



Research Article

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Epidemiological, clinical and therapeutic aspects of post-traumatic hemoperitoines operated at Jason Sendwe Hospital in Lubumbashi

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Abstract

Introduction: post-traumatic hemoperitoines is one of the most worrying medical and surgical emergencies for the surgeon, and remains a reality that we often face in our daily practice.

Material and method: This is a cross-sectional descriptive study with retrospective data collection, which was carried out within the surgery department of the provincial general reference hospital Jason Sendwe over a period of two years, from January 2011 to December 2012. We collected the files of 37 patients operated on for post traumatic hemoperitoines. Data analysis and processing was done using Microsoft Word 2013 and PPE software. INFO 7.1.3.

Results: The frequency of hemoperitoines was 6.01%. The average age was 29.48 ± 12.87 years (Extremes: 5 to 50 years). The sex ratio M / F was 2.36. Road traffic accidents (ATR) were the main cause (64.86%) and drivers of motorized vehicles were more concerned (35.13%). No patient benefited from pre-hospital care and the trauma was picked up by a non-medical entourage. In 75.67% of the cases, the abdominal trauma was closed. In 40.54% of cases, the patients were hemodynamically unstable. The average time for surgical management was 8.31 ± 1.23 hours (Extremes: 2 to 12 hours). Peritoneal irritation syndrome was observed in 70.27% of cases, and isolated abdominal pain in 29.72% of cases. Exploratory laparotomy with hemostasis and repair of visceral lesions had been performed at one time in 100% of the cases. The source organs of hemoperitoneum were mainly the spleen (43.24%) and the liver (18.91%). The course was good in 62.16% of cases, and complications represented 37.83% with a mortality rate of 27.02% of cases.

Conclusion: Post-traumatic hemoperitoneum is a real public health problem in our country and particularly in our city of Lubumbashi. The increase in road traffic accidents coupled with the delay in taking charge exacerbate this problem. However, the absence of a medical system for collecting the wounded, the insufficiency of qualified personnel, a long duration of surgical intervention, and the low socio-economic level of the population, are also associated with this high mortality.

Keywords: Hemoperitoneum, Trauma, Treatment, Mortality.

INTRODUCTION

Post-traumatic hemoperitoneum is defined as an effusion of blood in the peritoneal cavity secondary to trauma. It is one of the medical and surgical emergencies and a reality faced by general surgeons, radiologists, nurses and resuscitating anesthesia, hence its multidisciplinary [1]. The most frequent etiologies are accidents on the public highway, falls from heights, assaults and sports accidents. Their prognosis depends on the severity of the abdominal lesions, the associated extra abdominal lesions, but also on the speed and quality of the therapeutic management [2]. In Switzerland, Poletti in 2004, had found a frequency of 8.40% of traumatic hemoperitoines [3]. In Africa, in Cameroon, closed trauma to the abdomen occupies the first place in the etiologies of traumatic hemoperitoines [4].

The care of these injured is constantly evolving, taking into account the most recent contributions of the technique: ultrasound, scanners and diagnostic and interventional angiographies easily available in the best equipped centers; diagnostic and therapeutic laparoscopy for the best trained practitioners. Added to this is a modification of certain concepts, in particular "shortened" surgery where the immediate prognosis takes precedence over the definitive treatment of lesions and the minimally invasive and conservative approach to dealing with many hemorrhagic traumas. This mutation improves patient survival while reducing the complications and sequelae associated with the treatment of lesions [5]. Konate reports that the vital prognosis alongside the worsening of the above parameters increases with a mortality rate in general surgery services estimated at 4% respectively in France; 9.3% in Côte d'Ivoire and 8% in Mali [6, 7]. To date, therapy is better equipped. In addition to the empirical method of laparotomy,

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we are witnessing the development of more cautious and less restrictive therapeutic methods for both patients and surgeons.

Multi-stage surgical treatment of severe trauma to the abdomen is a recent concept. It is used in patients with multiple visceral failure due to hemorrhagic shock, coagulopathy and hypothermia. The initial management during a brief laparotomy aims to control the hemorrhage, prevent digestive contamination and close the abdomen without tension. After a resuscitation period varying from 24 to 96 hours, a planned re-intervention will allow the search for unrecognized lesions and anatomical reconstruction in more favorable conditions. The prognosis for traumatic hemoperitoines depends on a number of parameters: the severity of intraperitoneal lesions, the speed of treatment, the associated lesions, and the field. Our study will give us an idea of the epidemiological and clinical aspects, the diagnostic means and the management, and the evolution of traumatic hemoperitoines at Jason Sendwe Hospital in Lubumbashi.

PATIENTS AND METHOD

This is a descriptive cross-sectional study with retrospective data collection, which was carried out in the surgery department of the general provincial reference hospital Jason Sendwe of Lubumbashi over a period of two years, from January 2011 to December 2012. We collected the files of 37 patients admitted for post traumatic hemoperitoneum. Were not included in this study the cases of non-operated post-traumatic hemoperitoines, those diagnosed outside the study period, deaths brought and cases whose files lacked certain parameters essential for the realization of this study. . The diagnosis of post-traumatic hemoperitoneum was retained in any patient with the

presence of blood in the peritoneal cavity after trans-parietal peritoneal puncture, or by peritoneal puncture-washing; or noted intraoperatively, confirmed in the operating report. The hemodynamic state was considered stable if the systolic blood pressure is less than 140mmhg and a normal pulse between 60 and 80 pulses per minute in a patient who has been resting for 10 to 25 minutes since admission. It was said to be unstable if the TAS is less than or equal to 90mmhg. The pre-shock state was defined for a TAS between 61 and 99mmhg with a pulse rate greater than 100 pulses per minute. The state of shock was defined for a TAS lower than 60mmhg with a pulse higher than 100 pulsations per minute which can be shooting or even imperceptible. The data were collected directly from the patient files and registers available in the surgery department archives and entered into Excel software. The analysis and processing of the data was done using Microsoft Word 2013 and PPE software. INFO 7.1.3.

RESULTS

Epidemiological data

In our series, post-traumatic hemoperitoines represented 6.01% of all abdominal trauma. The sex ratio M / F was 2.36. The most affected age group was that between 21 and 30 years (40.53%) with an average of 29 ± 12.87 (Extreme: 5 years-50 years). Drivers of motorized vehicles (motorcyclists) were the most affected professional category with 35.13% of cases and road traffic accidents were the main cause in 64.86% of cases. No patient benefited from pre-hospital care and the collection of trauma victims was done by a non-medical entourage. (Table 1).

Table 1 : Patient distributions according to epidemiological data

Sex	Effective (n)	Percentage (%)
Female	11	29.73
Male	26	70.27
Age (years)	Effective (n)	Percentage (%)
0 - 5	1	2.70
6 - 10	1	2.70
11 - 15	3	8.11
16 - 20	4	10.81
21 - 25	7	18.92
26 - 30	8	21.62
31 - 35	6	16.22
36 - 40	4	10.81
41 - and more	3	8.11
Profession	Effective (n)	Percentage (%)
Military	3	8.11
Police	3	8.11
Pupils/Students	10	27.03
Motocyclists	13	35.14
Vehicle driver	1	2.70
Housewives	5	13.51
No occupation	2	5.41
Etiologies	Effectifve(n)	Percentage (%)
Brawl	2	5.41
White weapon	2	5.41
Fire arm	8	21.62
Road traffic accidents	24	64.86
Sport	1	2.70
Pre-hospital care	Effective (n)	Percentage (%)
No	37	100
Yes	0	0.00
Wound pick up mode	Effective (n)	Percentage (%)
Medical ambulance	0	0.00
Surroundings of the uninjured	37	100
Total	37	100

Clinical data

The study shows that all patients were admitted in emergency, brought by a non-medical entourage, in a private vehicle (64.86%); and in 72.97% of cases the patients had an altered general state. In our series, 15 patients or 40.54% were hemodynamically unstable, 8 patients (21.62%) in pre-shock, 4 patients (10.81%) in shock and 10 patients (27.02%) were considered stable upon admission. Abdominal trauma was the reason for admission with 94.6% of cases and was open in 18.92% of cases and closed in 75.68% of cases. Peritoneal irritation syndrome was observed in 70.27% and isolated abdominal pain in 29.72% of cases. Associated lesions were more thoracic lesions in 32.35% of cases, followed by lesions of the limbs with 26.47% of cases.

The exploratory puncture with or without peritoneal lavage had been carried out in 32/37 patients and had made it possible to confirm the diagnosis in 93.7% of the cases and The abdominal ultrasound had been made in 78.38% of the cases, the radiography of the abdomen without preparation and CT-scan were not performed in our patients (Table 2).

Table 2: Distribution of patients according to lesions associated with abdominal trauma

Associated lesions	Effective	Percentage (%)
No other objective lesions	3	8,11
Pool	4	10,81
Spine	6	16,22
Members	11	29,73
Head and neck	4	10,81
Thorax	9	24,32
TOTAL	37	100

Therapeutic and evolutionary data

After the initial clinical examination, immediate resuscitation was initiated according to the hemodynamic state to maintain vital functions in all patients. The resuscitation gestures consisted in doing:

- Blood samples for biological examinations
- Mask oxygenation or tracheal intubation
- The infusion of isotonic solutes (5% glucose serum, 0.9% physiological serum, Ringer lactate), macromolecule or crystalloids.
- Iso group, and iso rhesus blood transfusion in all cases.

In addition to resuscitation, all our patients with intra or extra abdominal lesions likely to be septic, benefited from antibiotic prophylaxis.

In our series, the average treatment time was 8.31 ± 1.23 h (Extremes: 2h-12h). All the patients had benefited from medication including analgesics, antibiotic prophylaxis, blood transfusion and hydro-electrolytic resuscitation measures. An exploratory laparotomy was performed and the lesions encountered intraoperatively concerned mainly the spleen (43.24%) and the liver (18.91%) (Table 3); and the act performed was a function of the lesion observed in order to achieve hemostasis. No patient had had a shortened laparotomy. The duration of the intervention varied between 2 and 5 hours with an average of 3.5 ± 0.75 hours. The mean hospital stay was 16.1 days (range: 8-27 days). The course was good in 62.16% of cases and 37.83% of complicated cases were recorded with a mortality of 27.02% of cases.

Table 3: Distribution of patients according to lesions encountered intraoperatively

lesions encountered intraoperatively	Effective (n)	Percentage (%)
intestinal perforations	2	5,41
Gastric perforations	3	8,11
Liver wounds	7	18,92
Diaphragmatic wound	3	8,11
Wound / Splenic rupture	16	43,24
Kidney wound	2	5,41
Mesentery wound	2	5,41
Great omentum wound	2	5,41
TOTAL	37	100

DISCUSSION

Epidemiological data

In our series, post-traumatic hemoperitoines operated represented 6.01% of all abdominal trauma with an average of 18.5 cases per year. For Vignon *et al* [8], the frequency was 13 cases / year and 1.8% of the hospitalized patients.

In a study done in Greece, Xeropotamos *et al.* [9] found a frequency of 9.30%. Poletti *et al.* [3] in Switzerland found a frequency of 8.40%. Our results are close to those found everywhere else, which demonstrates the importance of this nosological entity for the health of our populations.

The sex ratio was 2.36 in favor of males in our study. The predominance of the male sex in post-traumatic hemoperitoines has been reported by several authors [8-10]. This observation could be explained by two important facts, especially here in Africa, namely: The significant participation of men in road traffic and that for professional occupations and the assignment of women mainly housewives at home; Hence the low exposure of the latter to road trauma.

Age of patients

In our series, the average age was estimated at 29.48 ± 12.87 years and the age group most affected was that between 21 and 30 years (40.53%). In African literature, as in general literature, the high rate of traumatic hemoperitoines in young people is a classic. Our results are confirmed by those of several other authors [8, 11, 12], for whom the average age of the patients was respectively 29.7 years, 25 years and 22.4 years. This is explained by the high activity of this young population exposed to the vagaries of road traffic. Authors such as Tuyindi *et al* [13] have also reported that they were mostly young subjects. We believe, like the other authors that this would be due, in addition to the comments already made above, to the hyperactivity of this segment of the inexperienced and sometimes carefree population of the consequences of their behavior.

Circumstance of occurrence

In our study, motorcyclists were the most affected professional category with 35.13% of cases and road traffic accidents were the main cause in 64.86% of cases. In Europe and outside war zones, abdominal trauma occurs in more than 60% of cases during accidents on the public highway [5]. Makanga *et al.* [14] in their study in Butare/Rwanda, incriminate the road traffic accidents in 40.2%.

Our results are close to those found by Vignon *et al.* [8] who found that accidents on the public highway prevailed in 58.1% of cases. The

harmfulness of road traffic accidents has been demonstrated by several authors, 61.2% for [10, 12, 14]. In our context, young men are the main users of motorcycles, the vehicles most involved in road accidents [10, 15]. As in all works published in developing countries, the prevalence of road traffic accidents is constant in the sub-region [13, 14, 17]. The causes are multifactorial: exponential increase in the number of cars and motorcycles in emerging countries, non-compliance with basic road safety standards. In addition, the state of the roads, their night illumination, and the close proximity between various types of motorized vehicles, or pack animals and pedestrians, increase the exposure to accidents [18]. The high frequency of these aforementioned etiological circumstances (road accidents, brawls and villainous acts) associated with the observation of the male predominance found in our study (70.27%) as in those of many authors including Traoré *et al.* [2] who reported 68.5% male, suggest some comments. Indeed, certain characteristics of the male sex in our societies would explain this association: main drivers of gear, more daring behavior when driving gear, main violators of the Highway Code, easier availability to brawl and villainous acts and the drunk driving.

Clinical data

Our study shows that all patients were admitted in emergency, brought in by a non-medical entourage; and in 72.97% of cases the patients had an altered general state. This observation was also made by Vignon *et al.* [8] in their series where transport was unsafe in 70.5%.

For Choua *et al.* [10], the means of evacuation of the wounded towards the hospital was a private vehicle (taxi, private car) in 85% of the cases in their series, and an ambulance, otherwise non-medicalized, had transported only 3% of the patients.

In our series, 15 patients or 40.54% were hemodynamically unstable, 8 patients (21.62%) in pre-shock, 4 patients (10.81%) in shock and 10 patients (27.02%) were considered stable upon admission.

Vignon and col. [8], reported an unstable hemodynamic state in 62.2% of cases. For Choua *et al.* [10], hypovolemic shock was described in 44.9% of cases, and 45.4% in the series by Mehinto *et al.* [1] The lack of pre-hospital care for the injured is a factor that explains this result. Abdominal trauma was the reason for admission with 94.6% of cases and was open in 18.92% of cases and closed in 75.68% of cases. Peritoneal irritation syndrome was observed in 70.27% and isolated abdominal pain in 29.72% of cases. This peritoneal irritation syndrome has been reported by several authors. [4, 8, 16] with isolated abdominal pain in 25% of the cases. Functional complaints when traumatic hemoperitoneum occurs are dominated by pain. When this pain is localized, with precise irradiations, and accompanying signs; confronted with a precise mechanism of occurrence, it directs towards the diagnosis [19].

In our study, this pain was generally located next to the affected intraperitoneal organ (spleen, mesentery, etc.). This pain was most often associated with thirst, nausea and vomiting depending on the clinical condition of the patient. Associated lesions were present in 92% of cases, represented more by thoracic lesions in 32.35% of cases, followed by lesions of the limbs with 26.47% of cases (Table 2). For Vignon and col. [8], associated extra-abdominal lesions were observed in 57 patients (44.2%). These were: limb injuries (25 cases; 19.4%), chest injuries (24 cases; 18.6%), head injuries (15 cases; 11.6%), facial injuries (12 cases; 9.3%), pelvic trauma (5 cases; 3.9%) and neck trauma (3 cases; 2.3%).

In our series, the exploratory puncture with or without peritoneal lavage was performed in 32/37 (86.48%) patients and confirmed the diagnosis in 93.75% of the cases, and the abdominal ultrasound was performed in 35.13% of cases, radiography of the abdomen without preparation and CT scan were not performed in our patients. This simple and inexpensive gesture retains great efficiency, especially in

our environments where access to the paraclinical imaging assessments remains a serious problem given the self-care of the population. In the Vignon *et al.* [8], the transparietal peritoneal puncture confirmed the diagnosis in 58.3% of the cases.

In our study, the non-specificity of the clinical signs often made it essential to carry out systematic biological examinations, rhesus grouping, hemoglobin and hematocrit levels. Ultrasound is very specific for detecting the presence of intraperitoneal effusion, which has enabled it to replace peritoneal lavage in most hospitals. However, it is not quickly and systematically available urgently in our services; its realization necessitating a displacement of the patient towards another pavilion in the hospital and often conditioned by the payment of the expenses.

In our series, the low rate of completion of ultrasound, failure to perform an x-ray of the abdomen without preparation, and CT scan is justified by the fact that before a vital emergency, and the positivity of the transparietal peritoneal puncture; these examinations, which sometimes lengthen the time taken to take charge, seemed inappropriate.

Therapeutic and evolutionary data

In our series, the average treatment time was 8.31 ± 1.23 h (Extremes: 2h-12h). All the patients had benefited from medication including analgesics, antibiotic prophylaxis, blood transfusion and hydro-electrolytic resuscitation measures. An exploratory laparotomy was performed and the lesions encountered intraoperatively concerned mainly the spleen (43.24%) and the liver (18.91%) (Table 3). As in our study, several series have found that spleen involvement is predominant [8, 14, 20-22]. Perforation of the small intestine is the most common lesion in the series by Choua *et al.* [10], followed by rupture of the spleen. This is to be related to the type of accident, very often involving motorcycles, the handlebars of which can directly bruise the abdomen. The mechanism of injury consists of crushing, bursting of the organs, or the effect of deceleration. These different mechanisms can act alone or in various ways [14].

In our study, an exploratory laparotomy was performed and had objectified various lesions, mainly the spleen (43.24%) and the liver (18.91%) (Table 3); and the act performed was a function of the lesion observed in order to achieve hemostasis. The spleen being the most affected organ in our series, we performed 16 splenectomies. In the literature 60 to 80% of adults with trauma to the spleen are not splenectomized [16, 22-24]. The best splenic rescue rate is obtained by non-operative treatment. We believe that this approach must be done in the midst of surgical resuscitation. The conditions required are hemodynamic stability, no suspicion of perforation of a hollow organ, and the availability of morphological examinations [24, 25].

It should however be stressed that even in our countries with limited resources, conservative treatment can be effectively achieved. However, the possibility of a twice-daily clinical examination, a daily blood count, a repeated abdominal ultrasound at 48 hours and an on-demand scanner which reduces the spleen rescue rate to 80% is still lacking in our environments where the patient bears the cost of health care alone [23, 25, 26]. In our series, Lesions of the liver, diaphragm, stomach, mesentery, great omentum benefited from a repair or / and hemostatic suture while two nephrectomies were performed. The duration of the intervention varied between 2 and 5 hours with an average of 3.5 ± 0.75 hours. This is justified in our series by the attitude of the surgical team who wants at all costs to repair all the extra and intra-abdominal lesions which lengthens the operating time. In our study, no patient had undergone a shortened laparotomy. Hemoperitoneum is a medical and surgical emergency. Maintaining or restoring blood volume remains a critical problem during and after hemostasis or restorative surgery. Thus, all the patients in our series from hospitalization were followed up, according to their condition.

In our series, the average hospital stay was 16.1 days (Extreme: 8-27 days). The length of hospital stay was on average 9.2 days for Choua *et al.* [10], and they relate this to parietal complications by inoculation of peritoneal fluid.

Under rigorous surveillance, traumatic hemoperitoneum progress in most cases favorably. They are most often serious for polytrauma victims with serious associated lesions. The progress was good in our study with 62.16% of cases and 37.83% of complicated cases were recorded, mainly infection of the operating wound (8.10%) and postoperative bleeding (2.70%), with a mortality of 27.02% of cases. Our mortality rate is greatly increased, compared to the results of other series of developing countries, and certain western series [1, 9, 11, 16].

In Africa, a study of Ayite *et al* [28] reported 6.8% of preoperative deaths in irreversible shock. In France, preoperative deaths have become rare thanks to the development of massive transfusion and shortened laparotomy. In expert centers, more than 90% of traumatized abdomen patients are hemodynamically stable on admission thanks to the progress of pre-hospital resuscitation. Approximately, only 5% of the wounded are admitted in serious condition, with the need for resuscitation. Faced with this type of wounded, most often unstable, bleeding, the objectives are to prevent the occurrence of Moore's lethal triad (acidosis, hypothermia and coagulopathy) and to limit the risks of infection [29]. The protocol for controlling these complications is currently well codified [30]. In our series, the delay in treatment, the long intervention time and the severity of the lesions seem to contribute to this mortality rate; although the compromise of these serious patients takes place in the pre-hospital phase or intra-operatively by the occurrence of a vicious circle associating metabolic acidosis, hypothermia and coagulopathy.

CONCLUSION

Post-traumatic hemoperitoneum is a real public health problem in our country and especially in our city of Lubumbashi. The increase in traffic accidents associated with gunshot injuries are considered to be the most important causes. However, the absence of a medical system for collecting the wounded, a pre-hospital care, an adequate technical platform and the low socio-economic level of the population, increase morbidity and mortality. The urgent nature of this pathology makes it very important not to ignore it; because any diagnostic error can be fatal for the patient. We recommend the codification of an adapted management algorithm which must take into account our realities by favoring the new approach of shortened laparotomy (damage control). The improvement of our results must imperatively go through: the prevention of road accidents, the improvement of the transport and evacuation system for the injured, the establishment of a health insurance policy, and the reduction of the time hospital care.

Conflicts of interest

The authors do not declare any conflict of interest.

What is known about this subject?

- In developing countries, the treatment of post-traumatic hemoperitoneum poses a serious problem from the collection of the injured, to the hospital treatment.

- Mortality linked to post traumatic hemoperitoneum remains high.

- The prognosis for post-traumatic hemoperitoneum is currently improved by the shortened laparotomy.

What does our study bring new?

- Reliable data on epidemiological, clinical and therapeutic aspects at Jason Sendwe Hospital which can be used for future studies.

- The puncture - abdominal washing associated with the patient's hemodynamic state in our environment may be sufficient to indicate a surgical intervention.

Author contributions

All authors contributed to the development of the article.

All had read and approved the final version before submission.

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