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Pelvic colon volvulus: Results of one-stage versus two-stage colectomy at the University Hospital of Conakry

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Abstract

Introduction: The aim of this study was to evaluate the results of one-stage colectomy versus two-stage colectomy at Conakry University Hospital.

Methods: This was a retrospective study conducted at the University Hospital of Conakry from January 1, 2015 to December 31, 2019. All patients hospitalized and operated on in the Ignace Deen General Surgery and Donka Visceral Surgery departments for pelvic colon volvulus (PCV) who underwent colectomy during the study period were included.

Results: We collected 87 cases of pelvic colon volvulus (PCV). The average age was 45.71 years with extremes of 5 years and 80 years with a male predominance of 82.83% and a sex ratio of 5.18. The morbidity was marked by 2 cases of anastomotic fistulas, 7 cases of parietal suppuration and 1 case of peristomal hemorrhage. 4 cases of death were noted in two-stage colectomy and 2 cases in one-stage colectomy.

Conclusion: The occurrence of morbidity and mortality was not related to the type of colectomy. As our study does not allow us to affirm the superiority of one technique over the other, we recommend considering a future dynamic study that would take into account a larger sample.

Keywords: Pelvic Colon Volvulus; One-stage colectomy; Two-stage colectomy; Sigmoid colon

1. Introduction

Volvulus of the sigmoid colon is the twisting of the sigmoid loop on its mesocolic axis resulting in a low mechanical intestinal obstruction (AIO) by strangulation [1]. Abdominal and pelvic computed tomography (CT) without and then with injection of contrast medium allows the diagnosis to be made with certainty, but above all the diagnosis of severity [2].

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There are many different treatment options. Surgical resection is accepted as the treatment of choice. It consists of a segmental colectomy or sigmoidectomy followed or not by restoration of digestive continuity [3]. One-stage colectomy is described as ideal and is followed by immediate restoration of bowel continuity. The two-stage colectomy requires a colostomy while waiting for the restoration, which will be delayed for a few months [4]. Morbidity and mortality rates for one-stage and two-stage colectomy vary in the literature [5,3, 6,7].

The objectives of our study were:

- To describe the types of colectomy performed for pelvic colon volvulus
- To compare the morbidity and mortality outcomes of single-stage and two-stage colectomy

2. Methods

A retrospective descriptive study was conducted from 1 January 2015 to 31 December 2019. The study included the records of all patients who underwent colectomy for pelvic colon volvulus in the general and visceral surgery departments at the University Hospital of Conakry during the study period.

We included all the records of patients hospitalised in the general and visceral surgery departments at the University Hospital of Conakry, for volvulus of the sigmoid colon who had undergone colectomy during the study period and who had an operative report or a discharge finding confirming the diagnosis of the disease. We excluded from the study all incomplete records and all patients with pelvic colon volvulus who did not undergo colectomy. The variables studied were sociodemographic, diagnostic, therapeutic and evolutionary

Epidemiological parameters were: frequency, sex, age

The diagnosis was clinical: the Mondor tetrad (abdominal pain, abdominal bloating, cessation of feces and gas, ± vomiting) The diagnosis was clinical: the Mondor tetrad (abdominal pain, abdominal bloating, cessation of bowel movements and gas, ± vomiting), the time of consultation, the comorbidities and paraclinical (the characteristic images of the PCV on the ASP).

The therapeutic parameters studied were:

- The type of colectomy according to the anatomical state of the sigmoid loop, its meso and associated visceral lesions. We distinguished:
- One-stage colectomy: this consists of a sigmoidectomy followed by restoration of digestive continuity. One-stage sigmoidectomy, described as ideal, is followed by immediate restoration.
- Two-stage colectomy: two-stage colectomy consists of butting the proximal end of the colon to the skin; the distal end is closed and left or marked by a wire and fixed in the pelvis (according to Hartmann) or section of both feet of the volvulus colonic loop and skinning of both colonic ends (according to Bouilly Volkmann)

The results of immediate colectomies were evaluated in two groups of patients according to the type of colectomy (ideal and 2-stage). For each type of colectomy we distinguished between favourable results (clinical improvement, first stage healing) and unfavourable results that reflected morbid complications (suppuration, digestive fistula, second stage healing) and in the extreme, fatal complications. We calculated the case-fatality rate and i

nvestigated the circumstances and probable causes of postoperative deaths during hospitalization.

3. Results

Frequency of colectomy compared to other methods of treatment of pelvic colon volvulus:

Colectomy was performed in 68 cases (78%)

Primary endoscopic devolution in 7 cases (8%)

The characteristics of the patients were:

-Average age: 45.71±16 years with extremes of 5 years and 80 years

-Sex ratio (M/F): 5.18. Men (n=57; 83.82%), Women (n=11; 16.18%)

The classic clinical picture of PCV was found in all patients.

The average consultation time was 3.8 days with extremes of 1 day and 15 days.

The frequency of comorbidities was: hypertension (n=5; 7.35%)

Diabetes (n=2; 2.94%)

The sigmoid loop during the operation was necrotic in 10 cases (14.71%)

Without necrosis in 58 cases (85, 29%)

Table 1 Distribution of patients operated on according to the surgical procedure

Technic/ Procedures	Number	Percentage
One-stage colectomy (n=46)		
Left hemicolectomy	36	52.94
Sigmoidectomy	10	10.29
Two stage colectomy (n=22)		
Bouilly Wolkman colostomy	14	20.59
Hartman colostomy	8	11.76
Total	68	100

Table 2 Distribution of immediate postoperative complications according to the technique used

Surgical follow-up Immediate				
Types of colectomy				
Simple follow-up Morbidities Total				
	suppuration	fistula	hemorrhage	
Single stage colectomy 39	5	2	0	7
Two stage colectomy 19	2	0	1	3
Total 58	7	2	1	10

NB: parietal suppuration n=7, anastomotic fistula n=2, peristomial hemorrhage n=1

Mortality according to technique: Of the 6 deaths, 4 had undergone a two-stage colectomy (66.66%) and 2 a one-stage colectomy (33.33%)

Table 3 Distribution of patients operated on according to length of hospital stay

Length of hospital stay	Wolkman	Hartman	Hemicolectomy	Left Sigmoidectomy	TOTAL
≤ 7	5	1	10	3	19
8- 14	9	7	23	3	42
15 - 21	0	2	1	1	4
> 21	0	0	3	0	3
TOTAL	14	10	37	7	68

Average duration: 13.5days Extremes: 1 day and 63 days.

**Figure 1** Intraoperative image showing a pevien colon dilated like an air chamber, we note a colon with signs of necrosis in places

4. Discussion

This study provided guidance in the choice of colectomy methods for colonic volvulus, although there was no proven superiority for any one method. We were also able to highlight the results of the methods in terms of morbidity and mortality with fewer complications in 2-stage colectomies. The retrospective nature of the study and the size of the sample do not allow us to assert the superiority of one method over the other.

We collected 2807 cases of surgical pathologies, 87 cases of PCV, i.e. 3.10%. Of these, 68 underwent colectomy, i.e. a frequency of 78.16%.

Soumaoro LT et al [8], in Guinea, in a study of 257 colectomies performed between 2013 and 2017, sigmoid volvulus represented 26.85%. In our study the most affected age group was between 35 and 44 years (22 cases) or 32.35%. The mean age was 45.71 ± 16 years, with extremes of 5 and 80 years. Our results are comparable to those of Choua Ouchemi et al. [9]. and Ba P et al [10]. who respectively found mean ages of 48.9 years with extremes of (17 years and 86 years) and 45 years with extremes (22 years and 89 years). This could be explained by the fact that in developing countries, where the diet is rich in fibre, this pathology affects mostly middle-aged adults.

In our study, we observed a male predominance (83.82%) with a ratio of 5.18. Our results are identical to those of Traoré D et al[11], Soumah SA et al, [12]. Choua O et al[9], who reported that men represented 92.7%, 86.96% and 96.9% respectively, i.e. sex ratios of 12.7, 6.66 and 32. This male predominance can be explained by the fact that the maximum width of the meso-sigmoid and the length of the meso-sigmoid root are greater in women than in men and the narrowness of the male pelvis, which offers no chance of spontaneous reduction in the event of torsion [13].

In the study, 79.42% (54 cases) were received between the first and fifth day of onset of symptoms. Our data are comparable to those of Soumah SA et al. who noted a notion of chronic constipation in all cases and the presence of dolichosigmoid in 17.39% of cases (n=4) [12]. In our study the symptomatology was dominated by abdominal pain (97.06%), cessation of feces and gas (95.56%), abdominal distension (91.18%) and delayed vomiting (51.47%). Our results corroborate the data in the literature [1,7, 14, 15]. The search for signs of gravity (fever, collapse, abdominal contracture, traces of blood on rectal examination) is essential [1,2, 4, 15]. The average consultation time was 3.8 days with extremes of 1 day and 15 days. Our result is comparable to that of Hama Y et al [16] in Niger who found a mean duration of evolution of 4.18 days with extremes of 1 and 14 days. On the other hand, Togo A. and colleagues in Mali reported an average duration of 2.5 days with extremes of 1 to 3 days [18].

This difference can be explained by the fact that most of our patients consulted in the periphery as soon as the symptoms appeared, resulting in a delay in the diagnosis of pelvic colonic volvulus. All our patients had an unprepared abdominal X-ray (UAP) which showed a double legged arch image. Traore D et al [17] in Mali found that 100% of their patients had an unprepared abdomen (UAP) which showed colonic type hydro-aeros levels in 75.6% (31/41), double leg hydro-aeros levels in 9.8% (4/41) in favour of a colonic occlusion, grelic type hydro-aeros levels in 7.3% (3/41) and mixed levels in 7.3% (3/41).

In the study by Choua O. et al, in Chad, 72.5% of patients had undergone a PSA showing a double legged arch or "inverted U" appearance [9].

In our study 85.29% of our patients had a viable sigmoid loop compared to 14.71% who had necrosis of the sigmoid loop. Our results are comparable to those of Traoré D et al [17], who found 16.7% sigmoid loop necrosis. The mechanism of strangulation and/or the prolonged delay in consultation favours the occurrence of complications exposing the patient rapidly to the risk of irreversible ischaemia and evolving towards necrosis and intestinal perforation with stercoral peritonitis [14,19]. This is why, if the patient presents serious clinical or radiological signs, he/she should be operated on as a matter of urgency [15]. In our study, one-stage colectomy was the most performed (67.65%) compared to two-stage colectomy (32.35%). The same observation was made by Togo A et al. [18] who noted 71.74% of cases of one-stage colectomy. On the other hand, in the study by Traoré D. et al. the main surgical techniques performed were two-stage sigmoidectomy (n=58; 60.5%): elective sigmoidectomy, Hartmann, Bouilly Wolkman and ideal sigmoidectomy in 28 patients, i.e. 29.2% of cases [17]. Hama Y et al also in their study had reported Hartmann colectomy performed in 68.45% of patients followed by ideal colectomy (25.60%) [16]. Hazem Ben A et al. in Tunisia found 26 cases of two-stage colectomy [3].

In our study, the postoperative course was simple in 85.29% (n=58). On the other hand, we recorded 10 cases of complications (14.71%), 7 of which occurred after a one-stage colectomy and 3 after a two-stage colectomy. In one-stage colectomy, we recorded 5 cases of parietal suppuration and 2 cases of anastomotic fistula. In two-stage colectomy, we recorded 2 cases of parietal suppuration and 1 case of peristomal haemorrhage.

We recorded 6 cases of death, i.e. 8.82%, 4 of which were cases of two-stage colectomy (66.66%) and 2 of which were cases of single-stage colectomy (33.33%). Septic shock was the most common cause of death: 5 cases or 83.32%. Our results corroborate those of most of the data from African series [2,11,16]. Traoré D et al 2014 in Mali had found 77 cases of complications out of 417 patients recorded, i.e. a percentage of 16.07%. They recorded 17 cases of death, i.e. 4.08% [11]. In the study by Touré CT et al [2], the overall morbidity was 14%. Only one anastomotic fistula and one delay in transit resumption were noted in the one-stage colectomy group. In the two-stage colectomy, there were two cases of parietal suppuration, two cases of evisceration and one delay in transit resumption. There were 6 deaths, 4 in one-stage colectomy and 2 in two-stage colectomy. Of the 6 deaths, 3 were related to septic shock, one to pneumopathy plus dehydration, one to anastomotic fistula, one to stroke, one to cachexia plus dehydration [2]. Hama et al [16], found an overall morbidity of 14.28%. These included 8.34% parietal suppuration, 2.38% postoperative obstruction, 1.78% evisceration and 1.78% enterocutaneous fistula. 7.15% of the patients died, 5.95% of them after Hartmann colectomy. The occurrence of complications was influenced by necrosis and long consultation time [8]. Safioleas et al [20] reported a mortality rate of 1-9% in a healthy colon compared to 25% in a necrotic colon. Akcan et al [21] found a rate of anastomotic fistula after one-stage surgery of 30% in perforated or necrotic colon and only 5.5% in healthy colon.

According to Khan M et al. [22] the low postoperative mortality and morbidity of the SCV is due to the fact that the patients are young and without co-morbidity factors. The occurrence of morbidity and mortality is not significantly associated with either single-stage or two-stage colectomy (relative risk being within the confidence interval). Togo A et al [18] reported that 32 patients (91.45%) had a simple outcome in two-stage sigmoidectomy versus 93 patients (93.93%) who underwent emergency anastomotic colectomy. There was no statistical difference in the outcome of

these two groups. They recorded 3 cases of parietal suppuration, 4 cases of digestive fistula (2.90%) which dried up during the hospital stay.

In a series of 136 patients, Akcan et al [21] found no statistically significant differences in morbidity and mortality rates between one-stage and two-stage surgery on a viable colon but a longer hospital stay in the Hartmann group. In the study by Agaoglu et al [23] postoperative complications and length of hospital stay were greater in the Hartmann group compared to the one-stage group. In their retrospective study, however, the differences were not significant and the distribution of patients in the two groups was not homogeneous (the most severe cases had a Hartmann procedure).

. In the study by Agaoglu et al [23] postoperative complications and length of hospital stay were greater in the Hartmann group compared to the one-stage group. In their retrospective study, however, the differences were not significant and the distribution of patients in the two groups was not homogeneous (the most severe cases had a Hartmann procedure).

In our study the average overall hospital stay was 13.5 days with extremes of 1 and 63 days. Our results are similar to those found by Togo A et al. [18] who reported a mean length of hospitalization of 11.26 days with extremes of 6 days to 65 days. Traoré D et al. [17] noted that in their study the mean length of hospital stay was 16.8 days for one-stage sigmoidectomy and 32.93 days for two-stage sigmoidectomy. The mean overall hospital stay was 27.9 days with a standard deviation of 12.3.

5. Conclusion

Pelvic colonic volvulus is a relatively common surgical emergency, affecting mostly adult males. One-stage colectomy was more common than two-stage colectomy. The immediate postoperative course was simple in the majority of cases. The occurrence of morbidity and mortality depended on the condition of the loop, the general condition of the patient, the age of the patient, and the existence or not of comorbidity. Early diagnosis and management can reduce the morbidity and mortality rate. The occurrence of morbidity and mortality was not related to the type of colectomy. As our study does not allow us to state the superiority of one technique over the other, we recommend that a future dynamic study with a larger sample size be considered.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors state that there was no conflict of interest in performing this work.

Statement of informed consent

This work is the result of the combined efforts of all the authors and all agree for the publication of this scientific article.

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