

Research Article

Traumatic Perforation of the Colon in the General Surgery Department of the Ignace Deen National Hospital-chu in Conakry (Guinea)

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Abstract

Aim: To describe the epidemiological, anatomoclinical aspects and management of traumatic colon perforations in general surgery at the Ignace Deen University Hospital in Conakry. **Materials and methods:** this was a retrospective study, descriptive type, lasting 5 years (September 2018 to September 2023). All successive records of patients operated on for traumatic colon perforation in the department during the study period were included. **Results:** We collected 70 cases of traumatic colon perforation, representing 5.8% of all operated abdominal traumas. The mean age was 30 ± 14 years, with extremes of 5 and 76 years. Males predominated (78.5%). Average hospital stay was 13.07 ± 6.07 days. The clinical picture was that of a peritoneal irritation syndrome. The etiologies were represented by road accidents ($n=52$; 47.4%). The transverse colon (32.86%) was the segment most affected. Simple suture repair was performed in 56 patients (80%). Postoperative complications included postoperative peritonitis ($n=7$; 10%). We noted 8 deaths, representing a mortality rate of 11.43%. Average hospital stay was 13.03 ± 6.07 days. **Conclusion:** Traumatic perforations of the colon are frequent and occur more often in young male subjects. The transverse colon was the segment most affected. Primary suturing was the preferred method for colonic trauma in our context.

Keywords

Perforation, Trauma, Colon, Surgery, Ignace Deen

1. Introduction

Traumatic perforation of the colon is an interruption of the integrity of the lining of the various layers of the colon following trauma [1]. Traumatic perforation is a surgical emergency requiring early management, due to the sudden onset of typical peritonitis caused by perforation of a hollow organ. It may also manifest itself as delayed symptoms, or symptoms masked by the therapeutics used, and by lesion associations that delay management, resulting in significant morbidity and

mortality [2].

In Europe, closed trauma to the abdomen is four times more frequent than open trauma in medical and surgical practice, while colonic injuries are uncommon, representing less than 1% of abdominal trauma injuries and less than 5% of digestive injuries [2].

In Senegal Wade T et al. in a 2014 study had reported that colonic perforations were observed in 14.6% of open ab-

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Received: 8 June 2025; Accepted: 1 July 2025; Published: 22 July 2025



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dominal trauma [3].

Demetriades D et al. in a prospective, randomized, multi-center study, had shown that the type of surgical treatment after resection for penetrating trauma had no influence on the incidence of septic complications [4].

Oosthuizen GV et al reported that there was no difference in the rate of anastomotic leakage or mortality between right and left colonic lesions [5].

In Guinea, the frequency of abdominal trauma has increased in recent years due to the development of means of transport, anarchic urbanization and the resurgence of violence. We therefore felt it necessary to carry out this study on traumatic perforations of the colon, with a view to determining their epidemiological, anatomo-clinical and therapeutic aspects at the Ignace Deen CHU National Hospital in Conakry.

2. Materials and Methods

This was a retrospective descriptive study lasting 5 years from September 1, 2018 to September 30, 2023.

Were included in this work, all consecutive complete records of patients operated for traumatic perforation of the colon following trauma in the general surgery department of the Ignace Deen National Hospital during the study period.

Our study variables were epidemiological, clinical, para-clinical, therapeutic and evolutionary. The lesion assessment was performed at exploratory laparotomy. The parameters studied were epidemiological, clinical, lesion site, associated lesions, surgical procedures and evolution. Restrictions on the possibility of specific complementary investigations such as CT scans were the limitations and constraints of this study. Our data were collected using Excel software from Pack Office 2016 and analyzed with epi info 7 software.

3. Results

We collected 70 cases of traumatic colonic perforation, representing 5.8% of all operated abdominal lesions. The mean age was 30 ± 14 years, with extremes ranging from 5 to 76 years, and 78.5% were male. Abdominal pain (100%) was the main functional sign. Abdominal defense dominated the physical signs. Details of patients' clinical signs are shown in Table 1. The average consultation time was 25 hours. The majority of our patients ($n = 34$; 48.6%) consulted between 24 and 48 hours after the trauma. The etiologies were represented by public road accidents ($n = 52$; 47.4%), followed by accidents at work ($n = 7$; 10%), sports accidents ($n = 6$; 8.6%), knife wounds ($n = 3$; 4.3%) and firearm injuries ($n = 2$; 2.8%). Abdominal radiography without preparation and abdominal ultrasonography were the main paraclinical examinations performed in 58.6% and 32.9% respectively. The paraclinical signs were: pneumoperitoneum in 23 cases (32.9%), hydroaerocitis in 12 cases (17.1%), diffuse grisaille in 17 cases

(24.3%) and intraperitoneal fluid effusion in 11 cases (15.7%). CT scans were not performed in any of the patients. Biological tests revealed hyperleukocytosis in 47 cases (67.4%), and anemia in 39 cases (55.7%). Mean time to surgery was 15 ± 9.01 hours, with extremes of 4 h and 37 h. Each patient with an abdominal wound received a dose of anti-tetanus serum. All patients received preoperative resuscitation. Analgesics and antibiotics were systematically administered. The indication for surgery was given immediately in 63 patients (90% of cases), while 7 patients (10%) underwent further clinical and biological monitoring for the development of peritoneal irritation with hyperthermia. All patients underwent general anesthesia. Median laparotomy above and below the umbilical cord was the surgical approach used in all patients. The parts of the colon most frequently touched were: the transverse colon (32.9%) and the descending colon in 15.7% of cases (Table 2).

Associated lesions were dominated by wounds of the greater omentum in 17.1% of cases, followed by wounds of the small intestine in 11.4% (Table 3). The procedures performed were: primary repair by simple suture in 56 patients (80%), colonic resection with colostomy in 8 patients (11.4%). Details of surgical procedures are given in Table 4. The outcome was favorable in 59 patients (84.3%). Postoperative complications included postoperative peritonitis ($n = 7$; 10%) and parietal abscesses ($n = 3$; 4.3%). We recorded 8 deaths, for a mortality rate of 11.4%. These included 5 cases of septic shock and 2 cases of hypovolemic shock. The average length of stay was 13.03 ± 6.07 days, with extremes of 3 and 30 days.

Table 1. Clinical characteristics of patients.

Clinical signs	Number	Percentage
Functional signs		
Abdominal pain	70	100
Vomiting	19	27.1
General signs		
Fever	36	51.4
Tachycardia	27	38.6
Thirsty	9	12.7
Pallor	5	7.1
Physical signs		
Parietal defense	58	82.9
Abdominal contracture	5	7.1
Evisceration	7	10.0
Parietal opening	24	34.3
Bruise	15	21.4

Table 2. Seat of perforation.

Perforation seat	Number	Percentage
Transverse colon	23	32.9
Sigmoid	10	14.3
Descending colon	11	15.7
Ascending colon	9	12.9
left colic angle	8	11.4
Caecum	1	1.43
Rectum	4	5.7
Right colic angle	4	5.7
Total	70	100

Table 3. Associated intra-abdominal lesions.

Associated intra-abdominal lesions	Number	Percentage
Mesenteric wound	6	8.6
Small intestine injury	8	11.4
Greater omentum lesion	12	17.1
Splenic injury	3	4.3
Liver injury	2	2.9
Retroperitoneal hematoma	1	1.4

Table 4. Surgical procedures performed.

Surgical gestures	Number	Percentage
Simple colonic suture	56	80
Colonic resection + colostomy according to Hartmann	8	11.4
Colonic resection + immediate anastomosis	6	8.6
Associated gestures		
Mesenteric hemostasis	4	5.7
Small bowel resection-anastomosis	5	7.1
Hemostasis of the greater omentum	10	14.3
Jejunal suture	3	4.3
Liver packing	2	2.9
Splenectomy	3	4.3
Ileal suture	5	7.1

Surgical gestures	Number	Percentage
Toilet + drainage	70	100

4. Discussion

The incidence of trauma-induced colonic injury is approximately 1-3% in the Western civilian population [6]. Traumatic perforation of intra-abdominal hollow organs is an important part of emergency abdominal pathology [7]. Traumatic perforation of the colon accounted for 5.8% of abdominal trauma in our series by Benjelloun [7] in Morocco and d'Arvieux [8] in France, 6.02% and 4.78% respectively.

Our result could be explained by the increase in the phenomenon of banditry and the development of means of transport with its corollaries.

Our patients were young, their average age corresponding to the most active age bracket in the population, and therefore more at risk from the various mechanisms involved. The same observation has been made by other authors. In Africa, Gaudeuille A et al [10] found a mean age of 29.67 years.

The male predominance in our series is also noted by most authors [9, 10]. This could be explained by the fact that men are more active and more exposed to trauma than women.

Colorectal lesions can be classified as penetrating, blunt and iatrogenic, and treatment methods may differ according to the mechanism of colonic injury [11].

As in our study, the mechanisms of injury were dominated by road accidents in the series by Mehinto DK et al. in Benin in 2006 [12] and Sani R et al. [13] in Niger in 2004, who noted 79.2% and 51.5% road accidents respectively. Internal injuries in closed trauma occur most often in violent impacts, as is often the case in road accidents.

The average consultation time was longer in our study than in the study by Arvieux C et al. in France in 2009 [9], which found a consultation time of 6.72 hours. This high consultation time in our series could be explained by the fact that patients were evacuated to a nearby health facility before consulting our center, thus lengthening the delay between trauma and arrival in the emergency department.

In our series, an unprepared abdominal X-ray was performed in 41 patients and showed pneumoperitoneum in 23 cases (32.86%). Abdominal ultrasonography is less reliable for recognizing pneumoperitoneum in relation to hollow organ trauma, but is highly sensitive for detecting intra-abdominal effusion [12]. It was performed in 32.86% of cases, and showed an intra-abdominal effusion in 11 cases (15.71%). Abdominal CT remains the examination of choice for exploring lesions of the digestive tract in closed abdominal trauma, and can demonstrate signs of intestinal rupture [14]. The low rate of complementary examinations in our series could be explained by the low socio-economic level of our patients, the absence of universal health coverage and the importance of clinical signs on ad-

mission, thus testifying to visceral damage and motivating surgical exploration.

Blunt trauma frequently occurs in mobile areas of the colon, such as the cecum, transverse colon and sigmoid colon, and secondary injuries caused by mesenteric devascularization frequently occur in the right colon. In gunshot wounds, the ascending and transverse colon are more frequently affected, and multiple colonic lesions may be associated [15, 16]. The transverse ascending colon (32.86%) and sigmoid colon (14.29%) were the main sites of perforation. This finding was also observed in the Benjelloun studies [8].

In the treatment of colonic lesions, the choice of primary repair and proximal bypass depends on the severity of the lesion. Maxwell and Fabian [17] have classified colonic lesions into non-destructive and destructive.

In non-destructive colonic lesions, Stone and Fabian [18] provided the first evidence that primary repair was superior to colonic bypass in a prospective randomized study of selected patients.

Subsequently, several other prospective and retrospective studies concluded that in non-destructive colonic lesions, primary repair should be the standard treatment, irrespective of associated risk factors, as it is responsible for less intra-abdominal sepsis and death [17, 19-21].

Recommendations for the treatment of destructive colonic lesions remain controversial due to their low incidence and lack of definitive data [22]. In the case of destructive colonic lesions, if patients are hemodynamically stable during surgery, have fewer associated lesions, no severe peritonitis and no underlying medical history, a termino-terminal anastomosis after colonic resection is recommended without proximal shunting [4]. In cases of shock or severe associated disease with severe peritonitis and underlying medical history, colonic resection and proximal shunting are the standard treatments [23].

Closed-wound colonic perforation results from ischemia due to vascular damage. Perforation occurs late and in mobile areas of the colon, such as the cecum, transverse colon and sigmoid colon. Secondary lesions caused by mesenteric devascularization frequently occur in the right colon [15, 16]. In cases of severe fecal contamination during surgery and septic conditions, resection and bypass colostomy are preferred to primary repair [11].

In our series, we performed a simple suture in 56 patients (80%), a colonic resection with stoma in 8 patients (11.43%) and an anastomotic resection in 6 patients (8.57%). Stomas were performed on lesions with significant peritoneal contamination or in patients with uncontrolled hemodynamic instability.

In Benjelloun's series, overall morbidity was 38.7%, dominated mainly by parietal infection in 14 patients (73.7%), postoperative peritonitis in 3 patients (15.7%) and peristomal abscess in 1 patient (5.3%) [8]. Geukens D reported an overall morbidity of 4.95% [24].

Postoperative morbidity was exclusively related to peritonitis (14.3%). Peritonitis, being a serious peritoneal contamination

after any abdominal surgery, could explain our result.

Postoperative mortality was around 4% (2 cases), following septic shock in the series by Benjelloun in Morocco [8]. Geunkens [24] in France, Iqbal [25] in Pakistan and Tan [26] in New Zealand, reported operative mortality of 0.99%, 4.5% and 5.8% respectively.

The in-hospital mortality rate for our patients was 14.3%. These differences may be related to the delay in treatment, the degree of peritoneal contamination and the presence of associated lesions.

5. Conclusion

Traumatic perforations of the colon are common, and more frequent in young men. They occur more frequently in abdominal wounds than in abdominal contusions. Road accidents are the most frequent circumstance. These lesions constitute a medical-surgical emergency. The transverse colon is the segment most affected. Primary suturing has been the preferred method for colonic trauma in our context. Their prognosis depends on how early the diagnosis is made, the quality of medical and surgical management, the degree of peritoneal contamination, the existence of associated lesions and the therapeutic method used.

Author Contributions

Abdoulaye Yattara: Conceptualization, Data curation, Formal Analysis, Project administration, Resources, Software, Writing - original draft, Writing - review & editing

Ansoumane Conde: Methodology, Software, Supervision, Visualization, Writing - original draft

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Houssein Fofana: Supervision, Validation, Visualization

Aboubacar Toure: Supervision, Validation, Visualization, Writing - review & editing

Conflicts of Interest

The authors declare no conflicts of interest.

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