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RAPID COMMUNICATION

Factors predicting poor prognosis in ischemic colitis

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Abstract

AIM: To determine the clinical, analytical and endoscopic factors related to ischemic colitis (IC) severity.

METHODS: A total of 85 patients were enrolled in a retrospective study from January 1996 to May 2004. There were 53 females and 32 males (age 74.6 ± 9.4 years, range 45-89 years). The patients were diagnosed as IC. The following variables were analyzed including age, sex, period of time from the appearance of symptoms to admission, medical history, medication, stool frequency, clinical symptoms and signs, blood tests (hemogram and basic biochemical profile), and endoscopic findings. Patients were divided in mild IC group and severe IC group (surgery and/or death). Qualitative variables were analyzed using chi-square test and parametric data were analyzed using Student's *t* test ($P < 0.05$).

RESULTS: The mild IC group was consisted of 69 patients (42 females and 27 males, average age 74.7 ± 12.4 years). The severe IC group was composed of 16 patients (11 females and 5 males, average age of 73.8 ± 12.4 years). One patient died because of failure of medical treatment (no surgery), 15 patients underwent surgery (6 after endoscopic diagnosis and 9 after peroperatory diagnosis). Eight of 85 patients (9.6%) died and the others were followed up as out-patients for 9.6 ± 3.5 mo. Demographic data, medical history, medication and stool frequency were similar in both groups ($P > 0.05$). Seriously ill patients had less hematochezia than slightly ill patients (37.5% *vs* 86.9%, $P = 0.000$). More tachycardia (45.4% *vs* 10.1%, $P = 0.011$) and a higher prevalence of peritonism signs (75% *vs* 5.7%, $P = 0.000$) were observed in the severe IC group while the presence and intensity of abdominal pain were similar between two groups. Two patients with severe IC had shock when admitted. Regarding analytical data, more seriously ill patients were found to have anemia and hyponatremia than the mildly ill patients (37.5% *vs* 10.1%, $P = 0.014$ and 46.6% *vs* 14.9%, $P = 0.012$, respectively). Stenosis was the only endoscopic finding that appeared more frequently in seriously ill patients than in slightly ill patients (66.6% *vs* 17.3%, $P = 0.017$).

CONCLUSION: The factors that can predict poor prognosis of IC are the absence of hematochezia, tachycardia and peritonism, anemia and hyponatremia and stenosis.

Key words: Ischemic colitis; Hematochezia; Tachycardia; Peritonism; Anemia; Hyponatremi ; Stenosis

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INTRODUCTION

Ischemic colitis (IC) is the most frequent form of vascular alterations in the digestive system. It occurs mainly in the elderly with pluripathology when there is no major vascular occlusion as a result of reduced blood flow responsible for the colon's needs, and is conditioned by many factors[1].

Clinical presentations vary from mild and limited forms not needing medical treatment to fulminant trans-mural colonic necrosis which may lead to death of patients. The variability in presentations of IC makes epidemiologic research difficult in the general population. The most frequently observed symptoms are abdominal pain and hematochezia[2].

If IC is clinically suspected, its diagnosis can be established by colonoscopy. The most frequent locations are the splenic flexure, the descending colon and the sigmoid colon, although any segment of the colon can be affected[3].

Evolution of IC in patients depends on the severity of the presentation. Most mildly affected patients are asymptomatic after medical treatment. Severely affected patients and those that have strictures need to undergo surgery and have a higher morbidity and mortality rate.

The possibility of establishing prognostic factors promptly is of great importance in deciding the best therapeutic strategy for each case. However, only a few

studies on the possible relation of etiological, pathogenic and clinical factors with the progression to colitis are available[1,3-11].

This study was to review the clinical, biological and endoscopical data of ischemic colitis patients admitted to our hospital and to discover the prognostic factors that determine the evolution of ischemic colitis.

MATERIALS AND METHODS

Patients

A total of 85 patients who were admitted to our hospital from January 1996 to May 2004 and diagnosed with ischemic colitis were restrospectively analyzed. The diagnosis was suspected based on the clinical and X-ray findings and confirmed by the endoscopic and histologic results or the exploratory laparotomy findings. The patients with ischemic colitis secondary to vascular surgery, thromboembolism of the mesenteric artery and/or recto-colonic tumour were excluded.

Methods

The clinical variables including age, sex, period of time from the onset of symptoms to admission and colonoscopy, personal medical history (especially cardiovascular and metabolic history), medication taken regularly, previous stool frequency, symptoms at onset (general well being, abdominal pain, and hematochezia) were analyzed. The exploration signs on admission including hemodynamic state, especially peripheral collapse (systolic blood pressure < 90 mmHg with signs of decreased peripheral blood flow and high blood pressure (systolic blood pressure > 140 mmHg and/or diastolic blood pressure > 90 mmHg) and abdominal exploration, mainly signs of peritoneal irritation such as rigidity and rebound tenderness (Blumberg's sign) were evaluated.

The usual biological, hematological and biochemical parameters obtained on admission were also analyzed. The normal ranges of values provided by our hospital laboratory were used for the qualitative analysis of the main blood test parameters (basic hemogram and biochemical markers).

The endoscopic and laparoscopic results were described identifying the segment of the affected colon. The colon was divided into ascending colon (superior mesenteric artery) and descending colon (inferior mesenteric artery) according to the artery responsible for each segment, sigmoid and descending colon, transverse colon and ascending colon according to the location.

Patients were divided in two groups: severe ischemic colitis patient group (who needed surgery or died in the episode), and mild ischemic colitis patient group (good evolution with medical treatment). Medical treatment included fasting, symptomatic treatment, hydro-electrolytic correction and support, and use of wide spectrum antibiotics.

Statistical analysis

Data were introduced and analyzed using SPSS version 11.0. Qualitative variables were analyzed with the chi-square test (Fisher's correction when necessary) and the parametric data were analyzed with the Student t test for independent groups. Variables with $P < 0.1$ in the univariant analysis were submitted to logistic regression analysis. $P < 0.05$ was considered statistically significant.

RESULTS

Patients

The study included 85 patients (53 women and 32 men) with an average age of 74.6 ± 9.4 years (range 39-89 years). The main risk factor was high blood pressure which was present in 55 patients (64.7%), followed by other cardiovascular diseases (37.6%), diabetes (29.4%), chronic obstructive pulmonary disease (11.8%) and chronic renal insufficiency (1.2%). Previous cardiovascular illness was confirmed in 80% of the patients. Medications taken during the 15 d before the diagnosis of ischemic colitis were registered: antihypertensive medication (64.7%), nonsteroidal antiinflammatory drugs (NSAID) (35.3%), diuretics (25.9%), anticoagulants (3.5%) and cardiotonic drugs (2.4%). Chronic constipation was confirmed in 52 out of 71 patients (73.2%), while regular laxative intake was verified in 39 out of 66 patients (59.1%). The main symptoms that motivated medical attendance were abdominal pain (72/85 patients, 84.7%) and hematochezia (66/85 patients, 77.6%). Immediate physical exploration revealed that two patients suffered from shock at admission (systolic blood pressure < 90 mmHg), while 47.5% of the patients had high blood pressure. Abdominal exploration was compatible with peritonism (positive Blumberg's sign) in 16 cases (18.8%).

The diagnosis was established by endoscopy with biopsies (73 patients) and surgery (12 patients). A conventional abdominal ultrasound was performed in 43 patients (50.6%) and a CT-scan was done in 19 patients (22.4%) prior to endoscopy and/or surgery.

The lesions were distributed depending on their locations: descending colon in 66 patients (77.6%), splenic angle in 10 patients (11.8%), transverse colon in 4 patients (4.7%) and ascending colon in 4 patients (4.7%).

Mild ischemic colitis was found in 69 patients (81.2%) including 27 men and 42 women with an average age of 74.7 ± 8.6 years (range 45-89 years). All the patients improved after medical treatment. The severe ischemic colitis patient group was consisted of 16 patients (18.82%) including 5 men and 11 women, with an average age of 73.8 ± 12.4 years (range 39-85 years). One patient died due to failure of the medical treatment, while 15 patients underwent surgery (6 patients wo were diagnosed by colonoscopy deteriorated despite medical treatment and 9 patients were directly diagnosed during surgery). Eight patients (9.6%) died. The rest of the patients were followed up at the out-patient clinic for an average period of 9.6 ± 3.5 mo (1-72 mo).

Severity prediction factors

The comparative analysis of mild and severe IC showed no statistically significant differences with respect to age, sex, past medical history, previous medication, stay in hospital,

Table 1 Clinical characteristics of the patients with ischemic colitis

	Total *n* = 85	Mild *n* = 69	Severe *n* = 16
Age (yr)	74.6 ± 9.4	74.7 ± 8.6	73.8 ± 12.4
Sex (M/F)	32/53	27/42	5/11
Hospital stay (d)	8.5 ± 6.8	8.0 ± 5.5	10.4 ± 10.9
HBP, *n* (%)	55 (64.7)	48 (69.6)	7 (43.8)
Diabetes, *n* (%)	25 (29.4)	20 (29)	5 (31.3)
Cardiovascular illness, *n* (%)	32 (37.6)	26 (37.7)	6 (37.5)
CRF, *n* (%)	1 (1.2)	1 (1.4)	0 (0)
COPD, *n* (%)	10 (11.8)	6 (8.7)	4 (25)
Constipation, *n* (%)	52 (61.2)	42 (60.9)	10 (62.5)
Hematochezia, *n* (%)	66 (77.6)	60 (87)	6 (37.5)[b]
Abdominal pain, *n* (%)	72 (84.7)	57 (82.6)	15 (93.8)
Peritonsism, *n* (%)	16 (18.8)	4 (5.8)	12 (75)[b]
Systolic BP (mmHg)	142.01 ± 28.3	145.2 ± 28.8	128.4 ± 22.2
Diastolic BP (mmHg)	77.7 ± 13	79.2 ± 13.3	71.2 ± 9.5
Heart rate	82.2 ± 16.2	80.1 ± 13.9	93.5 ± 22.3[a]
Anemia	13	7	6[a]
Leukocytosis (> 108 × 10^9/L)	73	60	13
Uremia	26	23	3
Hyponatremia	17	10	7[a]

[a]$P < 0.05$, [b]$P < 0.01$. Hronic renal failure, COPD: Chronic obstructive pulmonary disease.

stool frequency and location of the lesion in the intestine (Table 1).

Regarding the clinical presentation of the illness, statistically significant differences were observed between the two groups. Hematochezia was most frequently seen in the mild IC patient group compared to the severe IC patient group(86.9% *vs* 37.5%), while signs of peritonism were mostly found in the severe IC patient group compared to the mild IC patient group (75% *vs* 5.7%, $P < 0.001$). No differences were observed in the presence and intensity of abdominal pain (Table 1).

On admission, tachycardia (heart rate > 90 b/min) was found most frequently in the severe IC patient group compared to the mild IC patient group (45.4% *vs* 10.1%, $P < 0.008$). The average blood pressure (systolic and diastolic) was higher in the mild IC patient group than in the severe IC patient group (145.2 ± 28.8 mmHg and 79.2 ± 13.3 mmHg *vs* 128.4 ± 22.2 mmHg and 71.2 ± 9.5 mmHg, $P < 0.05$). However, the number of patients with high blood pressure was similar in both groups. The two patients suffering from shock at admission had severe IC (Table 1).

Biological parameter analysis showed that there were statistically significant differences between the two groups in haemoglobin (normal 120-160 g/L), platelet (normal 130 × 10^9/L-400 × 10^9/L) and glycemia (3.9-6.2 mmol/L) values, and similar results in the rest of the parameters (Table 1). Patients with severe IC had anemia most frequently (haemoglobin < 120 g/L) when compared to patients with mild IC (37.5% *vs* 10.1%, $P = 0.012$) and hyponatremia (serum sodium < 136 mmol/L) (46.6% of the severe *vs* 14.9% of the mild, $P = 0.012$).

No statistically significant differences were observed with respect to the endoscopic lesions (erythema, edemas, hematomas, ulcers and fibrin deposits) except for the strictures which were more frequent in the severe IC patient group (66.6% *vs* 17.3%, $P = 0.017$).

Logistic regression analysis showed that hematochezia was a weak predictor of mild IC (OR = 0.09, IC95% = 0.026-0.308, $P = 0.000$), while signs of peritonism (OR = 48.7, IC95% = 10.6-222.1, $P = 0.000$), tachycardia (OR = 7.36, IC95% = 1.71-31.5, $P = 0.007$), anemia (OR = 5.31, IC95% = 1.47-19.08, $P = 0.010$) and hyponatremia (OR = 4.98, IC95% = 1.47-16.8, $P = 0.010$) were associated with severe IC.

DISCUSSION

Ischemic colitis is a well defined illness that is frequently found in elderly patients and is generally associated with clinical or therapeutic situations. The true incidence in the general population or in groups of patients with specific illnesses is not well known because it depends both on the ability of physicians to suspect the diagnosis and on the thoroughness of the diagnostic process. It was reported that the incidence is 6.1 to 47 in 100 000 inhabitants/year[12]. No systematic studies have established the association between ischemic colitis and cardiovascular pathology, chronic obstructive pulmonary disease, use of different medications and all circumstances responsible for a reduction in blood flow. Our patients had a high prevalence of these factors.

Observational and meta-analysis studies that point to a relationship between IC and irritable bowel syndrome and their treatment with antagonists of 5-HT_3 receptors have recently been published[13-16]. Whether they are different stages of the same process remains unclear. Treatment sequelae or the final consequence of an altered phenomenon that was previously considered functional has to be explained.

Another predisposing factor for IC may be constipation, probably due to the increased colonic luminal pressure which is responsible for worse blood flow in the colonic wall. All these factors, in addition to the progressive aging of the population, make us presume a future increase in its incidence. The diagnostic and therapeutic strategies need to be further studied.

Clinical presentation in ischemic colitis varies from mild forms that heal after medical treatment to severe forms with complete necrosis of the colonic wall requiring surgery and/or leading to death of patients. In general, the first symptoms of IC are hematochezia and abdominal pain as confirmed in our series.

Clinical, biological and/or endoscopic factors capable of promptly discriminating both groups of patients can be used to take the most appropriate therapeutic steps. Few studies have evaluated this aspect of IC[8-11].

Out of all the clinical parameters evaluated in our patients, that standing out as a possible predictor for the evolution of IC is only hematochezia. As a clinical presentation, it can protect the patient from severe IC, because in our study it was significantly more frequent

in the mild forms. The presence of tachycardia and peritonism on physical exploration (in our study significantly more frequent in the severe forms of IC) is possibly an expression of the hemodynamic instability and the colonic trans-mural injury, which could lead to perforation and subsequent peritonitis.

The only biological parameters are anemia and hyponatremia which were more frequent in severe forms of IC in our study.

In our series of patients, we did not find a relationship between the evolution of IC and the anatomical location of the lesions, regardless of the diagnostic method applied (endoscopy or surgery), which is different from that disclosed by other authors[9].

In this study, we found no relationship between age, sex and the subsequent evolution of IC as in other studies[8-9]. Pla *et al*[11] and Barouk *et al*[10] reported that they have established a worse prognosis in elderly patients. There are also incongruent results with regard to the relationship of the medical history of patients and the severity of IC. Medina *et al*[9] reported that there is no relationship, while others[8,10-11] reported that high blood pressure is a predisposing factor for the worse evolution of the illness.

The mortality of our patients was almost 10% and all the patients suffered from severe IC, differing greatly from that (66%) reported in the literature[17].

In conclusion, ischemic colitis is an illness that should be considered in any elderly patients with clinical and therapeutic risk factors, such as abdominal pain and/or hematochezia. The mortality rate of ischemic colitis is still high. We hold that it is necessary to carry out prospective and controlled studies in order to clearly detect the factors that predict the evolution form and find the best therapeutic approach.

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