RESEARCH ARTICLE

Value of abdominal pressure by using abdominal belt in facilitating colonoscopic procedure in Egyptian patients

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Abstract

Objective: To evaluate the role of applying abdominal pressure using abdominal belt in overall improvement in the practice of colonoscopy.

Method: The randomised, single-blind case-control study was conducted from March 2020 to March 2021 at Kafrelsheikh University Hospital, Cairo, Egypt, and comprised patients of either gender aged 30-70 years who underwent elective colonoscopy. The patients were randomised into belly belt group A and control group B. The endoscopist was blinded to the group assignment. Time needed to reach the caecum, requirement for changing the position, dosage of anaesthetic agents, completion of endoscopy, ileal intubation, post-procedure pain and abdominal distension were noted and compared between the groups. Data was analysed using SPSS 24.

Result: Of the 160 patients, 80(50%) were in each of the two groups. There were 38 (47.5%) males and 43 (52.5%) (females) in group A with mean age 55.8±4.1 years. In group B, there were 40(50%) males and as many females with mean age 55.4±3.4 years. Group A had significantly better overall outcomes than group B ($p<0.05$) except procedure complications ($p=0.526$).

Conclusion: Abdominal belt was found to be an effective and simple method to improve the practice of colonoscopy.

Keywords: Colonoscopy, Ileum, Cecum, Colorectal neoplasms, Intubation, Intratracheal, Anaesthesia.

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Introduction

Colonoscopy is a frequently performed diagnostic and therapeutic procedure, and is the main screening method in several colorectal cancer screening programmes.[1] To optimise the practice of colonoscopy, proper selection of patients is needed alongside effective preparation, good technique, including withdrawal of the endoscope, to avoid post-colonoscopy complications. Endoscopists face many challenges during colonoscopy, such as ileal intubation and frequent looping that occurs in about 90% cases.[2] Looping is a major cause of discomfort and complication and it increases the time and anaesthesia dosage. To avoid looping of the colonoscope, endoscopists usually make several risky manoeuvres, like pushing, pulling, rotating the colonoscope and changing patient position.[3,4]

Many devices may be used to prevent looping, like over tube, sigmoid stiffener and the double balloon method.[5-7] Imaging facilities can also be used, including computed tomography (CT), fluoroscopy and magnetic endoscope imaging (MEI). However, these measures require higher cost and are not always available.[8,9]

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One of the important ways to improve the practice of colonoscopyis abdominal pressure techniques that facilitate the passage of the colonoscope with lower rate of looping. This results in higher patient comfort and safety. Abdominal compression can decrease intubation time with more ileal intubation, especially in obese patients.[10] Unfortunately, these measures are applied variably, need assisting persons, and are not always successful.[11-13]

The current study was planned to evaluate the role of applying abdominal pressure using abdominal belt with respect to overall improvement in the practice of colonoscopy.

Patients and Methods

The randomised, single-blind case-control study was conducted from March 2020 to March 2021 at Kafrelsheikh University Hospital, Cairo, Egypt. After approval from the institutional ethics review committee, the sample was raised using convenience sampling technique. Those included were patients of either gender aged 30-70 years and having body mass index (BMI) <40 kg/ m^2 who underwent elective colonoscopy. Patients with BMI >40kg/m^2, pregnant women, patients with marked ascites or big anterior hernia, big obstructing colonic mass, or with poor preparation were excluded.

After taking informed consent from all the subjects, detailed medical and surgical history and indication for

colonoscopy were noted. The patients were then randomised by the use of computer-generated random sequence into belly belt group A and control group B. All procedures were performed by a single experienced endoscopist with more than 3,000 cases. The endoscopist was blinded to the randomisation.

All the patients were instructed to fast the day before the procedure and ingest two litters of polyethylene glycol solution. All patients were in the left lateral position and underwent colonoscopy as per the standard procedure.

In group A, appropriate abdominal belt was applied around the circumference of the abdomen from just below the ribs till the hip bone. The coordinator nurse asked group A patients to wear the suitable belly belt under the sterile gown in a separate dressing room to ensure confidentiality. Propofol was used for anaesthesia in all patients regardless of the group.

The primary outcome was the time needed to reach the caecum, which was calculated from the insertion time till reaching the caecum as indicated by Mercedes sign and appendicular orifice. The secondary outcomes were the requirement for changing the position, anaesthesia dosage, completion of the endoscopy, ileal intubation, post-procedure pain and abdominal distension.

Data was analysed using SPSS 24. Data was tested for normal distribution using the Shapiro Walk test. Qualitative data was presented as frequencies and percentages. Chi-square test and Fisher exact test were used to calculate difference between qualitative variables, as appropriate. Quantitative data was expressed as mean and standard deviation. Student's t test and Mann Whitney test were used to calculate difference between quantitative variables in the two groups for parametric and non-parametric variables. Two-tailed p< 0.05 indicated statistical significance.

Results

Of the 160 patients, 80(50%) were in each of the two groups. There were 38(47.5%) males and 43(52.5%) females in group A with mean age 55.8±4.1 years. In group B, there were 40(50%) males and as many females with mean age 55.4±3.4 years. There was no significant difference between the groups at baseline (Table 1) or in terms of indication for colonoscopy (Table 2)

The time needed to reach the caecum and ileal intubation were significantly lower in group A and so was the case with anaesthesia dose and the need to change position during colonoscopy than group B (Table 3).

There was no significant difference between the groups

Table-1: Intergroup comparison of sociodemographic data.

Variables	Group A n= 80	Group B n= 80	*p-value*
age			
Mean± SD	55.8± 4.1	55.4± 3.4	0.502[a]
Gender			
Male n (%)	38 (47.5)	40 (50)	0.874[b]
Female n (%)	42 (52.5)	40 (50)	
Marital status			
Single n (%)	20 (25.0)	23 (28.7)	0.919[b]
Married n (%)	48 (60.0)	44 (55)	
Widow n (%)	7 (8.8)	7 (8.8)	
Divorced n (%)	5 (6.3)	6 (7.5)	
BMI			
Mean± SD	25.4± 2.6	24.8± 2.4	0.120[a]
Waist circumference			
Mean± SD	36.3± 3.5	37.1± 2.7	606
Parity			
Nullipara n (%)	35 (43.8)	41 (51.3)	0.711
Multipara n (%)	45 (56.2)	39 (48.7)	
Previous surgery			
Yes n (%)	18 (22.5)	15 (18.7)	0.820
No n (%)	62 (77.5)	65 (81.3)	
Preparation			
Poor n (%)	23 (28.7)	20 (25)	0.818
Fair n (%)	44 (55)	40 (50)	
Good n (%)	7 (8.8)	10 (12.5)	
Excellent n (%)	6 (7.5)	10 (12.5)	

SD: Standard deviation, BMI: Body mass index. a: student t test
b: Chi square test
*p is significant at <0.05

Table-2: Intergroup comparison regarding indication for colonoscopy.

Indication for colonoscopy	Group A	Group B	Test value	*p-value*
Diarrhoea n (%)	20 (25.0)	22 (27.5)	0.836	0.850
Constipation n (%)	18 (22.5)	20 (25.0)		
Bleeding per rectum n (%)	19 (23.8)	20 (25.0)		
Mass n (%)	23 (28.7)	18 (22.5)		

SD: Standard deviation, BMI: Body mass index. a: student t test
b: Chi square test
*p is significant at <0.05

Table-3: Intergroup comparison of procedural data.

Variables	Group A	Group B	*p-value*
Caecal intubation time (min)			
Mean ± SD	8.0 ± 1.5	14.1 ± 3.8	<0.001*a
Ileal intubation time (min)			
Mean ± SD	3.1 ± 0.8	4.1 ± 0.8	<0.00*b
Propofol dose (mg/dl)			
Mean± SD	220 ± 60	250 ± 70	0.008*
Need to change position			
Yes n (%)	17 (21.3)	38 (47.5)	<0.001*
No n (%)	63 (78.7)	42 (52.5)	

SD: Standard deviation.a: Mann Whitney U test
b: Student t test
*p is significant at <0.05

Table-4: Intergroup comparison of procedure-related Complications.

Variables	Group A	Group B	Test value	*p-value*
Procedure complications				
Yes n (%)	40 (50)	35 (43.7)	0.627	0.526
No n (%)	40 (50)	45 (56.3)		
Discomfort				
Yes n (%)	16 (20.0)	37 (46.2)	12.442	<0.001*
No n (%)	64 (80.0)	43 (53.8)		
Post-procedure pain				
Yes n (%)	14 (17.5)	39 (48.7)	0.291	<0.001*
No n (%)	66 (82.5)	41 (51.3)		
Post procedure Bloating				
Yes n (%)	16 (20)	39 (48.7)	1.201	0.007*
No n (%)	64 (80)	61 (76.3)		
Looping				
Yes n (%)	12 (15)	38 (47.5)	11.009	0.003*
No n (%)	68 (85)	62 (77.5)		

SD: Standard deviation.a: Mann Whitney U test
b: Student t test
*p is significant at <0.05

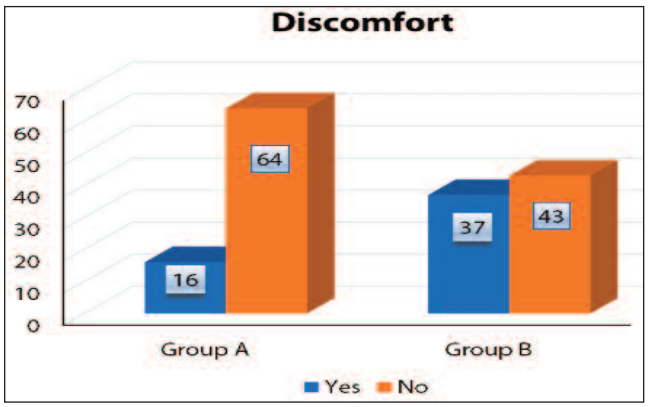

Figure: Per-procedure discomfort in the two groups.

regarding procedure complications (p=0.526), but discomfort, post-procedure pain, bloating and looping were significantly lower in group A compared to group B (Table 4), and the same was the case with per-procedure discomfort (Figure).

Discussion

Colonoscopy is a basic screening method in several colorectal cancer screening programmes.[1] Abdominal compression by using abdominal belt can help preserve the colonoscope in a straight position and thus prevent looping during colonoscopy, and make the procedure less painful. The current study aimed to evaluate the efficacy of abdominal compression by using abdominal belt showed significantly positive impact of the abdominal belt compared to the control group. A similar study concluded that effective compression during colonoscopy may reduce the procedure time.[13] Another study found that external compression by abdominal belt reduced caecal intubation time.[14]

However, in one study, abdominal compression using external device showed no significant differences with regard to caecal intubation time.[15] Different genetics, sample size and methods of abdominal compression may well be the cause of contrasting findings.

In agreement with the current study, Toros et al. found that patient who used abdominal corset underwent less position change [16], and Toyoshima et al. found that using back brace belt decreased looping during colonoscopy.[17]

In the current study, patients with abdominal belt experienced less post-procedure pain and their anaesthesia dose was lower than the controls. In a study, abdominal bandage decreased pain and discomfort.[18]

The current study has its limitations as the sample size was not calculated which may have influenced the power of the study, and the sample, raised by using convenience sampling, was too small to allow generalisation of the findings. Besides, all surgeries were conducted by a single experienced endoscopist at a single centre. Larger, multicentre studies are recommended to validate the current findings.

Conclusion

Abdominal belt was found to be a simple and effective method for reducing colonic time, looping and post-procedure discomfort in patients undergoing elective colonoscopy.

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Conflict of Interest: None.

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