



Original article

Colonic volvulus and recurrence of volvulus: what should we do?

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A B S T R A C T

Introduction: Colonic volvulus (CV) is an uncommon disease in our country, which may present clinically as an intestinal obstruction or occlusion. Its diagnosis and therapeutic management remains controversial. The objective of this article is to present our series, analyse the results and establish a therapeutic approach to decrease the recurrence of the volvulus.

Material and methods: A retrospective, descriptive study of patients diagnosed with CV between January 1997 and December 2009.

Results: There was recurrence of volvulus in 62% of cases treated with surgery, and surgery was performed in 72% of these. In the whole series, surgery was performed in 35 cases (64%), with sigmoidectomy with primary anastomosis being the technique most employed. The overall mortality of the series was 7 cases (12%), with 16% being in cases of surgery due to recurrence.

The study included 54 patients, with a mean age of 74 years, who had a total of 89 CV episodes. There was associated disease in 70% of the cases, which included 44% with constipation and 53% with neurological diseases. The volvulus was located in the sigmoid in 87% of cases and in the right colon in 13%. The large majority (92%) of cases had intestinal obstruction. Endoscopic treatment was effective in 61% and urgent surgery was performed in 31% of the cases, and in 40% of the first episodes of CV.

Conclusions: The diagnostic technique and initial treatment of CV is endoscopic decompression. Early elective surgery prevents the high recurrence rate associated with higher mortality.

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Vólvulo de colon y recidiva del vólvulo: ¿qué debemos hacer?

R E S U M E N

Introducción: El vólvulo de colon (VC) es una patología infrecuente en nuestro medio que cursa con clínica de oclusión intestinal; el manejo diagnóstico y terapéutico es una constante controversia. El objetivo de este trabajo es presentar nuestra serie, analizar los resultados y plantear una actitud terapéutica para disminuir la recidiva del vólvulo.

Material y métodos: Estudio retrospectivo y descriptivo de los pacientes diagnosticados de VC entre enero de 1997 y diciembre de 2009.

Palabras clave:

Vólvulo de colon

Oclusión intestinal

Descompresión

Recidiva

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Tratamiento ablativo
Supervivencia

Resultados: Se incluye a 54 pacientes que presentaron un total de 89 episodios de VC, con una edad media de 74 años y con un 70% de patología asociada, destacando un 44% de casos con estreñimiento y un 53% con enfermedades neurológicas. El vólvulo se localiza en sigma en el 87% de los casos y en el colon derecho en el 13%. El 92% de los casos presentó clínica de oclusión. El tratamiento endoscópico tuvo una eficacia del 61% y se practicó cirugía urgente en el 31% de los casos y en el 40% de los primeros episodios de VC.

El 62% de los casos tratados sin cirugía presentó recidiva del vólvulo y en éstos se realizó cirugía en el 72%. En el total de la serie se realiza cirugía en 35 casos (64%); la sigmoidectomía con anastomosis primaria es la técnica más empleada. La mortalidad global de la serie fue de 7 casos (12%) y del 16% en los casos de cirugía por recidiva.

Conclusiones: La técnica diagnóstica y terapéutica inicial del VC es la endoscopia descompresiva. La cirugía electiva precoz evita la alta tasa de recidiva asociada a mayor mortalidad.

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Introduction

Colonic volvulus (CV) results from bowel twisting upon its mesenteric axis, producing clinical symptoms of intestinal obstruction.

The incidence of CV varies in different parts of the world, with a clear predominance in Africa, Asia, South America, and the Middle East. In these areas with a high incidence of volvulus, the condition is known as endemic volvulus, and constitutes between 20% and 54% of all occlusions.¹

On the contrary, in Europe and the USA, volvulus is involved in only 1%-10% of all occlusions, and these cases are labelled as sporadic volvulus due to their low incidence.¹⁻³

The most common type of CV is CV of the sigmoid colon (40%-80%), followed by the caecum (10%-40%). CV in the transverse colon (2%-4%) and splenic flexure (0%-2%) are much rarer. There are clear geographical, epidemiological, and aetiopathogenic differences between each type.^{4,5}

This condition appears primarily in elderly patients. It requires a correct diagnosis and early treatment in order to resolve the occlusion caused by CV.⁶

Several different diagnostic and therapeutic methods have been proposed in recent years that occasionally produce changes in treatment approaches. The objective of this study is to review our own experience in treating this pathology, to analyse the results from applying the changes in therapeutic techniques that have appeared over the years, and above all, attempt to define the most appropriate surgical strategy for the treatment of CV in order to avoid recurrence.

Material and methods

Ours is a retrospective, descriptive study of 54 patients that were diagnosed and treated for CV with a total of 89 episodes which were attended to at our institution between January 1997 and December 2009.

We reviewed the clinical histories of patients according to The International Classification of Diseases, 9th Revision, Clinical Modification 1978 (ICD-9-CM) using the diagnostic code 560.2. We assessed the following parameters: age, sex,

personal background, clinical presentation of the disease, physical examination, clinical diagnosis, diagnostic and treatment methods, results from endoscopic treatments and surgical techniques used, patient evolution, recurrence of volvulus, and treatment of recurrence.

For the personal background of each patient, we focused on previous history of surgical procedures or cardiorespiratory incidents that may affect surgical risk. We described incidents from patient histories considered as risk factors in generalised terms in order to facilitate their analysis. For neurological background, we documented cases of mental illness, degenerative neurological disease, mental retardation, and habitual residence in a mental institution or nursing home. For gastrointestinal background, we recorded patterns of bowel movements and the existence of acquired megacolon.

We used SPSS® software, version 11.1 for Windows®, for the processing of all data (SPSS Inc., Chicago, IL, USA). We used Student's t-tests for the equality of the means. We used the mean and standard deviation of study variables as measures of central tendency and variance, and considered P-values of less than 0.05 as statistically significant.

Results

Colonic volvulus

Our study included a total of 54 patients (35 males and 19 females). The CV was located in the sigmoid colon in 47 cases (87%) and in the right colon in 7 cases (13%), see Table 1.

The mean (standard deviation) age of patients with right CV was 55 (15) years, and the mean age of patients with sigmoid volvulus was 77 (11) years. The overall mean patient age was 74 (13) years.

In 3 (5.5%) of the 54 cases, the patient had a history of previous abdominal surgery, and 40 patients (74%) had some relevant occurrences in their personal history. Of these, 26 were male and 14 female. Fifteen out of the 26 males had one single relevant occurrence and 11 had two. Seven out of the 14 females had one relevant occurrence and 7 had two.

Twenty-four (44.4%) out of the 54 patients included in the study had chronic constipation (13 male and 11 female), 4

Table 1 – Distribution of the volvulus according to location, sex, age, and number of cases

Type	Sex, total	Age	No. cases
Right colon volvulus	Female	59.60 (16.28)	5
	Male	43.50 (3.53)	2
	Total	55.00 (15.51)	7
Sigmoid volvulus	Female	82.85 (10.60)	14
	Male	74.57 (10.94)	33
	Total	77.04 (11.38)	47
Total	Female	76.73 (15.83)	19
	Male	72.80 (12.90)	35
	Total	74.18 (13.98)	54

had megacolon, and 13 (24%) histories of cardiorespiratory problems that represented a surgical risk (11 male and 2 female). Mental retardation was observed in 4 out of the 54 cases (7.4%, 3 males, and 1 female). Ten out of the 54 patients (18.5%) lived in nursing homes (3 males and 7 females). Additionally, 29 (53.7%) out of the 54 patients had neurological diseases (17 males and 12 females).

In 50 cases (92.6%), the main symptom was intestinal occlusion (32 males and 18 females); 2 males first developed peritonitis, one female went to the emergency department for abdominal pain, and another due to a mass in the right iliac fossa (RIF).

We used simple abdominal x-rays for diagnosis (Figure) in 28 cases (51.8%). This was accompanied by a barium enema in another 10 cases (18.5%) and by a computerised tomography (CT) in 16 cases (29.6%). We performed an endoscopic study with therapeutic intent following the radiological examination in 33 cases (61%).

The initial treatment given was medical in 37 cases (68.5%) and urgent surgery in 17 cases (31.5%) due to 7 cases of volvulus in the caecum and 10 cases of sigmoid volvulus.

The medical treatment was the placement of a rectal decompression tube in 4 cases, decompressive colonoscopy in 27 cases, and a decompressive colonoscopy with the placement of a colon tube in 6 cases.

Table 2 shows the surgical techniques used during urgent surgery, both during the first episode and the recurrences of volvulus.

In the 17 patients treated using urgent surgery, 4 had ischaemia of the colon, one of them (5.8%) died due to multi-organ failure. In the group of 37 patients that received medical treatment, three passed away (8.1%) due to their poor general state of health. Two died after the colonoscopy and the other one after the placement of the rectal tube. The mortality for all 54 patients after the first episode of CV was 7.4% (4 cases).

Five out of the 37 patients that were initially treated medically accepted the proposed surgical treatment after the occlusive phenomena were resolved. Four underwent surgery during the same hospital stay and the fifth patient elected to be readmitted after 2 weeks.

Table 3 describes the elective surgical techniques employed after the first episode of volvulus and after recurrence.

**Figure 1 – Simple abdominal x-ray. Coffee bean sign.**

Following the first episode of CV, definitive surgical treatment was given to 22 out of the 54 patients (40.7%): 17 cases were urgent surgery, with one death (4.5%), and 5 were elective surgery, 4 of them during the same hospital stay. The volvulus was located in the sigmoid colon in 15 cases and in the caecum in 7 cases. Three (9.3%) out of the 32 patients that were treated medically died.

Elective surgery was suggested in 12 out of the 29 cases (53.7%) that survived after medical treatment of the first episode of CV, but this option was not selected. In the other 17 cases, elective surgery was contraindicated because of the high risk due to associated pathologies.

Table 2 – Urgent surgical techniques (23 cases)**Urgent surgery after first episode (No.=17)**

<i>Right colon volvulus</i>	
Right hemicolectomy	5
Right colectomy+ileostomy+mucous fistula	1
Devolvulation+caecostomy	1
<i>Sigmoid volvulus</i>	
Hartmann procedure ^a	5
Sigmoidectomy+primary anastomosis	3
Sigmoidopexy	1
Colostomy	1

Urgent surgery for recurrent volvulus (No.=6)

Sigmoidectomy+primary anastomosis	3
Hartmann procedure	2 ^a
Colostomy	1 ^a

^aOne death.

Table 3 – Description of surgical techniques for elective surgery (12 cases)

<i>Elective surgery after first episode (No.=5)</i>	
Sigmoidectomy+primary anastomosis	3
Total colectomy+ileorectal anastomosis	1
Hartmann procedure	1
<i>Elective surgery after recurrence (No.=7)</i>	
Total colectomy+ileorectal anastomosis	3
Sigmoidectomy+primary anastomosis	2
Hartmann procedure	1
Total colectomy+ileostomy	1

Recurrent volvulus

Eleven (38%) out of these 29 patients remained asymptomatic and 18 (62%) developed recurrent volvulus (11 male and 7 female), with a total of 35 episodes of recurrent CV out of the 89 total cases that occurred in this group of 54 patients.

These 18 patients developed the following patterns of recurrence: 12 cases had one episode; 1 case had two episodes; 4 cases had four episodes, and 1 patient had five episodes, with medical treatment provided in 22 cases and surgical treatment in 13.

Of the 18 patients that developed recurrent CV, decompressive endoscopic treatment was used in 10 (55.5%) with one death (10%), and surgical treatment was performed in 8 cases (44.5%), 4 of them were urgent (2 deaths [50%]), and 4 were elective, with no mortality during hospitalisation. A total of three deaths were registered in this group of recurrent CV (16.6%).

The patients undergoing surgery remained asymptomatic and surgery was again proposed to the remaining 9 patients. Surgical treatment was again contraindicated due to high risk in 6 cases, and 3 patients did not elect to undergo surgery. These 9 cases developed recurrent CV again, and 5 of them (55.5%) ended in surgery. Two patients underwent urgent surgery following the fourth episode of recurrence and 3 patients underwent elective surgery, one after the second recurrence and two after the fourth.

Of the 18 patients who developed recurrent CV, 72.2% underwent surgery at some point (13 patients, mean age: 77.4 [7.8] years). Seven of these cases were elective surgery during that hospital stay and 6 were urgent procedures, with two deaths.

In total, considering the initial case of CV and recurrent episodes, urgent surgery was performed in 23 out of the 54 cases (17 and 6 respectively, 42.6%) and delayed surgery in 12 cases (5 and 7, 22.2%). Eleven of them occurred during the hospitalisation period and 1 during a second hospitalisation, i.e., a total of 35 patients from the study underwent surgery (64.8%).

We performed a resection with primary anastomosis in 47% of urgent surgical patients (11 cases) and in 75% of elective surgical patients (9 cases).

Of the 29 patients that did not undergo surgery after the first episode of CV, 15 remained asymptomatic, which represents 27% of the total study sample.

The overall mortality from our study of 54 patients was 12.9% (7 cases) after a total of 89 episodes of CV, with 4 deaths resulting in cases of medical treatment and 3 from surgical treatment, all of which were urgent surgical procedures. No mortality was recorded in elective surgical cases.

Discussion

CV results from bowel twisting upon its mesenteric axis, which predominantly occurs in the sigmoid colon, followed by CV in the caecum.³ We observed CV in the sigmoid colon in 87% of cases, and in the caecum in 13%.

Our geographical area has a low incidence of this disease, with predominance in males (64.8%). The mean patient age is 74 years: in males 72 years, and 76 in females, with similar results to those previously described.

Several different factors have been reported to be involved in the appearance of CV. We know that the colon must be large and mobile in order to rotate over itself in the sigmoid region, and an abnormal fixation of the right colon can allow for its torsion in this area, implying a genetic factor.^{1,4,7} Other acquired factors have also been described that can cause the presence of dolichocolon. The primary factors are a diet rich in fibre, constipation, previous abdominal surgery, postoperative adhesions, pregnancy, diabetes, neurological diseases, and psychiatric diseases.^{1,8,9}

In our experience, 40% of the cases involved a background of key factors and 5% of patients had undergone previous surgical procedures. 44% had chronic constipation, 18% were living in nursing homes, 53% had neurological conditions, and 7% had mental retardation.

The diagnosis of CV is performed using clinical, radiological, endoscopic, and occasionally intraoperative criteria. The classical clinical manifestations are made up of the triad of abdominal pain, distension, and constipation. Depending of the speed of the intestinal torsion, the patient may develop a more fulminant or indolent set of symptoms in a mean of 3-4 days.

In our study, only 2 cases (3%) developed fulminant symptoms, whereas 92% had slowly developing intestinal occlusion.

Imaging diagnosis can be used to corroborate clinical suspicion, and is usually achieved using simple abdominal x-ray. One can observe intestinal dilatation with air-fluid levels and the deformity known as the "coffee bean sign", which is present in 30%-60% of cases.^{1,10} One can also observe intestinal dilatation in the right CV, with a dilated caecum and the absence of gas in the colon. Simple abdominal x-ray can provide the diagnosis in 25% of right CV cases and in 60%-65% of sigmoid volvulus cases.

The use of a barium enema to confirm the diagnosis is questionable. In cases where the diagnosis is clear, this procedure provides no further information, and when the diagnosis is unclear, its use can delay treatment, therefore, it is not currently used. The test that provides the greatest amount of information is the CT scan, with over 90% reliability. This exam shows dilated intestinal loops along with the colon and its vascular pedicle rolled into a spiral. It

also reveals severe radiological signs, such as ischaemia of the colon wall.¹¹

In our study, simple x-rays provided the initial diagnosis in 51% of cases. Barium enemas were used to confirm the diagnosis in 18% of cases, and CT scans in 29%. In the last years of the series, simple abdominal x-rays were used exclusively, followed by CT scans to confirm the diagnosis, assess the severity of the condition, and rule out other possible causes of occlusion.

If radiological and clinical examinations indicate CV, an endoscopic exploration must ensue. This technique provides two advantages: confirmation of the diagnosis and, its main value, decompression of the colon as a treatment of the condition. Therapeutic approaches vary depending on whether signs of mucosal ischaemia are observed in the colon. In our study, a decompressive colonoscopy was used in 61% of cases. Currently, we do not use rectal decompression tubes.

In spite of the wide range of diagnostic methods available, the diagnosis was made intraoperatively in 7% of our cases.

There are two objectives in the treatment of CV: resolve the occlusive phenomena and prevent recurrence of the volvulus. The treatment of choice is a decompressive colonoscopy, as long as no signs of peritonitis secondary to ischaemia or colon perforation exist, with an effectiveness of 70%-90%, but a recurrence rate of 18%-90%.^{1,8,12}

When the colonoscopy is not effective, or if the patient develops signs of peritonitis, urgent surgery is indicated.

In our study, medical treatment was the initial approach in 68% of cases, and surgery in 31%. In urgent surgery, one can encounter a viable colon and perform a simple devolvulation, although this procedure is associated with a recurrence rate of 14%-38% and a mortality rate of 14%, making sigmoidectomy a better option. However, controversy exists regarding the advantages of primary anastomosis vs a terminal colostomy in urgent surgery.^{13,14}

If the general state of health of the patient allows it, a primary anastomosis is recommended since it is associated with a lower mortality rate (8%-13%) compared to the Hartmann procedure (25%-50%).¹⁵ In our series, primary sutures were used in 47% of urgent surgical procedures.

However, the colon may not be viable in urgent surgery due to ischaemia, gangrene, or perforation. In these cases, we performed a sigmoidectomy and, based on the level of faecal peritonitis and the general state of the health of the patient, an anastomosis.¹⁶

Although the endoscopic treatment of CV is effective, it is associated with a high rate of recurrence (40%-90%) and mortality from recurrence is 5%-35%. As such, once the immediate symptoms have been alleviated, elective surgical treatment is recommended within 48-72 hours after the CV has been reduced.¹⁷

The controversy surrounding the indications for this type of surgery is based on the high surgical risk of these patients, who are elderly and present with associated diseases. In these patients, elective surgery has a mortality rate of 16%, whereas the mortality caused by recurrence is 9%. Since 83% of controlled patients die within 2 years after their CV due to associated diseases, a conservative endoscopic treatment is recommended.¹⁸

Some authors have reported that patients with high comorbidity who are managed by watchful waiting have a mortality rate of 11%-21%, whereas this rate is 5%-6% after elective surgery, which is why surgery is recommended. In our study, although it was small, we observed a 16% mortality rate in recurrent volvulus, whereas it was only 7% after the first episode. For these reasons, we believe that physicians must attempt to treat these patients surgically as early as possible in order to avoid recurrence, although we have not always achieved this goal and some patients have experienced recurrent volvulus before undergoing surgery.

However, there will always be a bias in the data due to case selection, since patients with more severe conditions will be treated conservatively. Contrary to other, more common diseases,¹⁹ we do not know the current situation of CV in Spain, as few studies exist reporting the outcomes from changes in therapeutic approach,² probably due to the high mortality rates associated with recurrence. As such, what must we do to reduce the rates of recurrence and mortality? The answer is to increase the number of patients undergoing elective surgery after the first episode of CV.

Currently, mesosigmoidoplasty is not performed due to the high associated rates of recurrence (16%-70%) and mortality (0%-11%),¹³ although we did perform this procedure on one occasion.

Sigmoidectomy with primary anastomosis is the method of choice for sigmoid volvulus, with a mean mortality rate of 8% (0%-15%), a morbidity rate of 13%-26%, and a mean recurrence rate of 1.2% (0%-20%).^{1,12} A subtotal colectomy is recommended in order to prevent the recurrence of volvulus in cases of megacolon, and we used this technique in 4 cases, although this was after the patients had developed recurrence.

In right CV,⁷ endoscopic decompression has a high rate of failure and is associated with a high risk of perforation, therefore, urgent surgical treatment is recommended. Simple untwisting of right colon volvulus has a recurrence rate of 10%-75%. In caecostomy and caecopexy, recurrence is 10%-40%, making right colectomy with primary ileocolic anastomosis the method of choice. High-risk patients require an ileostomy with a colonic mucous fistula. In our patients, we performed a caecostomy in only one case, with good results. In all other cases we performed a right colectomy.

The surgical mortality rate in right CV with a viable colon is 1%-10%, and 25%-40% in the case of ischaemic or gangrenous colon, whereas other techniques (caecopexy and caecostomy) have a mortality rate of 40%.

In our series, overall mortality was 12.9%, which is within the reported range, and was greater in cases of recurrence. Based on our experience, we must conclude by recommending that the number of patients undergoing elective surgery after the first episode of volvulus must be increased as much as possible in order to reduce the rates of recurrence and mortality.

Conflict of interest

The authors affirm that they have no conflict of interest.

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