoid looping. This corset is inexpensive and easy to obtain. The 'classical solution' manual compression needs uninterrupted assistance and may result in uncontrolled applied pressure. The study was carried out at endoscopy unit of Tropical Medicine Department, El-Hussein University Hospital from April 2018 to March 2019. A total of 120 individuals were included in this study. They were randomly classified into two groups,

- **Group I:** Including 60 patients who underwent colonoscopy with use of abdominal binder

- **Group II:** Including 60 patients who underwent colonoscopy without use of abdominal binder.

Full clinical evaluation including basic data as age, gender, clinical presentation, laboratory parameters and sonographic data were done. Also, colonoscopic findings obtained during procedure were recorded for evaluating their influence on colonoscopy failure rate. The gender and age in the current study reveals no statistical significant difference between the studied groups, the results were in agreement with Soo et al., (2017). The most common finding in two groups was normal colonoscopy in group I (25 cases) while in group II (22) with no statistical difference regarding endoscopic findings between the studied groups; this was in agreement with Özsoy. (2004). We also agree with Fernández et al., (1996) who reported that the commonest finding was normal examination of colonoscopy in (32%) of patients then colitis and polyps ⁽⁴⁾.

In our study, the commonest indication for colonoscopy was chronic constipation in 32 cases (26.6%) bleeding per rectum in 30 cases (25%) with no significant differences between the studied groups; this were in agreement with Olokoba et al., (2013) who reported that chronic constipation as the commonest indication for colonoscopy. This is in agreement with Alatisé et al., (2012) who reported that the commonest indication of colonoscopy was chronic constipation ⁽⁵⁾. Hernández et al., (2005) also reported that chronic constipation as the commonest indication of colonoscopy ⁽⁶⁾. It was shown that rate of complete procedure (cecal intubation) was higher in group I (96.6%) than group II (83.3%) which was statistically significant (p value = 0.035); this results were in agreement with Tsutsumi et al., (2007) who evaluated the usefulness of an abdominal bandage for colonoscopy to keep the colonoscope straight in the sigmoid colon without looping throughout the examination ⁽⁷⁾.

There was statistically significant increase in reposition of patients in group II (30%) in comparison to group I (10%) (P value = 0.036), there was also increase of increase in use of manual pressure in group II than group I (p value = 0.036) this was reported by ⁽⁸⁾. Our study showed that the mean duration for complete procedure from insertion of tip of the shaft of colonoscopy till cecal intubation was significantly less in group I 8.11 ($\pm$ 1.91) than Group II 9.21 ($\pm$ 2.11), (P value = 0.034); this was in agreement with Ahmet et al., (2012) who reported that cecal intubation time was shorter, the need for extra manual compression and change of position decreased during the procedure in the group using a fitted abdominal corset, when compared to the group without a corset ⁽⁹⁾. We also agree with Hansel et al., (2009) who reported that cecal intubation time was shorter, need for extra manual compression and change of position decreased in the group using a fitted abdominal corset, when compared to the group without a corset ⁽¹⁰⁾.

Yörük et al., (2003) also reported that abdominal binder provided a faster and more effective colonoscopy, as it significantly reduced the time needed for insertion, frequency of changes in position and abdominal manual pressure, and the degree of abdominal distention after colonoscopy ⁽¹¹⁾. Using an abdominal bandage was also reported to be more effective compared with traditional methods to reduce the degree of pain ⁽¹²⁾. The possible reduction in need for manual pressure and patient positioning has implications not only for patient comfort, but also for

endoscopy unit staffing and procedural costs, given that extra personnel are often required to perform these maneuvers ⁽¹³⁾.

An abdominal compression device (ColoWrap) has been developed for this purpose Jason et al., (2014). ColoWrap is a noninvasive abdominal compression device designed to prevent and reduce looping during the insertion phase of colonoscopy ⁽¹⁴⁾. Catalano et al. developed an external straightener device that enabled compression of the abdomen during colonoscopy. This apparatus was successful at reducing cecal intubation and decreasing the pain reported by patients undergoing the procedure ⁽¹⁵⁾. However, increasing the use of sedation and analgesia for comfortable colonoscopy would make it difficult to apply these ancillary techniques to aid in colonoscope insertion. Unlike manual abdominal pressure or postural change, abdominal binder generally provides effective pressure to assist insertion without the help of assistants or patients themselves ⁽¹⁶⁾. Toros et al., (2012) found that the use of an abdominal binder reduced patient-reported pain at a statistically significant level. There was, however, no significant difference in cecal intubation rate between groups ⁽¹⁷⁾.

Conclusion

In our study it has been found that abdominal binder provides some benefits and help endoscopist to achieve high quality colonoscopy in shorter duration with higher rates of cecal intubation and lower rates of repositioning of patients.

Recommendations

Results of this study support the use of elastic abdominal binder during colonoscopy, as its beneficial effects on completion of procedure in shorter duration, more comfort for the patient and less staff needed for manual pressure and reposition of the patient.

References

1. Ahmet B, Feyzullah E, et al., (2012): Does a fitted abdominal corset make colonoscopy more tolerable? *Digestive Endoscopy*, 24:164-167.
2. Alatis O, Arigbabu A, Agbakwuru E, et al., (2012): Spectrum of colonoscopy findings in Ile-Ife Nigeria. *Niger Postgrad Med J*. 19(4): 219-224.
3. Allison R, Marvin Rand Walter W (2017): A Novel Hands-Free Abdominal Compression Device for Colonoscopy Significantly Decreases Cecal Intubation Time: A Prospective Single-Blinded Pilot Study. *Journal of Laparoendoscopic & Advanced Surgical Techniques* 6 (564).
4. Appannagari A, Mangla S, Liao C, et al., (2014): Risk factors for inadequate colonoscopy bowel preparations in African Americans and whites at an urban medical center. *South Med J*. 107(4):220-4.
5. Bruce Mand Choi J. (2018): Detection of endoscopic looping during colonoscopy procedure by using embedded bending sensors. *Med Devices (Auckl)*. 11:171-191.
6. Changela K, Bhatia T, Ofori EA, et al., (2015): Wire-assisted sigmoid intubation: An alternative approach to overcome technically difficult colonic angulations. *Arab J. Gastroenterol*. 16(3-4):129-30.

7. Fernández E, Linares A, Alonso J, SotorrioN, Vega D, et al., (1996): "Colonoscopic findings in patients with lower gastrointestinal bleeding send to a hospital for their study. Value of clinical data in predicting normal or pathological findings." *Rev Esp Enferm Dig.* 88(1): 16–25.
8. Hansel S, Prechel A, Horn B, et al., (2009): Observational study of the frequency of use and perceived usefulness of ancillary manoeuvres to facilitate colonoscopy completion. *Dig Liver Dis* 41 (11): 812–816.
9. Hernández Guerrero A, SobrinoCossio S, et al., (2005): Therapeutic colonoscopy. *Rev Gastroenterol Mex.* 70 Suppl 1:149-57.
10. Jamie L, Gustafson A, Jennifer D, et al., (2014): Elastic Abdominal Binders Reduce Cesarean Pain Postoperatively: A Randomized Controlled Pilot Trial. *Kansas journal of medicine* vol. 11, 2 1-19.
11. Jason A, Dominitz JA, Neradilek M, et al., (2014): Determination of colonoscopy indication from administrative claims data. *Med Care.* 52(4):e21-9.
12. Santi, L. K. S., Sudewi, A. A. R., Duarsa, D. P., & Lesmana, C. B. J. (2021). The effect of pregnancy massage on level of depression, anxiety and stress in pregnant women. *International Journal of Health & Medical Sciences*, 4(2), 220-225. <https://doi.org/10.31295/ijhms.v4n2.1692>
13. Seth S. (2012): Evaluating the Patient with Diarrhea: A Case-Based Approach. *Mayo Clin Proc.* 87 (6): 596 602.
14. Shankar S, Rowe S, et al., (2011): Splenic injury after colonoscopy: case report and review of literature. *Ochsner J.* Fall; 11(3):276-81.
15. Suryasa, I. W., Rodríguez-Gámez, M., & Koldoris, T. (2021). The COVID-19 pandemic. *International Journal of Health Sciences*, 5(2), vi-ix. <https://doi.org/10.53730/ijhs.v5n2.2937>
16. Takahashi Y, Tanaka H, Kinjo M, Sakumoto K, et al., (2005): Prospective evaluation of factors predicting difficulty and pain during sedation-free colonoscopy. *Dis Colon Rectum* 48(6):1295-300.
17. Toros A, Ersoz F, Ozcan O, et al., (2012): Does a fitted abdominal corset make colonoscopy more tolerable? *Dig Endosc* 24:164-7.
18. Tsutsumi S, Haruo F, Hiroyuki K, et al., (2007): Colonoscopy using an abdominal bandage. *Hepatogastroenterology.* 54(79): 1983–1984.
19. Yörük G, Aksöz K, Ünsal B, et al., (2003): "Colonoscopy without sedation." *Turk J Gastroenterol* 14:59-63.