



Original Article

Use of a standard gastroscope for colonoscopy at a general hospital in Venezuela: A prospective randomized trial

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ARTICLE INFO

Article history:

Received 13 November 2009

Accepted 29 December 2009

Keywords:

Gastroscope

Colonoscopy

Caecal intubation

Colorectal cancer screening

ABSTRACT

Background and study aims: The use of an upper endoscope has been considered as a back-up method in case of incomplete caecal intubation. We compared caecal intubation rates between colonoscopic examinations done with a standard colonoscope and those in which a standard gastroscope was used, to determine if routine colonoscopies could be performed with a gastroscope if no colonoscope is available.

Patients and methods: A prospective comparative study, analyzing continuous data was designed to evaluate the usefulness of a standard gastroscope in a group of outpatients with indication for colonoscopy in colorectal cancer screening. A total of 170 adult patients were randomly assigned to two similar study groups. All examinations were performed by a single endoscopist. Our primary end point was to achieve caecal intubation.

Results: Successful caecal intubation was achieved in 162 patients that fulfilled our inclusion criteria, 83 patients in the colonoscope and 79 in the gastroscope group. Failure of caecal intubation was similar in male and female patients in both groups ($p = 0.34$). Caecal intubation failure rates were similar in both study groups.

Conclusions: We used the gastroscope as a first line method for routine colonoscopies and found no statistical difference between the colonoscope and gastroscope groups. If these results can be verified in larger multicenter studies, it may be possible in the future, to work with only one endoscope for both upper and lower digestive tract examinations in small centers, particularly in developing countries.

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Introduction

Colorectal cancer is the second leading cause of cancer death in the United States [1,2]. The majority of cancers arise from adenomatous polyps that can be detected and removed by screening tests [3–6]. Incomplete colonoscopies due to a difficult procedure can lead to failure of these screening tests. Different factors can influence the degree of difficulty to perform a colonoscopy resulting in lower caecal intubation rates. The Multi-Society Task Force on Colorectal Cancer in 2002 stated that caecal intubation rates should be 90% or more when considering all colonoscopies and 95% or more in screening cases [7].

Lee et al. [8] correlated intubation rate and time with the length of the colonoscope used. A recent publication by Wehrmann et al. [9] compared the use of upper endoscope with standard colonoscope for lower endoscopy, using the gastroscope as a back-up method, in case of incomplete caecal intubation.

In our study, we compared caecal intubation rates between colonoscopic examinations done with a standard colonoscope and

those in which a standard gastroscope was used, to determine if routine colonoscopies could be performed with a gastroscope if no colonoscope is available.

Patients and methods

A prospective study, analyzing continuous data was designed to evaluate the usefulness of a standard gastroscope in a group of outpatients requiring routine colonoscopy.

A total of 170 adult patients attended the Gastroenterology Service at the Hospital de Lidice, Caracas, Venezuela in 2008, 80 (47.05%) female and 90 (52.95%) male, with ages ranging between 45 and 76 years of age (mean 56.43 years) scheduled for a routine colonoscopy were randomly assigned to two similar study groups.

The indication for colonoscopy was colorectal cancer screening in all 170 patients (100%). The primary end point for both groups was successful caecal intubation.

These patients were randomly assigned to two groups with similar demographic characteristics: 84 patients (49.41%) assigned to undergo colonoscopy with a standard colonoscope (females 38.09%; males 52, 61.90%) and 86 (50.58%) with a standard gastroscope (females 48, 55%; males 38, 44%).

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All colonoscopies were performed by one expert colonoscopist, with more than 15 years of experience in the field. The endoscopist and nurses were not blinded to instrument allocation. Caecal intubation was demonstrated by photographing landmarks (ileocaecal valve and/or appendical orifice) [10], and confirmed by at least two gastroenterologist of our service. Incomplete colonoscopy was defined as the inability to reach the caecum due to intolerable pain or fixed angulations. Duration of each study was timed by the nurse. All patients received conscious sedation with Midazolam and Meperidine. Additional maneuvers, including compression of the abdomen and changes in patient's position were used.

A history of abdominal and/or pelvic surgery, the presence of diverticulosis and any complications were recorded. All patients underwent bowel preparation with a polyethylene glycol (PEG) electrolyte lavage solution the day before the examination. We used both an Olympus CF-Q145L colonoscope (outer diameter 12.8 mm; working length 163 cm), with an Exera CIE-145 video processor and a Fujinon EG-200FP Type S gastroscope (outer diameter 9.8 mm; working length 103 cm), with an EG-200FP processor for all the procedures.

Cleansing was done using Cidex OPA solution following the recommendations of the American Society of Gastrointestinal Endoscopy [11]. All patients gave us informed consent to participate in the study which was approved by the hospital ethics committee. No conflicts of interest were reported by any of the investigators involved in the study.

All statistical analysis were performed using the SPSS 15.0 software. A linear regression model was developed using the logarithm of caecal insertion time; multivariable linear regression models were fitted by using the caecal intubation time as the dependent variable and sex, age and previous surgical procedures. The mean difference between the randomized groups (standard colonoscope and standard gastroscope), were analyzed with a non parametric approach. Yates correction for continuity was used as part of the χ^2 test, to analyze the 2×2 contingency table data. A p value of ≤ 0.05 was considered as statistically significant.

Results

Hundred and seventy colonoscopic examinations in the same number of patients were performed with indication for colorectal cancer screening. Hundred and sixty-two were complete colonoscopies and satisfied our inclusion criteria, with a caecal intubation rate of 95.3% (162/170), 83 (98.8%) of patients in the colonoscope group (CG) and 79 (91.9%) in the gastroscope group (GG) (see Table 1).

Caecal insertion time was significantly longer in the GG when compared with the CG. The mean caecal insertion time was 4.5 min for CG versus 6.0 for GG; and withdrawal time 6.5 for the CG versus 7.0 for the GG (see Table 2). Multivariate linear regression analysis demonstrated that the use of the gastroscope

Table 1
Demographics characteristics.

<i>Total patients</i>	
Colonoscope group	(n = 84)
Gastroscope group	(n = 86)
<i>Age (mean \pm SD)</i>	
Colonoscope group	55.61 \pm 9.36
Gastroscope group	57.33 \pm 9.17
Sex (men/women)	90/80
Indication (screening)	170/170
Previous surgery (men/women)	26/37
Patients excluded	0
Caecal insertion time (mean) minutes colonoscopy/ gastroscope	4.5/6.0

Table 2
Comparison of groups according to instrument used.

Factors	Colonoscope group (n = 84)	Gastroscope group (n = 86)	p Value
<i>Sex (n/%)</i>			
Men	52 (61.9)	58 (67.4)	
Women	32 (38.0)	48 (55.8)	
Age (mean \pm SD)	55.61 \pm 9.36	57.33 \pm 9.17	
Indication screening	84/84	86/86	
<i>Previous surgery</i>			
Men	14	12	0.104
Women	15	23	0.026 ^a
Caecal intubation rate (n)	83	79	0.064 ^a
Caecal insertion time (mean minutes)	4.5	6.0	
Withdrawal time (mean minutes)	6.5	7.0 ^b	
Detection rate for adenomas	14/84	15/86	0.528 ^a

^a These p values, from exploratory statistical tests, are uncorrected for multiple testing and should be taken as descriptive only.

^b Excluding patients with adenomas.

($p = 0.000$), age, female sex ($p = 0.000$), and previous abdominal surgery ($p = 0.000$) were significant independent factors associated with longer insertion time (see Table 3).

Incomplete caecal intubation was similar between male and female patients in both groups ($p = 0.64$). Previous abdominal or pelvic surgery is well described as a factor associated with incomplete colonoscopy [8–10], in our study; caecal intubation failure rates were similar in both study groups, with or without previous surgery. In the CG, failure was 1.19% (1/84 patients), and in the GG failure was 5.81% (5/86 patients), 3 with previous surgery, and 2 with no previous surgeries ($p = 1.000$) (see Table 2). When comparing mean caecal insertion times in relation to gender and age, we can observe that it was significantly longer in female patients with previous abdominal surgery and ages between 55 and 64 years old (37/80) ($p = 0.015$). The detection rate for adenomas was similar in both groups, 14 lesions in 12 patients in the CG and 15 lesions in 13 in the GG which was not statistically significant ($p > 0.05$).

Discussion

The American College of Gastroenterology recommends colonoscopy as the preferred screening strategy for colorectal neoplasia [12]. Colonoscopy has emerged as the first-line imaging technique for investigation of the colon [13]. Over the years there have been many attempts to improve caecal intubation rates. In 1999, Lichtenstein et al. [14] described the use of a push enteroscopy to achieve caecal intubation rates of 68.7%. The variable-stiffness colonoscope was described by Rex et al. [9] in 2001 and Shumaker et al. [15] in 2002 to achieve success rates of 99.2% and 94.0%, respectively. In 2002, Marshall et al. [16] reported caecal intubation rates of 96.1% when using a pediatric colonoscope, and Pickhardt et al. [17] recently reported 99.4% in their comparative study involving tandem conventional and virtual colonoscopy for screening. Kozarek et al. [18] in 1989 initially described the use of a small caliber upper endoscope after incomplete colonoscopy, with a caecal intubation rate of 60%. Paonessa et al. [19] in 2005

Table 3
Linear regression model of predictors of logarithm: caecal insertion time in both groups.

Variable	β coefficient	p Value
Age ^a	0.267	0.000
Instruments	0.359	0.000
Previous surgery ^a	-0.537	0.000

^a Reference category: women.

described a successful caecal intubation rate of 62% with a gastro-scope in patients in whom colonoscopy failed initially. Furthermore, in 85% of their cases, the gastro-scope easily intubated the initial area of fixation.

Cirocco and Rusin [20] described factors that predict incomplete colonoscopy including female gender, especially in women with a history of abdominal hysterectomy. In 2007 Shah et al. [21] reported rates of incomplete colonoscopies in 13.1% of a population of 331,608. We observed in our study that age, gender and previous abdominal surgery were independently associated with incomplete colonoscopy.

There have been many attempts to improve caecal intubation rates through different methods [14–18], Wehrmann et al. [9] compared the use of a gastro-scope with a standard colonoscope for lower endoscopy. In our study the frequency of successful caecal intubation was lower with the gastro-scope (93%) than with the standard colonoscope (96%), which was, however, not significant.

Time taken to reach the caecum was slightly prolonged when a gastro-scope was used; this could be explained by the need to perform straightening procedures more often with the gastro-scope than with the colonoscope to overcome the shorter length of the tube. Wehrmann et al. concluded that gastroscopes should be used as a back-up in cases of unsuccessful colonoscopy with a standard instrument [9]. We used the gastro-scope as a first line method for routine colonoscopies, and found no statistical difference in either study group, therefore, we can recommend the use of a standard gastro-scope for this purpose in a western population if no colonoscope is available.

There was no statistical difference in caecal intubations rates between both groups in patients with or without previous abdominal surgery. This was a secondary conclusion drawn from this study that must be verified in larger populations.

In conclusion, the use of a standard gastro-scope as a first line method for routine colonoscopy can be recommended. There are no significant differences in caecal intubation rates using either a colonoscope or a gastro-scope. If these results are verified in larger multicentric studies, it could be possible in the future to perform upper and lower endoscopies with a gastro-scope, particularly in third world facilities where a colonoscope is not always available.

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