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ORIGINAL ARTICLE

Evaluation of the Value of Using Simple Elastic Abdominal Binder During Colonoscopy

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Abstract

Background: Colonoscopy is an endoscopic procedure which used for screening of large bowel abnormalities, diagnosis, and treatment of particular disorders. Over time some techniques have been developed to make colonoscopy easier, more comfortable for patients and help to complete the procedure in shorter duration.

Objective: The aim of the work was to evaluate the use of simple elastic abdominal binder during colonoscopy and its outcome on the ease, safety, duration, and success of the procedure.

Patients and methods: This study was carried out on 120 patients who underwent elective colonoscopy (during period from April 2018 to March 2019) enrolled from Hepatogastroenterology and Infectious diseases Department in Al-Azhar University Hospitals, and were divided into two groups I and II.

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 in use of manual pressure in group II than in 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 8.11 min (± 1.91 min) than group II 9.21 min (± 2.11 min).

Conclusion: It has been found that abdominal binder provides some benefits and help endoscopists to achieve high quality colonoscopy in shorter duration with higher rates of cecal intubation and lower rates of repositioning of patients.

Keywords: Colonoscopy, Cecum, Looping, Colorectal cancer

1. Introduction

Colonoscopy is the visual inspection of large bowel and distal part of small bowel it can detect abnormal lesions, take a biopsy or remove the lesion, for these reasons and more, colonoscopy has become a standard screening, diagnostic, and therapeutic endoscopic procedure. Colonoscopy is the endoscopic examination of the large bowel and the distal small bowel using a fiber optic camera on a flexible tube inserted via anus to anal canal up to caecum. Colorectal cancer suspects may have a visual diagnosis (ulceration, polyps, etc.) and perhaps have those lesions removed for further testing.¹

Colonoscopy equipment is constantly being improved upon. Scope width and the capacity to change the stiffness of the scope are two examples of modifications that may impact functionality and lead to improved outcomes like increased frequency of cecal intubation, shorter duration to reach cecum, and less discomfort for patients. The looping of the colonoscopy shaft is an issue that has to be resolved. 90% of colonoscopies may include looping.²

Perforation of the colon wall and splenic damage are two serious complications that may result from looping of colonoscopy shaft. As a result, the patient has even more pain and distress.³

The aim of the work is to evaluation the use of simple elastic abdominal binder during colonoscopy

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and its outcome on the ease, safety, duration and success of the procedure.

2. Patients and methods

This study was carried out at Al-Azhar University Hospitals (Al-Husseini and BAB Al-Shaarea hospitals). From April 2018 to March 2019, 120 individuals who had elected to undergo a colonoscopy in order to determine the value of application of an elastic abdominal binder during the procedure was beneficial. The patients were distributed randomly among the studied groups into two groups: group (I): including (60) patients who underwent colonoscopy with application of abdominal binder (AB). Group (II): including (60) patients who underwent colonoscopy without application of abdominal binder.

The study was approved by the Ethical committee of faculty of medicine, Al-Azhar University.

All participants signed written informed consents and were given information about potential adverse effects. Patients who refused to undergo the procedure or to sign consent, younger than 18 years, had history of colonic surgery and patients who have contraindication of application of abdominal binder like COPD or other chest diseases like abdominal breathing were excluded from the study. All the studied individuals were subjected to full medical history taking including epidemiological data (age and sex), symptoms as jaundice, abdominal pain, fever and previous abdominal surgery, hemorrhagic diathesis, diarrhea, constipation or comorbid conditions such as liver disease, ischemic heart, renal impairment, diabetes mellitus, and hypertension. Full general and abdominal examinations were performed. Laboratory tests: blood sample were obtained for full blood count (CBC), AST, ALT, serum albumin, serum bilirubin, serum creatinine, serum urea, Pelvic, and abdominal ultrasound scan were performed for all participants.

Colonoscopy was performed under sedation with midazolam (dose 1–2 mg given via intravenous access over 2 min) 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.

The information was gathered, coded, reviewed, and put into SPSS version 20. Quantitative data having a parametric distribution were reported as mean, standard deviation, and ranges; data with a nonparametric distribution were presented as median and interquartile range (IQR). When comparing two groups based on qualitative data, we employed

the χ^2 test, and when the predicted count in any cell was less than 5, we switched to the Fisher exact test. The Mann–Whitney *U* test was used to compare quantitative data from two groups with a nonparametric distribution, whereas the Independent *t*-test was used to compare quantitative data from two groups with a parametric distribution. The margin of error allowed was 5%, and the confidence interval was set at 95%. So, the *P*-value was considered significant as the following: *P* greater than 0.05: Non significant (NS), *P* less than 0.05: Significant (S), and *P* less than 0.01: Highly significant (HS).

3. Results

Analysis of the data of participants included in the study showed no statistically significant differences regarding sex with *P* value (0.361) and age with *P* value (0.065) (Table 1).

Also there were no statistically significant differences regarding endoscopic finding between studied groups with *P* value (0.985); normal colonoscopy was the commonest finding in 47 cases (Table 2).

Rates of successful cecal intubation (CI) were higher in group I with *P* value (0.014) which was a statistically significant difference (Table 3).

Rates of reposition of patients were higher in group II with *P* value (0.006) which was a statistically significant difference (Table 4).

Rates of using manual pressure were higher in group II with *P* value (0.036), also duration in minutes were longer in group II with *P* value (0.034) which was a statistically significant difference (Table 5).

4. Discussion

In this study, abdominal pressure was applied with the use of a corset to stop the mesentery from stretching and the sigmoid from looping which may be annoying for patients and interfere with completion of procedure and can cause injury like colonic perforating. Compressing manually, the ‘traditional approach’ and changing position of patient from lateral to supine position requires constant attention and extra persons.

The looping of colonoscopy not related to sex and age of patients as it shown in our study, there was

Table 1. Comparison of demographic data between studied groups.

	Group I (No. = 60) No (%)	Group II (No. = 60) No (%)	Chi square test	
			χ^2/t^*	<i>P</i> value
Sex				
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

Table 2. Comparison of endoscopic findings between studied groups.

	Group I (No. = 60) No (%)	Group II (No. = 60) No (%)	Chi square test	
			χ^2	P value
Normal	25 (41.6%)	22 (36.6%)	1.004	0.985
Erythematous colitis	11 (18.3%)	10 (16.6%)		
Polyp mass	5 (8.3%) 3 (5%)	7 (11.6%) 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%)		

no statistically significant difference between the groups in terms of sex (P value 0.361) and age with (P value 0.065) in agreements with a study done by Fernández *et al.*⁴

The most common colonoscopic finding in two groups was normal colonoscopy in group I (25 cases) while in group II (22) (P value 0.985); with no statistical difference regarding endoscopic findings between the studied groups; which was in agreement with study done by with Alalise *et al.*⁵

There are many values for colonoscopy one of them is screening for colorectal cancer especially in adult; the most common symptom of colorectal cancer is chronic constipation, so many guidelines advice to undergo colonoscopy in elderly patients with chronic constipation. In our study, the most common indication for colonoscopy was chronic constipation in 32 cases (26.6%) bleeding perrectum in 30 cases (25%) with no significant differences between the studied groups; which was in agreement with study done by Hernández *et al.*⁶

Looping of colonoscopy shaft causing stretch of bowel loop which is annoying and painful for patient and occasionally the patient cannot tolerate the pain and the endoscopist abort the procedure. 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 = 0.014); which results were in agreement with study done by Tsutsumi *et al.*⁷

During insertion of colonoscopy through intestine, the assistant like a nurse change the position of patient frequently to help endoscopist to introduce the colonoscopy and complete the procedure, this

Table 3. Rates of successful cecal intubation (CI) between studied groups.

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

Table 4. Comparison between studied groups regarding reposition of patients.

	Group I (No. = 60) No (%)	Group II (No. = 60) No (%)	Chi square test	
			χ^2	P value
Reposition	6 (10%)	18 (30%)	7.500	0.006
Repositioning				

needs extrapersonnel. In the study with use of elastic abdominal binder, we need to change the position of patients less in group I (10%) compared with group II (30%) (P = 0.006) which was in agreement with study done by Allison *et al.*⁸

Manal compression of abdominal wall makes intestine and mesentery more rigid which help endoscopist to further insertion of colonoscopy. There was increase in use of manual pressure in group II (45%) than group I (26.7%) (P value = 0.036) which was in agreement with study done by Ahmet *et al.*⁹

The 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 ± 1.91) than group II (9.21 ± 2.11), (P value = 0.034); this was in agreement with Hansel *et al.* who reported that patients who wore a well-fitting abdominal corset required less manual compression and fewer changing of position during colonoscopy compared with those who did not use the abdominal binder, which was in agreement with study done by Hansel *et al.*¹⁰

It was reported that the time needed for cecal intubation was shorter in the group that wore a fitting abdominal corset, as was the requirement for further manual compression and a change of position, which was in agreement with study done by Yoruk *et al.*¹¹

Furthermore, it was observed that applying pressure to the abdomen with a bandage was more beneficial than more conventional pain treatments in agreement with a study done by Seth *et al.*¹²

Patient comfort is one consideration, but the potential elimination of the requirement for manual

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

	Group I (No. = 60) No (%)	Group II (No. = 60) No (%)	Chi square test	
			χ^2/t^*	P value
Manual pressure	16 (26.7%)	27 (45.0%)	4.385	0.036
Used				
Duration in minutes	8.11 \pm 1.91	9.21 \pm 2.11	0.249	0.034
Mean \pm SD				

pressure and patient positioning might also have a significant impact on the size of the endoscopy unit's staff and the cost of procedures.¹³

An abdominal compression device (ColoWrap) has been developed for this purpose. During the colonoscopy insertion process, the ColoWrap is used to compress the patient's abdomen non-invasively to decrease or eliminate looping.¹⁴

Jamie et al. invented a colonoscopy-friendly external straightener to compress the abdomen. The number of patients requiring cecal intubation was decreased, and their reported discomfort was lessened, thanks to the use of this device.¹⁵

However, it would be challenging to employ these supplementary strategies to help with colonoscope insertion if the use of sedation and analgesia for pleasant colonoscopy were to be increased. Abdominal binders, in contrast to physical abdominal pressure or posture change, often offer sufficient pressure to aid insertion without requiring the assistance of the patient or medical staff.¹⁶

Limitations of the study: the current study enrolled a relatively small number of patients. Therefore, it will be useful if these findings are confirmed by other larger randomized studies to assess the role of elastic abdominal binder during colonoscopy. Also, it represents our first experience of a single center. A multicenter trial would gather additional and enhanced experience.

4.1. Conclusion

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

Conflicts of interest

None declared.

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