

ORIGINAL PAPERS

## Prospective study of anxiety in patients undergoing an outpatient colonoscopy

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### ABSTRACT

**Background:** Undergoing a colonoscopy can cause anxiety in patients and this is something which has not been closely studied.

**Objective:** To determine the frequency and intensity of anxiety prior to a colonoscopy and the factors which are related to the procedure.

**Methods:** This is a prospective study of patients undergoing outpatient colonoscopy in our hospital. Anxiety was assessed using a visual analogue scale of 0 to 100. The severity of anxiety was rated as mild (1-29), moderate (30-79) or severe (80-100).

**Results:** Three hundred and twenty-seven patients completed the study, of whom 154 (47.1%) were men with a median age of 54 years (p25-75: 45-65). Three hundred and nine (94.5%) patients were found to suffer a certain degree of anxiety. The median value on the visual analogue scale was 31 (p25-75: 10-53). Anxiety levels were mild in 136 patients (44%), moderate in 141 (45.6%) and severe in 32 (10.4%). Greater anxiety was associated with female patients (mean 40.38 vs 31.99,  $p = 0.01$ ) and a poorly tolerated previous colonoscopy (mean 50.67 vs 28.44,  $p = 0.01$ ) and correlated inversely with age ( $r = -0.170$ ,  $p = 0.02$ ).

**Conclusions:** Colonoscopy causes some degree of anxiety in most patients. Being female, younger and having experienced poor tolerance to a previous scan are associated with greater degrees of anxiety. These findings should be taken into account in the implementation of measures to improve the quality and tolerance of colonoscopy.

**Key words:** Colonoscopy. Anxiety. Benzodiazepines. Opiates. Surgery. Sedation.

### INTRODUCTION

Colonoscopy is a diagnostic and therapeutic method which is widely used in digestive medicine (1).

Although efforts have been made to improve tolerance by using conscious or deep sedation, little attention has been paid to pre-procedural anxiety in patients.

The state of anxiety is characterized by tension, nervousness and worrying. This is an acute situation that disappears when the causative stimulus disappears (2).

Colonoscopy-related anxiety can be caused by a number of factors, including potential diagnosis of a serious illness, complications which may occur during the procedure itself, fear of pain and embarrassment (3).

The relatively few studies which have analyzed this matter have found that patient anxiety increases before the procedure, although the findings concerning the factors which may be responsible for this are somewhat contradictory. In some studies it has been associated with being female or having experienced pain during a previous colonoscopy (3-7).

There are various methods, both pharmacological and environmental, which can reduce anxiety prior to surgery. Some are also used in the case of colonoscopy (4,5,8,9). Therefore, if the state of anxiety is clinically significant it is possible to resort to such methods to improve the situation.

All the above circumstances justify the need to carry out the study, with the objective of analyzing the frequency and degree of outpatient colonoscopy anxiety in our hospital, as well as determining the factors which cause this effect, and its influence on the tolerance of the procedure.

### MATERIALS AND METHODS

#### Patients

This is a prospective study based on outpatient referrals, from the Department of Digestive Diseases, who underwent a colonoscopy procedure. The study was conducted between May 2012 and April 2013 at the Hospital de Alta Resolución de Écija (Seville, Spain), which serves a population of 56,000 people. Before participating in the study, patients were asked to sign an informed consent document. The study was approved by the ethics committee of the Hospital Universitario Virgen del Rocío and coded CEI 2013PI/008. The colonoscopies were performed by two digestive health specialists

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in our center using a ST EC 250 WL5 Fujinon® video-colonoscope and a 2200 Fuji video processor.

### **Inclusion criteria**

Patients of 18 years of age and over requiring a diagnostic or screening colonoscopy who had signed the consent for the study.

### **Exclusion criteria**

Patients with a severe hearing impairment or significant degrees of dementia who were not eligible for assessment using a visual analogue scale (VAS).

### **Anxiety assessment**

A series of patients who were being treated at the digestive health unit and required a colonoscopy were invited to participate in the study and sign an informed consent form to confirm their agreement. Those who had undergone a previous colonoscopy were asked to rate their tolerance to the procedure in a quantitative manner, using a 0 to 100 mm VAS indicating “no pain” to “extreme pain”, and the numerical values were recorded. They were also asked to assess the discomfort they felt during the exploration in a qualitative manner, rating their experience as “good” or “bad”. Patients were then informed verbally and in writing of the risks and benefits of colonoscopy, specifying that the procedure was to be performed under conscious sedation and that deep sedation would be provided under the supervision of an anesthetist if necessary.

In the same consultation, the physician filled in a form prepared specifically for the study which included general information about the patient, including age, gender, weight, height, body mass index, co-morbidity and the reason for colonoscopy.

Prior to the exploratory procedure a nurse asked patients to assess their level of anxiety using a 0 to 100 mm VAS, ranging from “no anxiety” to “high anxiety”, and recorded the numerical values provided. Anxiety levels were also classified as mild, moderate or severe according to the values recorded, 1-29, 30-79 and 80-100, respectively. This information was not given to the endoscopist carrying out the procedure.

The colonoscopy was performed with patients under conscious sedation, administering benzodiazepines (midazolam) and/or opiates (fentanyl or pethidine), with doses considered as necessary by the endoscopist to ensure a good tolerance to the explorative procedure. When the exploration was considered by the endoscopist as painful or uncomfortable for the patient, deep sedation was provided by a specialized anesthetist.

After performing the colonoscopy, the endoscopist recorded the data related to the exploration, including duration, whether cecal intubation was successfully completed, the difficulty of the procedure, the drugs and doses administered, and the colon preparation details. The endoscopists also used a 0 to 100 mm VAS to express their perception of the pain suffered by the patient during the procedure, and rated the experience in a qualitative manner as “good” or “bad”.

After recovering from sedation and being discharged, patients were asked to assess the level of pain using a VAS and rating the experience qualitatively as “good” or “bad”.

### **Statistical analysis**

Continuous variables are expressed as means or medians depending on whether they show a symmetrical or asymmetrical distribution. Categorical variables are shown as numerical values and percentages. Comparisons between categorical variables were performed using the Chi-squared or Fisher’s tests. The Student’s t test was used for continuous variables which were found to be homogenous and had normal distribution. If this was not the case, the Mann-Whitney U test was used. The correlation between variables was studied using the Spearman’s correlation coefficient. The study data were analyzed using the SPSS Inc. Chicago IL, version 15.0 statistical package.

## **RESULTS**

Three hundred and forty-three patients took part in the study and 327 completed the study (95.3%). The reasons for not completing the study included not knowing how to fill in the VAS or not having been previously registered to undergo a colonoscopy. No differences were found in the general characteristics of the patients who completed or failed to complete the study. Colonoscopies were performed on 154 men (47.1%) and 173 women (52.9%) with a median age of 54 years (p25-75: 45-65). The most common indication for the procedure was familial colorectal cancer screening and follow-up of polyps (52.6%). The characteristics of patients and exploration are shown in table I.

Three hundred and nine patients (94.5%) were found to suffer some degree of anxiety. The median VAS value prior to colonoscopy was 31 (p25-75: 10-53). In 99 (30.3%) patients the value was greater than 50. Prior to colonoscopy, anxiety levels were mild in 136 (44.4%) patients, moderate in 141 (45.6%) and severe in 32 (10.4%).

With respect to patient characteristics that could be associated with the degree of anxiety, anxiety levels in females were found to be statistically significant (mean 40.4 vs. 32,  $p = 0.01$ ) whilst the correlation with age was negative ( $r = -0.170$ ,  $p = 0.02$ ) (Fig. 1). Greater levels of anxiety were found in patients who had never undergone a colonoscopy although these differences were not statistically significant (mean 38.7 vs. 32.3,  $p = 0.09$ ). A sub-study conducted in patients who had previously undergone colonoscopy ( $n = 125$ ) showed that there was a significantly greater degree of anxiety in patients who had assessed their tolerance to a previous colonoscopy as “bad”, (mean 50.67 vs. 28.44,  $p = 0.01$ ), or where anxiety levels correlated with the VAS values reported by the patient in the previous colonoscopy ( $r = 0.26$ ,  $p = 0.005$ ) (Fig. 2).

A correlation was also found between the level of anxiety and pain assessment by the patient on the VAS scale

**Table I. Sample characteristics**

Sample characteristics	n = 327
<i>Patient characteristics</i>	
Sex (male/female)	154/173
Average age (p25-p75)	54 (45-65)
Weight (kg, p25-p75)	77.5 (65.6-88.8)
Height (m, p25-p75)	1.64 (1.58-1.70)
BMI (kg/m <sup>2</sup> , p25-p75)	28.39 (24.95-32.61)
History of previous abdominal surgery (n, %)	149 (45.6)
Previous colonoscopy (n, %)	125 (38.2)
History of or suspected IBS (n, %)	30 (9.2)
<i>Colonoscopy results</i>	
Duration of exploration	23 (18-30)
Cecal intubation (n, %)	271 (82.9)
<i>Main endoscopic diagnosis principal (n, %)</i>	
Normal	27 (8.3)
Adenomas	96 (29.4)
CCS	10 (3.1)
Diverticulitis	33 (10.1)
Inflammatory bowel disease	16 (4.9)
Internal or external hemorrhoids	67 (20.5)
Hyperplastic polyps	23 (7)
Others	55 (15)
Rescue by anesthetist (n, %)	6 (1.8)

( $r = 0.17, p = 0.02$ ) (Fig. 3). No relationship was found between the level of anxiety and cecal intubation, the need for deep sedation, or the administered dose of midazolam, fentanyl or pethidine.

**DISCUSSION**

The number of patients undergoing colonoscopy is increasing, mainly due to widespread screening and an increased access to the procedure. The outpatient colonoscopies performed in our hospital under conscious sedation caused some degree of anxiety in most patients and this was moderate or severe in more than a half of the cases.

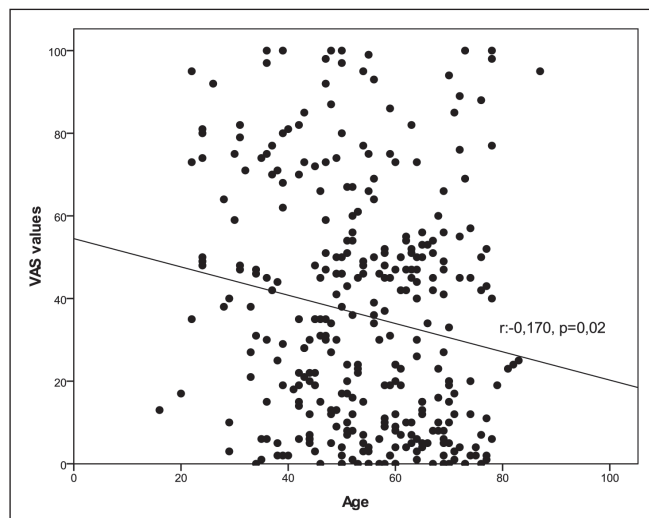


Fig. 1. Correlation of VAS anxiety values with age.

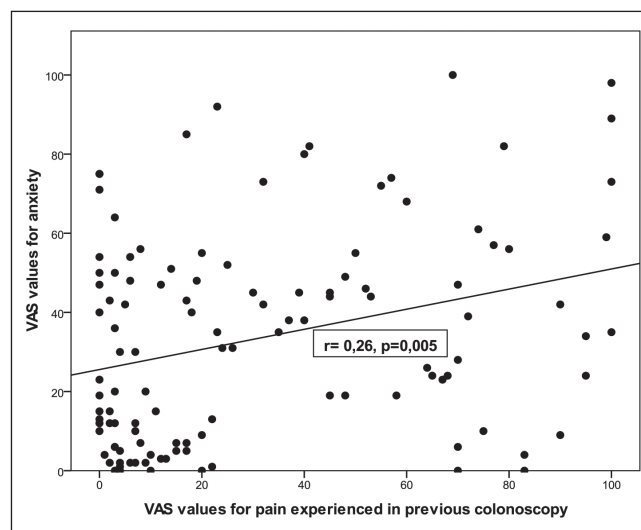


Fig. 2. Correlation between VAS values for anxiety and pain associated with colonoscopy.

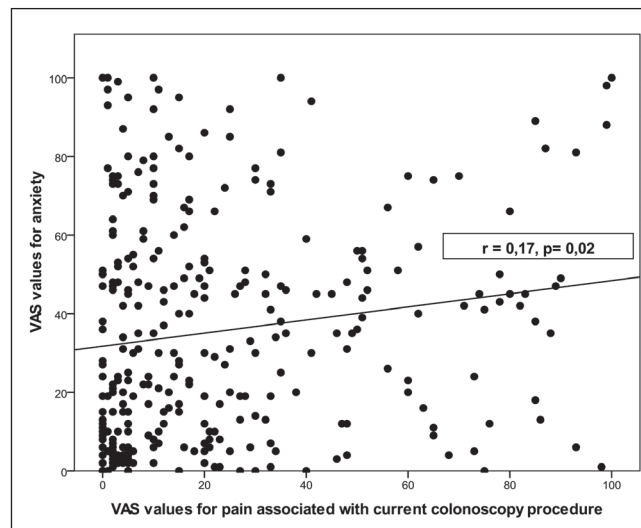


Fig. 3. Correlation between VAS values for anxiety and pain associated with the colonoscopy performed.

Therefore it is a common situation which has a clear clinical significance.

Our findings are consistent with those of other studies which have been carried out, although there are relatively few studies to date. In most studies some degree of anxiety was detected, and in approximately 50% of cases this was moderate or severe. Furthermore, there are a number of studies which have analyzed anxiety before oral endoscopy and colonoscopy in a qualitative manner, both separately and jointly, and these have identified an increase in pre-procedural anxiety (7,10). A study using the Beck Inventory Anxiety questionnaire, with 135 patients undergoing colonoscopy under deep sedation with propofol, reported minimal anxiety in 65% of cases, mild in 26%, moderate in 8% and severe in 2% of cases (6). In a 216-patient study, McEntire et al. reported moderate to severe anxiety in 56% of cases (11). The study with the largest sample size, 964 patients, undergoing colonoscopy with and without sedation, reported moderate or intense anxiety in 497 patients (51.5%) (12). In a sample of 60 patients undergoing colonoscopy without sedation which employed the same VAS method used in our study to assess anxiety, Umezawa et al. found a median VAS value of 51 to 52.5 (13). In another prospective study on 403 patients undergoing colonoscopy, the median value of the VAS was 52 among patients who chose colonoscopy without sedation and 61 in patients who chose colonoscopy under sedation (14).

It is interesting to compare pre-colonoscopy anxiety with that associated with surgery and other diagnostic procedures. There are a greater number of studies analyzing pre-surgery anxiety. In these cases, studies have shown figures for anxiety ranging between 11% and 80% of patients depending on the methods used for evaluation. Several studies have used VAS to analyze pre-surgery anxiety. Findings have shown that average VAS values range between 40 and 50 for a cataract operation under topical anesthesia (8,15) and between 50 and 60 prior to other surgical procedures (9,16), whereas moderate or severe anxiety was found in 65.5% of women prior to a cesarean section (17). These values are higher than those found in our study. This is possibly due to the fact that colonoscopy is generally perceived as a diagnostic procedure which does not require a general anesthetic which could explain the lower level of patient anxiety, although this is a hypothesis which has not been evaluated.

In our study, greater anxiety was found in women and patients with a lower tolerance to a previous colonoscopy. There was also an inverse correlation with age. Apart from these factors, there was a direct correlation between anxiety and pain experienced during colonoscopy. In another Spanish study with a very large sample size of 2,016 patients, the findings were consistent with those of our study; the levels of anxiety were higher in women and patients under 40 (18). In a prospective study by Luck et al.

carried out on a sample of 150 patients using the Spielberger Trait Anxiety Inventory (STAI), women and patients with no previous experience of colonoscopy were found to have higher levels of anxiety. No association with age, level of education or indication for colonoscopy was found (19). A prospective study conducted by Ylinen et al. on 130 patients, again using the STAI, also found an association with women and greater anxiety, although no correlation was found with having previously undergone a colonoscopy or suffering a painful experience. However, there was a correlation between the level of anxiety and pain during colonoscopy ( $r = 0.26$ ;  $p < 0.01$ ) (20). In the study by Jones et al. on 94 patients who had undergone endoscopy or colonoscopy, no relationship was found between the level of anxiety and age, gender, type of procedure or reason for carrying out the procedure (7).

Finally, it would be interesting to analyze the measures that can be implemented to control anxiety. The causes of pre-colonoscopy anxiety include waiting time for the procedure, fear of pain, potential diagnostic findings, suffering a complication, embarrassment or the need to repeat the procedure due to poor preparation. Some of these issues could be controlled by improving the information about the procedure. In this sense, Luck et al. analyzed the effect of showing the patients a video with information about the procedure. They found that anxiety levels were lower in individuals who had seen the video compared with those who had not (19). Another potentially useful measure could be the use of drugs on the day of the procedure or in the period leading up to it. In this respect, benzodiazepines and melatonin have been used to successfully reduce pre-surgery anxiety and even music has been shown to have positive results (21,22).

One important limitation of our study is the fact that it was carried out in a single hospital, thus reducing its possible application to other areas with different socio-demographic or cultural characteristics. Equally, the use of VAS to quantify pre-colonoscopy anxiety is possibly not ideal. The gold-standard method for the assessment of anxiety is considered to be the STAI, which uses two different questionnaires to assess state and trait anxiety. However, the VAS system has been employed in other studies because it is easier to be used in routine clinical practice than the STAI. Furthermore, there are studies which have validated VAS compared with STAI (23-25). We therefore consider this to be a minor limitation.

In conclusion, performing an outpatient colonoscopy in our center has shown to cause anxiety in most patients, with reports of moderate or severe anxiety in more than a half of the cases. A greater degree of anxiety is associated with females, younger patients and previous painful experience of the procedure. Thus, it would be advisable to implement measures to reduce anxiety, particularly in this group of patients, because it has an adverse effect on their quality of life.

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