

# Epidemiological evaluation of abdominal trauma victims submitted to surgical treatment

## *Avaliação epidemiológica das vítimas de trauma abdominal submetidas ao tratamento cirúrgico*

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### A B S T R A C T

**Objective:** To evaluate the profile and outcome of victims of abdominal injuries who underwent laparotomy in the Emergency Hospital of the state of Sergipe (HUSE). **Methods:** This was an observational, descriptive longitudinal study with prospective approach, through interviews of 100 patients with abdominal trauma who underwent surgery and evaluation of their medical records. The study period was from September to November of 2011 in the area of trauma care of the HUSE. **Results:** the most affected individuals were male, mulattos, aged 25-49 years, with low education, single, Catholic, with an income of 1-2 minimum wages. There was a predominance of trauma in the urban areas, at night and on weekends. The most frequent cause of trauma was the attempted of murder associated with the use of alcohol and illicit drugs, and the most frequent mechanism, stabbing. The pain was the most frequent symptom. The most affected region was the upper abdomen and liver was the most affected organ. The hospital stay averaged 4-10 days. Most patients were discharged without sequelae. There were 2 deaths. **Conclusion:** In the HUSE, the association of abdominal trauma with men under the influence of alcohol and illegal drugs was striking, reflecting the context of interpersonal violence in current society. Despite the magnitude of the traumas, the outcome was satisfactory, although deaths, occurred, demonstrating the importance of keeping a trained surgical team in emergency hospitals.

**Key words:** Epidemiology. Abdominal injuries. Laparotomy. Surgery. Prevalence.

### INTRODUCTION

Traumas represent a serious public health problem and are among the first reasons of mortality and disability in developed countries, with significant human, economic and social costs<sup>1</sup>. The main causes of death among individuals aged 35 years are external, arising from the continued increase in violence. The abdomen is often affected by both penetrating and blunt injuries<sup>2</sup>.

Abdominal trauma is one of the most prevalent in the context of multiple trauma. Due to its potential for harm, it is related to multiple frames that increase morbidity and mortality, and it has therefore been increasingly studied in the evaluation of traumatic diseases<sup>2</sup>, being a major challenge for the various levels of health treatment<sup>3</sup>.

Due to the importance of the issue, epidemiological reports aim to illustrate the mechanisms of injury, the etiology and frequency of deaths resulting

from it<sup>4</sup>. The temporal distribution of deaths is influenced by the mechanism of injury, patient age, body surface area affected and severity of lesions<sup>5</sup>. Socio-economic issues also affect trauma, there being a correlation between the percentage of traumas and those conditions<sup>6</sup>.

There is, however, a paucity of epidemiological data on trauma in the national (Brazilian) literature. The objective of this study is to evaluate the profile and outcome of trauma victims subjected to abdominal surgery.

### METHODS

We conducted an observational study of longitudinal profile, with forward-looking approach, through interviews of 100 consecutive patients with abdominal trauma submitted to surgery, and analysis of their records. Data were collected by students in the area of health, trauma

Study conducted at the Emergency Hospital of the State of Sergipe – Aracaju – Sergipe State, Brazil.

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care sector of the Emergency Hospital of Sergipe (HUSE) in the period from September to November 2011. Patients, their caregivers or guardians were interviewed after signing the term of informed consent.

We used a semi-structured questionnaire containing 38 questions varying between closed and open. We addressed geodemographic and social variables: gender, age, skin color, educational level, marital status, family income, occupation, religion, date, time, county of event, rural or urban), as well as specific to abdominal trauma (motivation of trauma, mechanism of injury, presence of warning signs, affected region, affected organs/structures) and in-hospital developments (length of stay, destination after acute rehabilitation, presence of sequelae, death and organ donation).

The study was approved by the ethics committee of HUSE and the Federal University of Sergipe under number 0969.0.000.107-11. We used simple analysis for statistical evaluation.

## RESULTS

The male patients were affected in 92 of the 100 respondents with abdominal trauma with an indication for laparotomy. The mean age was 29.6 years (6-80). The most common age groups were 25-49 years, followed by 18-24 years, with 45 and 33 individuals, respectively. Sixty-eight patients were brown 68, 23 white and nine black. As for educational level, 31 patients had incomplete primary school, 27 incomplete high school, 14 complete primary and the same number with complete high school. There were no patients with complete or incomplete college education. Of the respondents, 49 were single, 32 married and 10 divorced. The average household income was one to two minimum wages for 55 of the individuals and half the minimum wage for 38. Of the patients, 27 were students, 23 self-employed, 16 registered employees, 16 unregistered and 17 unemployed. The Catholic religious orientation was reported by 66 of the victims, the African-Brazilian by six, the evangelical by five and spiritualism by two, while nine said they did not follow any religion.

Ninety-two of The patients were from the state of Sergipe and eight from Bahia. Thirty-nine patients were from the city of Aracajú, Nossa Senhora do Perpétuo Socorro, São Cristóvão and Barra dos Coqueiros, all regarded as the Great Aracaju. Ninety-two cases were from the urban environment.

In the period from 6 P.M. to midnight 42 patients were treated, 31 from noon. to 6 P.M., 20 from 06 A.M. to noon and seven from midnight to 6 A.M. On Sunday 29 occurrences were recorded, on Saturday, 24, on Mondays, 19, on Fridays, 10, on Thursdays, 8, on Wednesdays, 6 and 4 on Tuesdays.

Attempted murder occurred in 78 cases, unintentional trauma in 19 and attempted suicide in two.

As for the mechanism of trauma, 41 were stab wounds and 37 gunshot wounds (Table 1). The association of alcohol and illicit drugs occurred in 35 cases, only alcohol in 31, no substance abuse 11 and only illicit drugs in five. Eleven of the patients interviewed did not want to answer this question.

Of warning signs, pain was reported in 70 cases, hypotension in 16, evisceration in 13, fever in 11, hemoperitoneum in nine, changing level of consciousness in nine, peritonitis in seven, tachycardia in five, pneumoperitoneum in three, sweating in three and oliguria in one. In three cases there was no record of a warning sign.

The areas most affected by trauma were thoracoabdominal, mesogastrium and epigastrium (Figure 1). The liver mass was the most affected solid organ and the hollow viscus was the small intestine (Figure 2). There were no reports of intracavitary gynecological or anal injuries.

Hospital stay ranged from zero to seven days in 42 cases, eight to 15 days in 49, 16 to 30 days in 7 and more than 30 days in two cases. Regarding the outcome of trauma in the hospital environment, we found that 75 individuals were discharged without sequelae, 12 with transient sequelae, colostomy being the most common, and accounting for six of these cases. Of the 11 permanent sequelae, there were five splenectomies, three nephrectomies and two cholecystectomies. There were two cases of hospital death, without organ donation.

## DISCUSSION

The higher incidence of trauma in the group of young adult males due to the attempted murder coincides with the literature and is associated with an increased risk behavior in this age group due to exposure to alcohol and illicit drugs<sup>7,8</sup>. The predominance of brown patients was due probably to the great mixing of races in the state of

**Table 1 -** Mechanisms of trauma of the patients studied.

Variable	Operated patients (n = 100)
Stab wounds	41
Gunshot wounds	37
Collision car x car	6
General falls	6
Collision pedestrian x car	2
Collision car x motorcycle	2
Other	2
Collision car x bicycle	1
Assault	1
Fall from height	1
Sports	1

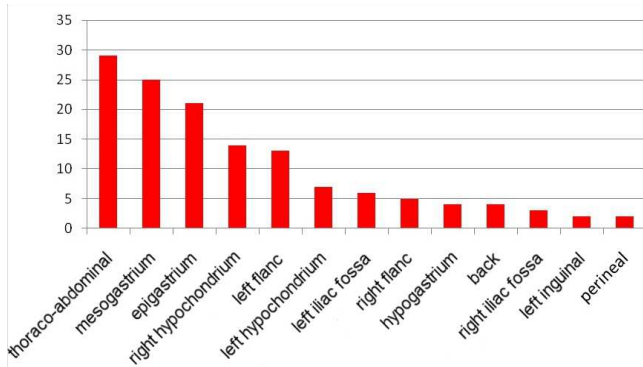


Figure 1 - Regions of the body most affected by trauma.

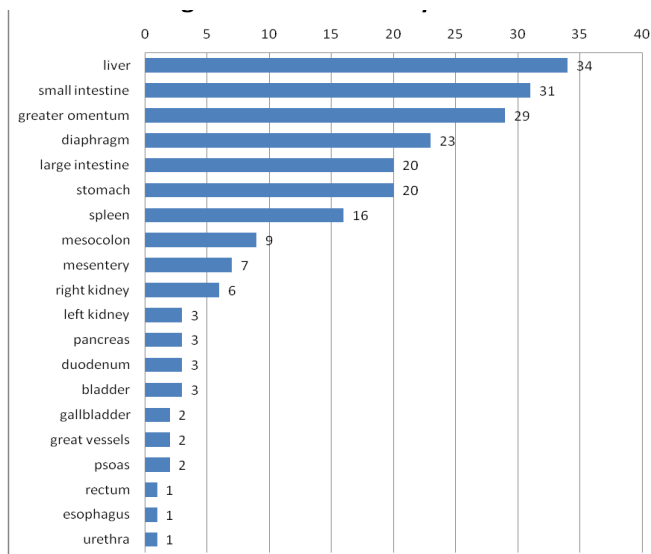


Figure 2 - Organs and structures most affected by trauma.

Sergipe. There are articles that suggest the existence of a correlation between skin color and trauma, with a predominance of white or black depending on geographic location<sup>9,10</sup>.

In our study there were no patients with educational levels of complete or incomplete the third degree. The combined frequency of single and divorced patients was higher than that of married patients. The lack of a stable relationship and low educational level are often associated with alcohol<sup>11</sup> and the use of other drugs, thus with a riskier behavior. Trauma was more common in people without employment, with average household income of up to two minimum wages. Most victims of traffic accidents are related to that salary level<sup>8</sup>. The growth of socioeconomic inequality, low wages and family incomes lead to the loss of purchasing power and are determinants of violence, intrinsically associated with trauma<sup>12</sup>.

The predominant religious orientation of the patients was Catholic. When researching trauma in motorcycle riders, which is also associated with abdominal trauma, there was a predominance of that religion<sup>13</sup>. This

dominance is due to a greater number of Catholics in the Brazilian population<sup>14</sup>.

The more frequent occurrence of trauma in the Great Aracaju, when evaluated in isolation with other cities, agrees with the literature, where it is perceived that this injury is higher in capital cities and their metropolitan regions, indicating the concentration of violence in Brazilian capitals<sup>15</sup>. It was observed that the traumatic injuries occurred more frequently at night-time and evening and on Sundays and Saturdays, which are associated with alcohol consumption, with higher rates of traffic accidents, drug use, which, in turn, is also related to increased exposure to violence<sup>2,7,11,16</sup>.

It was found that the attempted murder and trauma due to stabbing and firearms were responsible for most abdominal injuries. Studies show that the organs likely affected depend on the mechanism and anatomical location of the injury<sup>4-6</sup>. Among the injuries, those caused by firearms are the most common<sup>17</sup>. In the present study, the highest incidence of stab wounds can be explained by the ease of access to knives and the like<sup>18</sup>. The association with a low purchasing power of patients justifies the acquisition of such weapon, used often, and whose prices are lower than firearm's<sup>14</sup>.

In blunt trauma, traffic accidents predominated, overcoming other mechanisms such as falls. There are variations in the literature regarding the prevalence of falls and traffic accidents<sup>19</sup>. The predominance of traffic accidents may be related to adoption of less cautious attitude in traffic. The high rates of homicides and accidents can have, in many cases, a positive association between external events and the consumption of psychoactive substances, as also observed in this study<sup>4</sup>.

We noted, the upper abdomen was the most affected area, and the pain the most frequently reported symptom, in agreement with papers that focus on abdominal trauma in different contexts<sup>16,20</sup>. Among other warning signs, there was hypotension, evisceration, fever, hemoperitoneum, altered level of consciousness and peritonitis. Such warning signs depend on the viscera affected, which may be ratified by other works<sup>6,21-25</sup>.

The liver and small intestine were the organs most affected by abdominal trauma. In 2006, Pinedo-Onofre *et al.*<sup>2</sup> found a predominance of wounds to the left upper quadrant, lower right quadrant and epigastrum, and when evaluating blunt trauma, the spleen was the most affected organ, followed by the liver and pancreas. In penetrating trauma, the small intestine was the most affected, followed by the colon and liver<sup>20</sup>. Other studies have identified the small intestine and spleen injuries as the most frequent, both in penetrating and blunt traumas<sup>17,18</sup>. The variability among the findings of this research and the literature can be explained, among other factors, by the location and mechanisms of trauma.

The increase in accidents and violence (external causes) in Brazil has had repercussions on the organization

of the health system, which, by their responsibility for trauma care, has had its high expenditure on medical care. In Brazil, the proportion of hospitalizations due to external causes increased progressively from 5.2% in 1998 to 6.9% in 2005, as well as the proportion of spending, which rose from 6.4% to 8.5%<sup>25</sup>. The length of stay of each patient is directly proportional to the hospital costs. These, which become slightly higher for those with abdominal trauma due to assaults and traffic accidents, as the lesions are more severe and the hospital stay, longer. In the present study, hospital stay has lasted mostly between four and ten days, agreeing with the average found in the literature.

Regarding the outcome of trauma, most patients were discharged without sequelae but the scar caused by surgical laparotomy. Splenectomy was performed in 31.5% of cases with splenic involvement, and nephrectomy in 50% of cases with renal injury. In the literature, after an injury to

the spleen, splenectomy rate was 82.9%<sup>7</sup> and nephrectomy in 50% of the cases in which the kidney had been affected<sup>16</sup>. In-hospital death occurred in two cases. Froehner, in 2004, found a similar rate of deaths<sup>8</sup>. In some situations, the approach used by HUSE trauma surgeons to preserve the injured spleen did not influence the mortality rate.

We conclude that, in HUSE, there was a striking association between abdominal trauma and male patients, from the urban area, of productive age, without formal, regulated employment. The effect of alcohol and illicit drugs in attempted murder reflects the context of interpersonal violence in society today. Despite the magnitude of the trauma, the outcome was satisfactory, though deaths occurred, demonstrating the importance that emergency hospitals maintain a trained surgical team on their staff, in order to reduce morbidity and mortality due to these lesions.

## R E S U M O

**Objetivo:** avaliar o perfil epidemiológico e o desfecho das vítimas de trauma abdominal submetidas à laparotomia em hospital de urgência. **Métodos:** estudo observacional, descritivo, longitudinal, com abordagem prospectiva, mediante entrevista de 100 pacientes com trauma abdominal submetidos ao tratamento cirúrgico e à avaliação dos seus prontuários. Período da coleta dos dados: setembro a novembro de 2011. **Resultados:** Os pacientes mais acometidos pelo trauma abdominal foram do sexo masculino, de cor parda, na faixa etária de 25-49 anos, com baixa escolaridade, solteiros, católicos, com rendimento de um a dois salários mínimos. Houve uma predominância do trauma no ambiente urbano, no período noturno e no final de semana. O motivo mais frequente do trauma foi a tentativa de homicídio, associado ao uso de álcool e drogas ilícitas e o mecanismo a arma branca. A dor mostrou-se o sinal de alerta mais presente. A região mais afetada foi abdome superior e o fígado o órgão mais acometido. O tempo de internação hospitalar durou em torno de quatro a dez dias. A maioria teve alta sem seqüela. Ocorreram dois óbitos. **Conclusão:** Foi marcante a associação do trauma abdominal com homens sob efeito de álcool e/ou drogas ilícitas, refletindo o contexto da violência interpessoal na sociedade atual. A despeito da magnitude do trauma, o desfecho foi satisfatório, apesar da ocorrência de óbitos, o que denota a importância dos hospitais de urgência de manter no seu corpo clínico uma equipe cirúrgica treinada.

**Descritores:** Epidemiologia. Traumatismos abdominais. Laparotomia. Cirurgia. Prevalência.

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