

# The epidemiology and clinical evaluation of abdominal trauma.

## An analysis of a multidisciplinary Trauma Registry



Ann. Ital. Chir., 2010; 81: 95-102



Gianluca Costa, Simone Maria Tierno, Federico Tomassini, Luigi Venturini, Barbara Frezza, Giulio Cancrini, Francesco Stella\*

Università Roma Sapienza – II Facoltà di Medicina e Chirurgia

Azienda Ospedaliera "Sant'Andrea", Rome, Italy

Dipartimento di Chirurgia

\* Direzione Sanitaria

### The epidemiology and clinical evaluation of abdominal trauma. Analysis of a multidisciplinary Trauma Registry

Abdominal trauma is present in 7-10% of all trauma victims, and in cases of severe trauma is often found together with orthopedic, thoracic or central nervous system (CNS) injuries. The aim of the present study was to perform a comparative analysis of abdominal trauma and trauma involving other body regions, evaluating the prognostic significance of abdominal injuries in patients with severe trauma, based on data from a multidisciplinary trauma registry. Data from the period from March 1 2006 to December 31 2007 was collected from the trauma registry of the University Hospital Sant'Andrea in Rome, Italy. There were 25.875 patients (31.4%) with the diagnosis of trauma out of a total of 82.293 patients admitted to the emergency department. Eight hundred forty-four patients were selected according to specific inclusion criteria and patients with abdominal injuries were further selected. The following data were investigated: patient age, the trauma mechanism, duration of recovery, Abbreviated Injury Scale (AIS), Injury Severity Score (ISS), type and the incidence of abdominal and extra-abdominal injuries. Morbidity and mortality, especially in patients with spleen and liver injuries, were analyzed. There were 79 patients (9.3%) with abdominal trauma. Their mean ISS was  $25.7 \pm 14.3$ . Sixty-one (77.2%) of these patients had sustained severe trauma ( $ISS > 15$ ). Forty-one patients (51.8%) underwent surgery. The overall mortality rate was 24.1%, 19 patients all with  $ISS > 15$ , so that the mortality rate for patients with severe trauma was 31.2%. Splenic trauma was the most frequent, and was found in 36 patients (45.6%) whose mean ISS was  $31.1 \pm 14.4$ . Twenty-two patients (61.6%) were treated surgically; a total of 21 splenectomies and one laparoscopic procedure to control bleeding were performed. Overall mortality among patients with splenic trauma was 30.5% (11 patients), with an average spleen AIS of  $3.3 \pm 0.8$  (died vs. survived  $p = n.s.$ ). Liver injuries were found in 33 patients (41.7%). The mean ISS was  $28.4 \pm 11.6$ . Sixty-five percent of the patients were given nonsurgical treatment. Overall mortality among liver trauma patients was 24.2% (8 patients) with an average liver AIS of  $3.2 \pm 0.3$  (died vs. survived  $p < 0.05$ ). In multivariate analysis, among the general population of trauma patients, the ISS ( $p < 0.001$ ), patient age ( $p < 0.003$ ), and an orthopedic ( $p < 0.002$ ) or CNS injury ( $p < 0.006$ ) proved to be significant independent predictors of the presence of an abdominal injury. Multivariate analysis showed that in patients with abdominal trauma, only the ISS ( $p < 0.001$ ) was a significant independent predictor of mortality.

KEY WORDS: Abdominal trauma; ISS; Liver trauma splenic trauma; Trauma registry.

Presentato al XXXVII Congresso Nazionale SICUT  
Palermo 5 – 7 Novembre 2009

### Introduction

Trauma is the fourth cause of death in the general population, but the main cause in individuals under 45 years of age. Abdominal trauma, a frequent cause of death, found in 7%-10% of trauma patients, is divided into blunt trauma and penetrating trauma depending on the mechanism and/or the agent<sup>1-2</sup>. The former refers to

Pervenuto in Redazione Febbraio 2010. Accettato per la pubblicazione Marzo 2010.

Per corrispondenza: Dr. Gianluca Costa c/o Centro Studi sul Trauma,  
Via P. Galluppi 8, 00136 Roma (E.mail: gcosta@ospedalesantandrea.it)

injuries due to direct impact or countercoup, without wounds entering the peritoneal cavity. The most common cause of blunt abdominal trauma is road accidents followed by falls or precipitation, and assaults. Penetrating trauma, is caused by gunshot wounds, stab wounds, and wounds caused by other objects that enter the peritoneal cavity. Since abdominal trauma is usually caused by road accidents, it is almost always found in patients with severe trauma, and associated with orthopedic, thoracic or CNS injuries. The organs most frequently involved are the spleen and the liver, followed by the kidney, the hollow viscus, and the pancreas.<sup>3-5</sup> In the literature, studies that analyze abdominal trauma, focus on the epidemiology, etiology, diagnosis, and type of injury, almost always from a purely surgical point of view.<sup>6-10</sup> The aim of the present study was to perform an analysis of abdominal trauma compared to other body regions, and, using information taken from a multidisciplinary trauma registry, evaluate the prognostic significance of abdominal injuries in patients with severe trauma.

## Materials and methods

The present study was performed by analyzing data from the trauma registry of the University Hospital Sant'Andrea in Rome which was set up in March 2006, when the Emergency Department was opened to the ambulances of the Emergency Health Service of the Lazio region (ARES 118). The registry, created by using a specific database with the 8.5 version of the FileMaker Pro program (FileMaker Southern Europe, Paris, France), for MacOsX, provided for the enrolment of patients admitted directly or transferred to another hospital, over 16 years of age, victims of either blunt or penetrating trauma, or burn injury using the following inclusion criteria:

- All penetrating trauma of the neck, thorax, and abdomen;
- Blunt trauma and burn injury with the following criteria as regards triage.

### RED OR YELLOW CODE

- Presence of at least one significant injury (Abbreviated Injury Scale - AIS  $\geq$  2), regardless of the specialty in the 6 body regions used for calculating the ISS, (head or neck, face, chest, abdominal or pelvic contents, extremities or pelvic girdle, and external);
- Any death in the emergency room, if information about any epichises that occurred is available.

### GREEN OR OTHER CODE

- ISS > 15;
- Presence of at least one injury rated AIS  $\geq$  2, in the chest and/or abdomen

Trauma severity in each patient was evaluated in accordance with the following indices: The Revised Trauma

Score (RTS); the Abbreviated Injury Scale (AIS), using the 2005 version of the AIS-CD manual, updated in 2008 (Association for the Advancement of Automotive Medicine (AAAM), Barrington, IL, USA). The overall classification of trauma severity in each patients was evaluated by the Injury Severity Score (ISS) which was calculated taking the highest AIS severity code in each of the 3 most severely injured body regions and adding the squared numbers of each AIS.

Trauma registry data recorded between March 1 2006 and December 31 2007 was considered for the present study. Out of a total of 82293 patients admitted to the emergency department, there were 25875 patients (31.4%) with chief complaints of trauma or burns, 219 (0.8%) with red code triage, and 2237 (8.6%) with yellow code. A total of 844 cases, including 163 patients with an ISS > 15, that satisfied the inclusion criteria previously established, were entered in the database for the study, and all patients with abdominal trauma were further selected. The following data was analyzed: patient age, the cause and dynamics of the trauma, length of hospital stay (LOS), ISS, type of injury, incidence of concomitant extra-abdominal lesions. The clinical impact of the abdominal trauma, especially with regard to spleen and liver injuries, on morbidity and mortality was analyzed. Patients transferred to other institutions were excluded in the evaluation of the length of hospital stay, if it was impossible to obtain adequate information about their clinical course as well as any deaths that occurred during the first 48 hours after admission. Morbidity and mortality were analyzed independently of how much time had elapsed since the trauma occurred, provided they could be logically linked to the event. If any data were missing, either a follow-up was conducted by phone, or information was requested from sources in the region such as hospitals patients were transferred to, general practitioners, anagraphic offices, and the police. Statistical analysis was performed using the 17.0 version of the PASW Statistics program (SPSS, Bologna, Italy), for MacOsX, and provided for the use of the chi-square test, Student's t-test, Pearson's test, and ANOVA when applicable. P values < 0.05 were considered significant. Moreover, a multivariate analysis was performed, using stepwise logistic regression model, with abdominal trauma in the general population of trauma patients, and mortality among patients with abdominal trauma as dependent variables. P values < 0.05 were considered significant.

## Results

Abdominal trauma was found in 79 patients (9.3%), with an average age of 38.7±16.2 years. There were more men than women (66 patients, 83.6% and 13 patients, 16.4% respectively). The majority of the patients (60 patients, 75.9%) were victims of road accidents, 5

TABLE I - Types and frequency of injuries.

Injuries	Trauma registry population (n. 844)		Patients with an ISS >15 (n.163)	
	Pts. (%)	ISS (mean ± SD) p<0.001	Pts. (%)	ISS (mean ± SD) p<0.05
Abdominal	79 (9.3%)	25.7±14.3	61 (37.4%)	30.9±12.1
External (soft-tissue)	51 (6.0%)	14.2±9.3	23 (14.1%)	22.2±8.3
Maxillo-facial	105 (12.4%)	14.9±11.0	45 (27.6%)	25.0±9.7
Thoracic	187 (22.1%)	19.5±12.6	103 (63.2%)	28.3±10.6
Vascular (radiologist or surgeon)	16 (2.0%)	22.5±11.5	11 (7.4%)	28.6±8.2
Orthopedic	670 (79.3%)	10.4±8.9	106 (65.1%)	27.6±10.6
Central Nervous System (CNS)	138 (16.3%)	19.8±13.6	80 (49.1%)	28.4±11.7

TABLE II - Univariate analysis of ISS as regards mortality, morbidity, and treatment

	Ptients n°(%)	ISS (mean ± SD)	p value
<b>Mortality</b>			
Yes	19 (24.1%)	40.8±10.2	< 0.001
No	60 (75.9%)	20.2±12.0	
<b>Morbidity</b>			
Yes	23 (29.1%)	31.3±11.5	<0.05
No	56 (70.9%)	23.5±14.8	
<b>Treatment</b>			
Surgery	41 (51.9%)	29.3±14.0	<0.05
Non operative management	38 (48.1%)	21.8±13.8	

patients (6.3%) were victims of accidents in the workplace, 4 patients had sustained trauma due to domestic accidents, and 4 patients (5.1%) due to assault. For the remaining 6 patients the cause of trauma had not been recorded. Twenty-three (38.3%) of the road accidents involved cars, 19 (31.7%) involved motorcycles, 10 (16.7%) involved pedestrians. There was also one case (1.7%) of trauma due to a fall. For the remaining 7 patients the cause of road trauma had not been given. Blunt trauma was found in 77 patients (97%). The average length of hospital stay was 18.7±27.3 days. The average ISS was 25.7±14.3. The frequency of other injuries and the average ISS associated with them are shown in Table I. The average ISS in abdominal trauma was significantly higher (p<0.001) than in trauma of the other body regions studied. Out of 79 patients with an abdominal injury, 61 (77.2%) suffered from severe trauma. (ISS>15). The average ISS of these patients was also significantly high (p>0.05). (Table I). Overall mortality was 24.1%, and all 19 patients who died had an ISS >15, so that the mortality rate for patients with severe

trauma was 31.2%. Overall morbidity was 29.1%, i.e. 23 patients, 22 (95.6%) of whom had an ISS >15. The average ISS of patients with complications was significantly higher (p<0.05) (Table II). Forty-one patients (51.9%) underwent surgery. The difference between the average ISS of these patients which was 29.3±14.0, and that of patients who were not treated surgically, had statistical significance (p<0.05) (Table II). In the subgroup with ISS >15, 34 (55.7%) patients underwent surgery, and the average ISS was 33.7±11.1. The incidence of the various injuries found and the surgical procedures performed are shown in Tables III and IV. The most common injuries were splenic injuries which were found in 36 patients (45.6%), and consisted of 22 (61.1%) cases of major splenic rupture, 10 contusions/hematomas (27.7%), and 4 (11.1%) minor lacerations. The average ISS in the group of patients with splenic trauma was 31.1±14.4. Twenty-two of these patients were treated surgically; 21 splenectomies and one laparoscopic procedure to control bleeding were performed. Among the 14 patients not surgically treated, there was one failure (7.1%), which required a splenectomy 8 days after trauma occurred. The average spleen AIS in the patients who underwent surgery was significantly higher than that of the others (p<0.001), 3.5±0.1 e 2.5±0.9 respectively. The mortality rate in all patients with splenic trauma was 30.5% (11 patients). The difference between the average spleen AIS of patients who died and patients who survived, was not statistically significant. The relationship between the AIS and ISS values of patients with a splenic injury was directly proportional but not statistically significant (AIS/ISS r= 0.05, p= n.s). Liver trauma was found in 33 patients (41.7%) and consisted of 16 lacerations (48.5%), and 17 contusion (51.5%). The average ISS of the group of patients with liver trauma was 28.4±11.6. Twelve patients (36.3%) underwent surgery. The average liver AIS was significantly higher (p<0.001) in the patients who had surgery than in those who did not; 3.2±1.0 and 2.1±0.3 respectively. The mortality rate of patients with liver trauma was 24.2% (8

TABLE III - Types and frequency of abdominal injuries

	Abdominal injuries (79 cases) N° (%)	Patients with an ISS>15 (61 cases) N° (%)
Spleen	36 (45.5%)	32 (52.4%)
Liver	33 (41.7%)	29 (47.5%)
Kidney	13 (16.4%)	11 (18.0%)
Mesentery (contusion and/or laceration)	12 (15.1%)	9 (14.7%)
Retroperitoneal haematoma	10 (12.6%)	10 (16.3%)
Small bowel	8 (10.1%)	5 (8.1%)
Large bowel	5 (6.3%)	4 (6.5%)
Diaphragm	5 (6.3%)	5 (8.1%)
Abdominal wall haematoma	4 (5.0%)	2 (3.2%)
Pancreas	4 (5.0%)	3 (4.9%)
Genitourinary tract (external)	4 (5.0%)	3 (4.9%)
Adrenal gland	3 (3.7%)	3 (4.9%)
Bladder	2 (2.5%)	2 (3.2%)
Multiple stab wound without internal injuries	1 (1.2%)	–
Stomach	1 (1.2%)	1 (1.6%)

TABLE IV - Types and frequency of surgical procedures

	Surgical treatment (41 cases) N° (%)	Surgical treatment in patients with an ISS>15 (34 cases) N° (%)
Splenectomy	21 (51.2%)	21 (61.7%)
Intrabdominal (mesenteric or epiploic) hemostasis	9 (21.9%)	7 (20.5%)
Hepatic hemostasis	7 (17.0%)	7 (20.5%)
Small bowel repair	5 (12.1%)	3 (8.8%)
Colon repair	5 (12.1%)	4 (11.7%)
Nephrectomy	4 (9.7%)	4 (11.7%)
Hepatic resection/debridement	3 (7.3%)	3 (8.8%)
Ileo-colic resection	3 (7.3%)	2 (5.8%)
Hepatic packing	2 (4.8%)	2 (5.8%)
Pancreatic hemostasis	2 (4.8%)	1 (2.9%)
Pelvic packing	1 (2.4%)	1 (2.9%)
Explorative laparoscopy	1 (2.4%)	1 (2.9%)
Explorative laparotomy	1 (2.4%)	–
Stomach repair	1 (2.4%)	1 (2.9%)
Adrenal gland hemostasis	1 (2.4%)	1 (2.9%)
Uretral repair	1 (2.4%)	–
Laparoscopic splenic hemostasis	1 (2.4%)	–

patients). The average liver AIS in patients who died and in those who survived was  $3.2 \pm 0.3$  e  $2.3 \pm 0.1$  respectively, and the difference between the 2 values was statistically significant ( $p < 0.05$ ). In the group of patients with a liver injury, the relationship of the liver AIS and the ISS was directly proportional and statistically significant (AIS/ISS  $r = 0.3$ ,  $p < 0.001$ ). Multivariate analysis

showed that ISS ( $p < 0.001$ ), patient age ( $p < 0.003$ ), an orthopedic injury ( $p < 0.002$ ), and a CNS injury ( $p < 0.006$ ), are independent variables associated with intra-abdominal injuries. The multivariate analysis of mortality, demonstrated that only the ISS was a statistically significant independent variable ( $p < 0.001$ ). The results of multivariate analysis of mortality are shown in Table V.

TABLE V - Multivariate analysis of mortality

	B	E.S.	Wald	df	Sig. (p)	Exp(B)	95% CI per Lower	EXP(B) Upper
<b>Step 1<sup>a</sup></b>								
Road accident	2,061	1,462	1,987	1	,159	7,855	,447	137,955
Age	,070	,034	4,107	1	,043	1,072	1,002	1,147
G.C.S.	-,179	,131	1,871	1	,171	,836	,646	1,081
I.S.S.	,133	,065	4,213	1	,040	1,142	1,006	1,297
Blood pressure	-,004	,016	,070	1	,791	,996	,966	1,027
Sex(M)	,390	1,107	,124	1	,724	1,477	,169	12,922
Orthopedic Injury	-,622	1,608	,150	1	,699	,537	,023	12,542
CNS Injury	-,420	1,125	,139	1	,709	,657	,073	5,956
Thoracic injury	,260	1,218	,045	1	,831	1,296	,119	14,115
Pelvic fracture	,819	1,036	,624	1	,430	2,267	,297	17,284
Abdominal surgery	-,817	1,351	,366	1	,545	,442	,031	6,238
Splenic injury	-,894	3,194	,078	1	,779	,409	,001	213,848
AIS-spleen	,130	1,107	,014	1	,906	1,139	,130	9,982
Liver injury	-3,813	2,787	1,871	1	,171	,022	,000	5,211
AIS-liver	1,433	,981	2,135	1	,144	4,191	,613	28,645
Constant	-6,398	3,993	2,567	1	,109	,002		
<b>Step 2<sup>b</sup></b>								
I.S.S.	,133	,032	17,363	1	,000	1,142	1,073	1,216
Constant	-5,269	1,145	21,175	1	,000	,005		

## Discussion

In any field of work data analysis serves as a basis for the evaluation of resources, requirements, efficiency, productivity, and the quality of the final product. In an integrated system for organizing the care of trauma patients, (the so-called Trauma System), the trauma registry is an indispensable tool for epidemiological analysis and for verifying the requirements and the quality of service. The registry also makes possible a comparison between various professionals and various facilities joined by the same interests<sup>11-14</sup>. The Trauma Registry Project at the University Hospital Sant'Andrea in Rome, was begun in 2006 and immediately focused on those multidisciplinary criteria which today have a central role in the approach to trauma patients<sup>15-18</sup>. The analysis of abdominal trauma treated in a multidisciplinary setting was the main purpose of the present study, which, although of limited duration and size, highlighted various matters for further consideration. The study showed that although the abdomen is not the body region most often involved if all types of trauma are considered, it is one of the most commonly affected in patients with severe trauma. The types of trauma that affect the abdomen are divided into blunt and penetrating trauma, which differ not only in the mechanism of injury but also in the frequency with which the various organs in the peritoneal cavity are involved, the diagnostic and therapeutic approach taken, and the treatment strategy required. It is well known that the higher the energy that develops at the moment of impact, due to the veloc-

ity, the greater the incidence and extent of the damage in blunt trauma. The epidemiological data reported in the literature confirms this, since it indicates that the number of abdominal injuries varies according to the speed at which the body is moving at the moment of impact. In road accidents, which are the main cause of trauma, the number of injuries of internal organs varies according to the type of accident<sup>19-20</sup>. It should be noted that the abdominal trauma we have observed, almost always due to blunt trauma caused by a road accident, occur as part of severe trauma, and is often associated with orthopaedic, thoracic and CNS injuries, while the likelihood of finding an abdominal injury in a trauma patient increases exponentially with increasing trauma severity. When the ISS of single body regions, both in the general population of trauma patients and in those with severe trauma, were compared, the abdomen had the highest average score. As regards treatment, we noted that the ISS of patients who underwent surgery, about half of all the abdominal trauma patients, was significantly high. This supports our tendency to treat abdominal trauma conservatively, in accordance with current trends<sup>7,21-23</sup>. When overall mortality and morbidity rates are considered, our case series is comparable to those of other authors. It should be taken into account, however, that all the patients who died had an ISS >15, and complications occurred almost exclusively in patients with severe trauma. There are many reports in the literature that in cases of blunt trauma the most commonly injured organ is the spleen, followed by the liver and the kidney, while in cases of penetrating trauma,

injuries of the liver and the hollow viscus are most common<sup>3-5</sup>. The severity of these injuries, and their relative importance in relationship with morbidity and especially mortality, are, however, not always defined with the same precision. A splenic injury, according to our results, which are similar to the data in the literature, is the most common occurrence in blunt trauma. Treatment is carefully correlated with the degree of severity of the injury itself as well as with the condition of any concomitant injuries and the patient's hemodynamic status. Although progress has recently been made in nonoperative management<sup>22,25-26</sup>, surgery is still the usual choice when the spleen is severely injured, when the patient is in shock, when other injuries require immediate treatment, or when, due to hypothermia, coagulopathy, or preexisting pathology, blood transfusions might be additional risk factors. In cases in which surgery is necessary, the most frequently used procedure is splenectomy. On the other hand, conservative treatment, which has higher costs with regard to operative time and transfusions, and is sometimes more difficult technically, should be proposed especially to young patients for whom partial resections or attempts to control bleeding by using biological glue or topical hemostatic agents, are more suitable<sup>22,24-32</sup>. We found that, in accordance with indications outlined in the literature, nonoperative treatment was carried out in almost half the cases, and had a very low failure rate. Patients who underwent surgery had high-grade splenic lesions, and treatment was rarely conservative. The mortality rate for patients with splenic trauma is not easy to determine, and is reported to be between 7 and 18%<sup>33</sup>. In our study mortality rate was considerably higher, which this deserves further thought since it seems to be due to factors unrelated to splenic lesions, as it has been reported in other studies<sup>34</sup>. The relationship between mortality and the average spleen AIS was not statistically significant. Furthermore, splenic injuries tend to occur in polytrauma patients with a high ISS, but the analysis of the relationship between the spleen AIS and the ISS, did not provide statistically significant results and permits us to make the hypothesis that it was not splenic trauma per se which influenced trauma severity and mortality. The liver is the organ most often involved in all types of abdominal trauma considered together, although it is second to splenic trauma in cases of blunt trauma, and second to hollow viscus injury in the occurrence of penetrating trauma. Minor liver lacerations and first or second degree hematomas make up more than half of blunt liver trauma, and almost the entire number of penetrating liver trauma cases. Clinical observation of patients with these injuries is usually sufficient, but simple surgical procedures, like hemostasis by manual compression, the application of topical hemostatic agents, or hepatorrhaphy, are sometimes performed<sup>35-37</sup>. Mortality is generally due to the presence of concomitant injuries. More severe injuries constitute only 40% of blunt traumas and 10% of pen-

etrating traumas. Such injuries may make rapid haemorrhage control necessary in order to save the patient's life. This can be accomplished in various ways carrying out extreme surgical procedures or interventional radiology<sup>38-40</sup>. Even most of our patients with liver trauma were treated non operatively. This was possible thanks to a progressively more extensive use of computer tomography, which permitted us to diagnose medium- or high-grade injuries while the patient was still hemodynamically stable<sup>8,41-43</sup>. In such a clinical instance, even a large hemoperitoneum does not make it impossible to treat the patient's injuries non surgically, provided that the patient is closely monitored using ultrasound or CT scan and laboratory tests. The average severity of the injuries found in patients treated non surgically was lower than that of the injuries of the patients who underwent surgery. Moreover, approximately half of the latter patients died, which shows that only patients with the most severe injuries were operated on. Mortality among patients with liver trauma was, in our experience, higher than that reported in the literature, which is around 10%<sup>44-46</sup>. It is, however, important to emphasize that, in this case as well, the fact that almost all liver trauma was found in patients with severe trauma who have an average liver AIS that was notably higher than in the patients who survived. This data is especially interesting if analyzed in light of the linear statistically significant correlation between the mortality among patients with liver injuries, the average liver AIS, and the ISS values. In contrast to what was observed in patients with splenic trauma, analysis of the relationship between the two indices showed a direct, statistically significant correlation, which permits us to make the hypothesis that liver trauma might have a greater influence on prognosis. The difficulty in determining precisely how individual injuries affect mortality becomes clear when one observes the results of the multivariate analysis. Only the ISS, which expresses overall trauma severity, was found to be an independent variable with a statistically significant link to a negative outcome. These observations, which agree with what is reported in the literature regarding hepatic trauma as the most common cause of death in patients with abdominal trauma, demonstrate the clinical and prognostic impact of liver injury even in the general population of trauma patients. It seems that liver injuries can contribute to the negative outcome of a patient's clinical course, especially if there are concomitant injuries such as pelvic fractures<sup>47-49</sup>.

## Conclusion

In conclusion, our study has shown that the impact of abdominal trauma on trauma patients is relevant not only as regards incidence but also as regards morbidity and mortality. Many patients with severe trauma have an abdominal injury, and since it is known that approximately half the avoidable deaths can be traced back to

suboptimal primary and secondary surveys, it is essential that an abdominal injury is always suspected in this phase and immediately ruled out, especially in patients suffering from severe trauma.

### Riassunto

I traumi addominali si riscontrano con una frequenza che oscilla tra il 7% e il 10% e si inseriscono quasi sempre nell'ambito di un trauma grave con lesioni associate ortopediche, toraciche o che coinvolgono il SNC. Scopo del presente lavoro è stato quello di effettuare un'analisi comparativa del trauma addominale rispetto alle altre regioni corporee valutandone, attraverso le informazioni derivanti da un registro traumi multidisciplinare, il significato prognostico nel contesto di un paziente traumatizzato grave. La presente ricerca è stata effettuata prendendo in esame i dati del registro traumi dell'Azienda Ospedaliera Universitaria Sant'Andrea di Roma nell'arco di tempo compreso tra il 1 marzo 2006 ed il 31 dicembre 2007 nel quale, su un totale di 82293 accessi al pronto soccorso, sono stati osservati 25875 pazienti (31,4%) che presentavano come problema principale la codifica trauma o ustione. Sono stati inseriti nel database 844 pazienti che hanno soddisfatto i criteri di inclusione tra i quali sono stati selezionati tutti coloro che presentavano un trauma addominale. Sono stati analizzati età, causa e dinamica del trauma, durata della degenza, ISS, tipologia della lesione, incidenza delle lesioni associate extra-addominali, e l'impatto del trauma addominale in termini di morbilità e mortalità soprattutto riguardo alle lesioni spleniche ed epatiche. I traumi dell'addome sono stati riscontrati in 79 pazienti (9,3%) con una media di ISS di  $25.7 \pm 14.3$ . Su 79 pazienti che hanno riportato una lesione addominale, 61 (77,2%) presentavano un trauma grave (ISS > 15). La mortalità globale è risultata del 24,1%, pari a 19 decessi, tutti osservati nei pazienti con ISS > 15, determinando un tasso di mortalità nel trauma grave del 31,2%. La morbilità complessiva è risultata del 29,1%, pari a 23 pazienti, di cui 22 (95,6%) con ISS > 15. I pazienti operati sono stati 41 (51,9%) con la media dell'ISS che è risultata di  $33.7 \pm 11.1$ . I traumi della milza sono risultati i più frequenti, 36 pazienti (45,6%) con una media di ISS di  $31.1 \pm 14.4$ . Il trattamento è stato di tipo operativo in 22 casi (61,1%) con 21 splenectomie e 1 trattamento conservativo di emostasi eseguito per via laparoscopica. Il valore medio dell'AIS-milza nei pazienti operati è stato di  $3.5 \pm 0.1$ . Il tasso di mortalità in tutti i pazienti con un trauma della milza è stato di 30,5% (11 pazienti). I traumi epatici sono stati riscontrati in 33 pazienti (41,7%) con una media di ISS di  $28.4 \pm 11.6$ . Sono stati sottoposti ad intervento chirurgico per lesione epatica 12 pazienti (36,3%). Nei pazienti operati il valore medio dell'AIS-fegato è risultato di  $3.2 \pm 1.0$ . Il tasso di mortalità è stato di 24,2% (8 pazienti). L'analisi

multivariata ha evidenziato come, nella popolazione generale, l'ISS ( $p < 0.001$ ), l'età ( $p < 0.003$ ), una lesione ortopedica ( $p < 0.002$ ) e una lesione del SNC ( $p < 0.006$ ) siano variabili indipendenti associate alla presenza di lesione endoaddominale. L'analisi multivariata relativa alla mortalità, nei pazienti con trauma dell'addome, ha evidenziato come soltanto l'ISS sia risultata variabile indipendente statisticamente significativa ( $p < 0.001$ ).

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