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Management of Acute Bowel Obstruction in Adults in Ziguinchor Hospital Establishments: About 163 Cases Followed Up

Omar Sow[1*], Cheikh H. Badji[1], Mouhamed Dieng[1], Reymond Seydi[1], Aissata Diallo[1], Cheikh Diouf[2], Papa A. Ba[3], Boubacar Fall[1]

[1]Department of General Surgery, Peace Hospital, Assane Seck University of Ziguinchor, Ziguinchor, Senegal
[2]Department of General Surgery, Central Regional Hospital of Ziguinchor, Assane Seck University of Ziguinchor, Ziguinchor, Senegal
[3]Department of General Surgery, University of Iba Der Thiam, Thies, Senegal
Email: *sowomar506@gmail.com

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Abstract

Acute intestinal obstruction represents a very frequent admission to surgical emergencies. The aim of our study was to make a descriptive analysis of the management of acute intestinal obstructions at the level of hospital establishments in Ziguinchor. **Materials and Methods:** This was a retrospective, descriptive, multicenter study from the period of January 1, 2017 to December 31, 2021. Patients over 15 years of age admitted for occlusive syndrome in the two surgical departments of the Ziguinchor regional hospitals were included in the study. Epidemiological, diagnostic, therapeutic and evolutionary data were studied. **Results:** Acute intestinal occlusions accounted for 8.3% of admissions. A total of 163 patients were enrolled, 61.9% were men, sex ratio of 1.6. The mean age was 48.7 years. The average consultation time was 74.8 hours (3.12 days). The total occlusive syndrome was in 48.5% of the cases. Abdominal pain was present in 87.1%, vomiting in 74.2%, cessation of matter and gas in 60.7% and meteorism in 36.2%. Biological lab tests reported hyperleukocytosis in 28.1% of the cases. Abdominal CT scans were performed in 71.2%, confirming the diagnosis in 90.5% and determining the etiology in 93.1%. The zone of the obstruction in the small bowel was 62.7%, and in the colon in 37.3%. Functional occlusions accounted for 22.7% of cases and mechanical for 77.3%, including 120 cases of strangulation occlusion (95.2%) and 6 cases of obstruction. Etiologies were dominated by adhesions and/or fibrous bands (61.2%). Medical treatment resolved the occlusive syndrome in 9.2% of cases, instrumental treatment in 17.1% and surgical treatment in 77.3%. Adhesiolysis/section of fibrous bands (55.7%), detorsion (14.3%) and resection + anastomosis (11.9%) were the most common surgical procedures.

Overall morbidity was 11.6%, dominated by surgical site infection (7.14%). The mean resumption of intestinal transit was 2.7 days, and the mean hospital stay was 7.9 days. Overall mortality was 6.7%. **Conclusion:** Acute intestinal obstruction is a frequent, absolute medical-surgical emergency, with multiple etiologies dominated in our series by adhesions and/or fibrous bands, whose morbi-mortality could be reduced by early and appropriate management before the onset of intestinal necrosis.

Keywords

Intestinal Obstruction, Emergency, Surgery, Ziguinchor

1. Introduction

Acute Intestinal Obstruction (AIO) is a major medical-surgical emergency and a common pathology in surgical emergencies. It accounts for up to 20% of acute surgical abdominal pain in Africa [1]. Intestinal obstruction represents 10% of acute abdominal pain in adults and constitutes the second reason for emergency surgical hospitalization after acute appendicitis [2]. Its severity depends on the topography, the mechanism and the duration of evolution. In Senegal, its frequency is fairly well known, mainly in Dakar, where authors have found an average admission frequency of 6.4% [1] [3]. In Ziguinchor, no study has yet been carried out on AIO in adults as a whole. This lack of data for a pathology so common in daily practice motivated us to carry out this study, the aim of which was to make a descriptive analysis of the management of acute intestinal obstructions in Ziguinchor hospitals.

2. Materials and Methods

This was a retrospective, descriptive, multicenter, 5-year study covering the period from January 1, 2017 to December 31, 2021. All patients over 15 years of age admitted for occlusive syndrome to the two surgical departments of two hospitals of Ziguinchor Peace Hospital and the Central Regional Hospital of Ziguinchor were included in this study. Non-inclusion criteria were patients under 15 years of age and those whose records could not be retrieved. The parameters studied were epidemiological data (age and gender), diagnostic data (clinical and imaging), the surgical procedure and evolutionary data (length of hospital stay, morbidity and mortality). Data were collected from operative and discharge registers and patient medical folders. The collected data were then coded, entered using Excel 2010 Microsoft Office software, and validated for analysis using Epi Info™ version 7.1 software.

3. Results

The total number of cases of acute intestinal obstruction during the study period was 273 according to the registers, including 163 exploitable records out of 3301

patients admitted to surgical emergency departments. Acute intestinal obstruction accounted for 8.3% of the admissions. Of the 163 patients, 61.9% (N: 101) were men and 62 women, giving a sex ratio of 1.6. The mean age was 48.7 years, with extremes of 15 and 82 years. The 35 - 44 age group predominated with 28.8% of cases, followed closely by the 45 - 54 age group with 23.3%. The mean consultation time was 74.8 hours, or 3.12 days. The majority of patients (51%) had at least one history of abdominal surgery. Caesarean sections accounted for the highest percentage at 24.5%, followed by appendectomies at 6.7% (Table 1). Abdominal pain was present in 87.1% of cases, vomiting in 74.2%, and cessation of stool and gas in 60.7%. The total occlusive syndrome was in 48.5% of cases. Physical general condition was altered in 50.9% of our patients, of whom 10.4% had associated fever and 4.2% had associated shock. Abdominal meteorism was well noted in 36.2% of cases, rectal examination was performed in 101 patients (61.5%), abdominal laparotomy scar was found in 44.7% of cases, and 7.3% had associated abdominal tenderness. Biological tests reported hyperleukocytosis in 28.1% of cases, an inflammatory syndrome in 59.3%, hydro electrolytic disorders in 65.3% and elevated renal function in 13.3%. Plain abdominal X-rays in 148 patients revealed air fluids levels in 122 (82.4%). Abdominal CT scans were performed in 116 patients (71.2% of the cohort), confirming the diagnosis in 105 patients (90.5%) and determining the etiology in 93.1%. The zone of the small bowel obstruction was in 62.7% of cases, and the colon in 37.3%. Functional occlusions accounted for 22.7% of cases, and mechanical occlusions for 77.3%, including 120 cases of strangulation occlusion (95.2%) and 6 cases of obstruction. Etiologies were dominated by adhesions and/or fibrous bands (61.2%), followed by colonic volvulus (33.4%), thirdly by colonic tumors (3.9%) and in 4th place by small bowel volvulus (1.5%) (Table 2). Medical treatment was carried out in

Table 1. Distribution of Surgical history.

SURGICAL HISTORY	NUMBER	PERCENTAGE (%)
Acute bowel obstruction	7	4.3
Acute appendicitis	11	6.7
Acute peritonitis	4	2.5
Ombilical hernia repair	4	2.5
Ectopic pregnancy	3	1.8
Cesarean section	40	24.5
Abdominal tumor	5	3.3
Abdominal trauma	3	1.8
Tumor of larynx	2	1.2
Laparotomy	6	3.6
None history	78	47.8
Total	**163**	**100**

Table 2. Etiology of mechanical obstruction.

ETIOLOGY	NUMBER	PERCENTAGE (%)
Brides	76	60
Bowel strangulation	2	1.59
Strangulation wall hernia	1	0.79
Sigmoïd strangulation	42	33.3
Colon cancer	5	3.96
Total	**126**	**100**

37 patients (22.7%), while instrumental treatment was successful in 28 (71.4%). Surgical treatment was performed in 126 patients, including 22 after failure of medical treatment and 08 after failure of instrumental treatment. Laparotomy was the main approach, except for one case of occlusion on an adhesive fibrous bands operated by laparoscopy. Surgical findings revealed 11.9% necrotic loops and 8.7% ischemic loops. Adhesiolysis/section of fibrous bands (55.7%), detorsion (14.3%) and resection + anastomosis (11.9%) were the most common surgical procedures. Overall morbidity was 11.6%, dominated by surgical infections (7.14%). The mean resumption of intestinal transit was 2.7 days, and the average hospital stay was 7.9 days. Overall mortality was 6.7%.

4. Discussion

4.1. Epidemiological Considerations

Acute intestinal obstruction is a pathology whose extreme emergency nature has long been illustrated by the famous aphorism: "you should never let the sun rise and set on an obstruction" [2]. In our series, AIO represented 8.3% of emergency admissions. In Gomis' series, the hospital frequency was 6.4% of admissions of the visceral surgery department of the Principal Hospital of Dakar [1]. In blacks, Africa, in Cameroon, it represents 21.9% according to the study by Engbang JP *et al.* [4]. This high rate, compared with Western data, could be linked to the practice of laparotomy in our context, which is a source of bridles. The mean age of the patients was 48.7 years. Our results are similar to those of a study carried out at the Principal Hospital in Dakar, which found an average age of 43 years [1]. Thus, acute intestinal obstruction remains the prerogative of young adults in Senegal. This is due to a young population with an average age of 22.7 years, half of whom are under 19 years of age, according to the 2023 General census of the Population, of the Habitat, of Agriculture) of Senegal's National Statistic Agent and Demography) [5]. The young age of patients presenting with acute intestinal obstruction may also be related to the history of abdominal and gyneco-obstetric surgery, which is frequent in the young population and a source of adhesions and/or fibrous bands [2]. Ooko *et al.* in Kenya found an average age of between 40.6 and 45 years [6]. In Europe and Asia, the average age

was much higher, around 60 [7]. The male sex was much more representative in our series. This male predominance is similar to other studies carried out in the region and other African studies [1] [6] [8]. However, European series showed the opposite, with a predominance of females [9]. Indeed, the etiologies of acute intestinal obstruction in Africa are dominated by strangulated hernias, post-operative adhesions and/or fibrous bands and sigmoid volvulus [6] [8] [10] [11]. Strangulated hernias and sigmoid volvulus are more male-dominated conditions [12]. On the other hand, in the West, adhesions and/or fibrous bands account for the majority of etiologies (60%) and are more secondary to gyneco-obstetric surgery than appendectomy [13]. In the West, appendectomy is increasingly performed by laparoscopy, whereas in Africa, laparotomy remains the main approach, greatly increasing the risk of adhesions and fibrous bands formation in men. In our study, 8 patients had a history of chronic constipation, including 7 with sigmoid volvulus, 14% of all patients with sigmoid volvulus. In the series by Ba *et al.*, 30% of patients with sigmoid volvulus had a history of chronic constipation [14]. Surgical history was reported in 52.2% of patients. These procedures were dominated by gyneco-obstetric surgery (24.5%) and appendectomy (6.7%). Dieng *et al.* found similar rates, with 33.8% having undergone gyneco-obstetric surgery and 4.4% appendectomy [1]. gyneco-obstetric procedures dominated the series, due to the high birth rate in our region and the increase in indications for caesarean sections [15]. Intestinal obstruction by adhesions and/or fibrous bands is strongly associated with previous abdominal surgery [16]. In our patients, the mean duration of signs was 3.12 days, and 6.8% of them consulted a doctor within the first 24 hours. This rate is similar to that of Gomis [1]. The average duration of signs in African series was 3.2 days [6]. European series showed a mean duration of clinical signs of 1.3 days [7]. This long duration may be explained by the fact that patients are often seen in peripheral health facilities, which can delay referral to a specialist. Intestinal transit disorders are often trivialized by patients, who first resort to self-medication and sometimes traditional medicine before turning to health facilities. Unlike in Africa, in the West, with greater awareness, easier access to health facilities and diagnostic resources, this period is short.

4.2. Diagnosis

The total occlusive syndrome was in 48.5% of our patients, associating abdominal pain, vomiting, cessation of stool and gas, and abdominal meteorism. This rate is much closer to that found in the study carried out by Gomis in 2017 [1] with 47.5% for a duration of evolution of 3.6 days. Ba *et al.* [14] found a rate of 72% for a mean evolution time of 2.5 days. This suggests that the longer the mean duration of signs, the higher the rate of complete occlusive syndromes. Vomiting was very frequent in our study, with a rate of 74.2%. In fact, vomiting is more precocious when the zone is proximal and the mechanism is strangulation [17] [18] [19]. This rate remains substantially similar to the Senegalese stu-

dies by Soumah [14], who found 85% respectively. Ooko *et al.* [6] reported a similar rate of 78%. The cessation of stool and especially gas is the defining sign of occlusive syndrome. However, it is very difficult to assess in patients with a long history of chronic constipation [19]. In our series, cessation of stool and gas was present in 60.7% of cases. Ooko's series [6] reported a rate similar to ours: 50.8%. The American study [7] reported a frequency of 80.6%. However, other Senegalese studies noted a frequency of cessation of stool and gas of between 92% and 96% [1] [10]. Abdominal meteorism, the main sign of the physical examination, was found in 36.2% of patients in our series, significantly lower than the study by Gomis [1], which found 75.2%, and significantly lower than the data in the literature [6] [12], which found a frequency of between 55% and 77%. This could be explained by the frequency of high occlusions in our series, the first-hand clinical examination often carried out by junior practitioners not necessarily differentiated and sometimes misled by abdominal obesity. Peritoneal irritation was present in 12 patients and tendernes in 2. These peritoneal signs testified to digestive distress, which correlated with the delay in consultation noted in our study. In our series, biology revealed hyperleukocytosis in 28.1% of cases, hyponatremia in 15.4%, hypokalemia in 23.1% and hyperkalemia in 15.4%. Renal function was impaired in 13.3% of patients, and anemia was present in 8.1%. Biological workup is essential prior to any surgical intervention and, in the case of acute intestinal obstruction, enables the impact to be assessed [17]. The high prevalence of strangulation and the delay in consultation in our series could explain the biological figures by installation of hydro electrolytic disorders and other severity factors. Indeed, hyperleukocytosis is a sign of severity, testifying to microbial translocation and pollution. Hydro electrolytic disorders are due to the formation of a 3rd sector and vomiting, which can lead to dehydration. These must be corrected before any surgical intervention [18]. All these phenomena are rapidly accentuated in the presence of acute intestinal obstruction, the mechanism of which is obstruction [17]. The plain abdominal X-ray used to be the 1st-line examination in cases of occlusive syndrome. However, it is now used less and less frequently [17]. Abdominal computed tomography is the reference examination for acute intestinal obstruction [11]. The literature reports diagnostic sensitivity of between 81% and 100%, topographical sensitivity of 93% and etiological sensitivity ranging from 50% to 91% for conventional CT [11]. However, with the advent of multi-detector helical CT, diagnostic accuracy has improved, with topographical sensitivity of 100% and etiological sensitivity of 89% [20]. In our series, abdominal CT scans were carried out in 71.2% of patients. It confirmed the diagnosis of intestinal obstruction in 90.5% of cases, mechanism in 92.4% of cases, diagnosed the zone in 95.8% of cases, and specified the etiology in 93.1% of cases. In comparison, in the Senegalese series [1], abdomino-pelvic CT scans were performed in 88% of patients. Our series reported 77.3% mechanical occlusions and 22.7% functional occlusions. These frequencies were lower than in the series by Gomis [1], who reported 97.5% mechanical occlusions and

2.5% functional occlusions. The literature reports a mechanical occlusion rate of between 95% and 100% [17]. In our series, 95.2% of mechanical occlusions were due to strangulation and 4.8% to obstruction. These rates were very similar to those found by Gomis [1], with 89.34% strangulation and 10.65% obstruction. African series showed a frequency of strangulation of between 80% and 98% in mechanical occlusions [8]. The American series [7] reported a rate of 84.3%. In fact, strangulation accelerates the onset of hydro electrolytic disorders, dehydration, hyperleukocytosis and other signs of severity such as ischemia and necrosis, and may even lead to perforation. All these phenomena can be life-threatening [11]. Hence the need for rapid management of these intestinal strangulation occlusions, which constitute a therapeutic emergency. Our study reported 62.7% small bowel obstructions and 37.3% colonic obstructions. In the literature, small bowel obstructions account for between 60% and 80% of all obstructions [8] [21]. Fibrous bands occlusions account for over 60% of occlusions [12] [13], as is the case in our work. The decline in the frequency of hernial strangulations over the years is thought to be due to a better understanding of this hernial pathology by patients, who consult us before the dreaded complication of strangulation occurs. In our series, adhesions and/or fibrous bands were mainly postoperative (76.6% of cases) and rarely spontaneous (23.4% of cases). African studies [8] reported a rate of between 74.6% and 66.1% for post-operative adhesions and/or fibrous bands. The series by Podda *et al.* [22] reported up to 75% post-operative adhesions and/or fibrous bands. This increase in the frequency of postoperative adhesions and/or fibrous bands in recent years is probably secondary to the increased frequency of laparotomies [16]. In our series, the surgical history was dominated by gyneco-obstetric surgery (24.5%) and appendectomy (6.7%). In fact, as described in the literature, gyneco-obstetric surgery and appendectomy are the most frequent sources of fibrous bands [1] [15] [22]. Hence the interest in laparoscopy could reduce the risk of post-operative adhesions and fibrous bands, especially in gynecological surgery and in the management of appendectomy. In our study, among occlusions involving adhesions and/or fibrous bands (n = 77), 13 were adhesions alone (16.9%) and 64 were fibrous bands (83.1%). In our series, colonic volvulus was the 2nd most common cause of all etiologies (33.4%) and the 1st most common cause of mechanical colonic obstruction (89.4%), and was more frequent in Africa than in the West [6] [8] [13] [23]. In the West, colon occlusions are dominated by tumors in 40% to 70% of cases, and occur preferentially in the left colon [24]. In our series, colonic tumors accounted for only 10.6% of mechanical colon occlusions. The African series by Adamou *et al.* [8] found 16.2% colonic tumors in mechanical colon occlusions.

4.3. Therapeutic Treatment

Medical treatment was done in 37 patients (22.7%). This treatment is systematic, whatever the mechanism or etiology. In our series, medical treatment resolved

the occlusive syndrome in 15 patients (40.5%), who showed no signs of digestive distress or ischemia. Enema with hydrosolubles (gastrografin) was not used in our work. However, some studies [25] [26] have shown that the use of a water-soluble enema (gastrografin) reduces the time to resolution of the obstruction, the length of hospital stay and the need for surgery. However, the 2017 study by Cossé *et al.* [25] showed only a reduction in occlusion resolution time with gastrograffin. On the other hand, it [25] also noted a reduction in hospital length of stay and use of surgery when pro-calcitonin testing was introduced into the decision-making algorithm for the management of uncomplicated small bowel obstructions. The pro-calcitonin assay had not been performed in our series. African series report a low frequency of medical treatment, ranging from 0% to 17% [6] [13]. In Europe, Japan and North America, the success rate of medical treatment ranged from 65% to 80% [25]. In our series, 28 patients underwent detorsion with a Faucher rectal probe, all of them with sigmoid volvulus and no signs of digestive distress, ischemia or intestinal necrosis on abdominal CT. Detorsion was successful in 20 patients (71.4%). In the literature, endoscopic detorsion is the first therapeutic option in the management of uncomplicated sigmoid volvulus, followed at the same time by admission of an ideal colectomy. In the event of signs of digestive distress, ischemia or necrosis, surgery is recommended, either as a one-stage or two-stage colectomy, depending on the patient's general condition and the state of the coves [12] [13]. The most commonly used approach in our series was the midline approach (89.7%), followed by the periumbilical approach (4.8%), the Mac Burney mirror incision (3.2%) and the left mirror incision (1.5%). These results are superimposed on those of Gomis [1], who found 89.4% for the median approach. In our series, the laparoscopic approach was used in one case (0.8%). There is as yet no consensus on the use of laparoscopy in the treatment of acute intestinal obstruction. Laparoscopy would be recommended only for intestinal obstructions on simple fibrous band. It would be limited by distension of the loops, abdominal scar and tight adhesions [18]. In Senegal, laparotomy was the main approach for all bowel obstructions due to fibrous bands. However, Cissé *et al.* [27], in their study on the contribution of laparoscopy in surgical emergencies, performed 12 laparoscopic fibrous band sections, with a conversion rate to laparotomy of 25%, close to the literature rate of 29%. This conversion was secondary to iatrogenic perforation of the small bowel and the presence of intestinal necrosis. This further demonstrates the limitations of laparoscopy in the management of acute intestinal obstructions. Surgical exploration in our study found ischemic loops in 8.7% of cases, and necrotic loops in 11.9%. All occurred in patients whose occlusion mechanism was strangulation. The main etiologies of necrotic loops were adhesions and/or fibrous bands, and sigmoid volvulus. Analysis of the mean consultation time and the occurrence of necrosis or ischemia suggested that the occurrence of necrosis or ischemia was related to the length of consultation time. Gomis [1] found ischemic coves in 5.7% of cases and necrotic coves in 13%. The Cameroon series [10] showed a 42% higher frequency of ischemia and necrosis

than our own. However, the etiologies in their series were dominated by hernial strangulation. In Europe, Podda *et al.* [22] reported a necrosis rate of 22.5% in all patients operated on. Neither in our series nor in Ba's had a self-expanding colonic stent been used. However, it would remove the obstacle and allow palliative treatment with less morbidity and mortality than surgery [28] [29]. However, the study by Baer *et al.* in 2017 [30] showed that there was no particular difference between the morbidity and mortality of stenting and those of colonic surgery. The stent also enables colonic preparation to be carried out, so that colonic surgery can be performed under better local conditions and colostomy, which is generally poorly tolerated due to certain socio-cultural beliefs, can be avoided [14] [30].

4.4. Outcomes

In our series, morbidity was 11.6%. Gomis [1] found a morbidity of 10.5% and 13.4% respectively in their series. Morbidity in Senegal ranges from 7% to 23% [11] [14], and is slightly lower than morbidity in the rest of Africa, which varies from 13.7% to 63% [4] [7]. In the West, morbidity is slightly lower, as shown in the study by Fahim *et al.* [31], with a rate of 8%, and could be explained by a better technical platform. Morbidity in our study was dominated by surgical site infection, as in other Senegalese series, which reported a rate of between 17% and 60% of complications [1] [14]. The same predominance was also observed in other African series, with a percentage between 29% and 64% of complications [4] [6]. Surgical site infection is an early post-operative complication in digestive surgery, and depends on the patient's clinical condition, aseptic conditions, and the nature and duration of the operation. Appropriate antibiotic therapy should be used according to the results of the antibiotic susceptibility test. To classify the occurrence of complications in our patients, we used the Dindo Clavien classification. Among 126 patients who underwent surgery, 19 (15.1%) had a post-operative complication. These were mainly 11 cases of death (8.7%) classified as grade V, 9 cases (7.14%) of surgical site infection classified as grade II, 2 cases (1.6%) of pulmonary embolism classified as grade II and finally 8 cases (6.3%) of digestive fistula classified as grade II. Overall mortality in our series was 6.7%. The Senegalese study by Soumah [14] also found a low overall mortality of 2.3%. African series show mortality ranging from 6% to 14% [14]. This shows that there has been an improvement in the management of acute intestinal obstructions in Africa, and better knowledge of the pathology on the part of practitioners and the general public, leading to shorter consultation times. European, American and Arab series reported a mortality rate of less than 4%, thanks to a better technical platform and easier access to diagnostic tests such as abdominal CT and magnetic resonance imaging [31] [32]. The average overall hospital stay was 7.9 days, with extremes of 2 and 24 days. Patients receiving medical treatment had a mean hospital stay of 3.8 days, with extremes of 2 days and 8 days. The mean hospital stay for patients receiving surgical treatment was 8.5 days, with extremes of 2 days and 24 days. This length of hospital stay depends above

all on post-operative complications and surgical technique [32]. Laparoscopic surgery offers a shorter hospital stay than laparotomy [33].

5. Conclusion

Acute intestinal obstruction is not a disease, but a syndrome with multiple etiologies. In fact, the occlusive syndrome is the mode of revelation, whether sudden and spectacular or progressive and insidious, of an underlying pathological condition which is its cause. Acute intestinal obstruction is an absolute medical and surgical emergency. Its prognosis depends on the mechanism, the presence or absence of clinical or paraclinical signs of severity, the etiology and the rapidity of management. Fibrous bands occlusion is the most common etiology. If occlusion is suspected, the diagnosis must be confirmed, the severity assessed, the mechanism identified, the topography determined, the etiology specified and the appropriate treatment ensured. The morbi-mortality rate remains high, but laparoscopic surgery could reduce the risk of occlusion by fibrous bands. It should therefore be more widely used in daily practice.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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