

Thoracic trauma: analysis of 100 consecutive cases

Trauma torácico: análise de 100 casos consecutivos

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ABSTRACT

Objective: To analyze thoracic trauma assisted by the Emergency Service of Hospital da Irmandade da Santa Casa de Misericórdia de São Paulo. **Methods:** One hundred patients with thoracic trauma were assisted throughout six months in 2006. Data from their records were collected and a protocol of thoracic trauma was fulfilled. The Revised Trauma Score was used to evaluate gravity of injury and to calculate the survival index. **Results:** Prevalence of trauma injury in male from 20 to 29 years old was observed. Out of all patients, 44 had blunt trauma and 56 penetrating trauma (78.6% presented stab wounds and 21.4% gun shots). Up to the settings of injuries, 23% were in the thoracoabdominal transition, 7% in the precordium and 70% in the remainder thoracic area. In those with the thoracoabdominal transition injury, 22.7% were hemodynamically unstable and 77.3% stable. Thoracoabdominal injury patients presented 40.9% of diaphragm wound and all were stable. Of those with precordium wound, 37.5% presented cardiac injury. In cardiac onset, 66.7% presented stable and 33.3% unstable. Thoracic drainage was the most accomplished surgical procedure (71%). **Conclusions:** The thoracic trauma patient is most prevalently young male with stab wound penetrating injury, without associated injuries, hemodynamically stable, presenting hemothorax, with high probability of survival.

Keywords: Thoracic injuries/epidemiology; Heart injuries; Woundings, penetrating; Abdominal injuries; Wounds, penetrating; Drainage; Hemothorax

RESUMO

Objetivo: Analisar os traumas torácicos atendidos pelo Serviço de Emergência do Pronto-Socorro Geral do Hospital da Irmandade da Santa Casa de Misericórdia de São Paulo. **Métodos:** Foi preenchido um Protocolo de Trauma Torácico com dados dos prontuários de cem

pacientes atendidos em 2006 por seis meses. Utilizamos o Escore de Revisado de Trauma para avaliar a gravidade da lesão e calcular a taxa de sobrevida. **Resultados:** Houve prevalência de homens entre 20 e 29 anos. Sobre as lesões, 44% eram traumas fechados e 56% traumas penetrantes, sendo desses 78,6% por arma branca e 21,4% por arma de fogo. Quanto à localização das lesões, 23% encontravam-se na transição toracoabdominal, 7% na região precordial e 70% no restante da área torácica. Dos pacientes com ferimento toracoabdominal, 22,7% eram instáveis e 77,3% estáveis. Nas lesões toracoabdominais, 40,9% apresentavam lesões diafragmáticas, e todos os pacientes eram estáveis. Entre os pacientes com ferimentos precordiais, 37,5% apresentavam lesões cardíacas, sendo estas 66,7% estáveis e 33,3% instáveis. O procedimento cirúrgico mais realizado foi a drenagem de tórax (71%). **Conclusões:** O paciente de trauma torácico mais frequente é o homem jovem, com ferimento penetrante por arma branca, estável, apresentando hemotórax sem lesões associadas, e com alta probabilidade de sobrevida.

Descritores: Traumatismos torácicos/epidemiologia; Traumatismos cardíacos; Traumatismos abdominais; Ferimentos penetrantes; Drenagem; Hemotórax

INTRODUCTION

Thoracic trauma accounts to 25% of deaths in polytrauma⁽¹⁾. Mortality rate is high, but 85% of thoracic trauma patients can be appropriately assisted only with ventilation support, analgesia and thoracic drainage⁽²⁾. The classification of thoracic lesions is basically limited to blunt or penetrating injuries, and the latter divided in stabbing or gunshot. The successful care of these patients depends on identification of the types of lesion

Study carried out at Department of Thoracic Surgery of Faculdade de Ciências Médicas da Santa Casa de São Paulo – FCMSCSP, São Paulo (SP), Brazil. [Presented at the 12th Congress of Pneumology and Tisiology, Sao Paulo (SP), Brazil; 2007].

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Received on Oct 1st, 2009 – Accepted on Jul 30, 2010

and appropriate management, which is simple but decisive for patient survival.

OBJECTIVE

To analyze thoracic traumas seen at the Emergency Department of the Hospital da Irmandade da Santa Casa de Misericórdia de São Paulo (ISCMSP) together with the Department of Thoracic Surgery of the Faculdade de Ciências Médicas da Santa Casa de São Paulo (FCMSCSP), based on the analysis of one hundred consecutive cases.

METHODS

A thoracic trauma protocol was prepared and filled in with data from the medical charts of one hundred patients seen in 2006, throughout a six-month period, at the Emergency Department of the ISCMSP. This protocol comprised the following items: identification, mechanism of trauma, general and specific physical examination, radiological exams, initial management, treatment, associated lesions, mechanical ventilation, diagnosis and progression. Based on these pieces of information, patients were divided into three groups, respecting the classification proposed by Saad Jr. et al.⁽³⁾. Group I comprised unstable patients; Group II included stable patients and thoracic drainage was their definite treatment; and Group III was composed of stable patients in whom thoracic drainage was not the definite treatment. The Revised Trauma Score (RTS) that is widely used in pre-hospital screening was employed to assess severity of the lesion of these patients and to calculate the survival rate based on the physiological parameters of systolic blood pressure, respiratory rate and Glasgow Coma Scale⁽⁴⁾. Hence, it was possible to input data and analyze them to know the frequency of the types of lesions and their presentations, and to compare with the expected survival and among the classification groups.

RESULTS

Upon analysis of cases, there was a prevalence of males aged 20 to 29 years. As to types of lesions, 44% were blunt trauma and 56% penetrating trauma; in the latter, 78.6% were due to stabbing and 21.4% by gunshot. Regarding site of lesions: 70% were thoracic (including fractures of costal arches, heart wounds, pulmonary contusion, hemothorax and pneumothorax), 23% were in the thoracoabdominal transition and 7% in the precordial region. The findings more often found in blunt thoracic traumas were fractures of costal arches. Moreover, polytrauma was also frequent, and fracture of limbs

(Figure 1) was the main factor simultaneous to thoracic trauma. In cases of penetrating injuries, hemothorax was predominant and almost always associated to pneumothorax (Figure 2). In patients with thoraco-abdominal wounds, 22.7% were unstable and 77.3%, stable. As to precordial lesions, 75.0% were unstable and 25.0%, stable. In individuals with thoraco-abdominal injuries, 40.9% presented diaphragmatic lesions and all were stable. In precordial wounds, 37.5% had cardiac lesions, and 66.7% were stable and 33.3%, unstable (Table 1). According to the classification proposed by Saad Jr. et al.,⁽³⁾ the patients were distributed into three groups: 24 patients in Group I, 36 in Group II, and 40 in Group III. Considering the thoraco-abdominal transition lesions, diaphragmatic involvement was more frequent (23%), followed by exclusively thoracic insults, such as pneumothorax and hemothorax (22%), liver (15%) and stomach involvement (11%). Regarding surgeries and other procedures, thoracic drainage was the most frequently performed and accounted for 50% of the surgeries, involving 71% of patients. Other types of surgery frequent in this group included splenectomy,

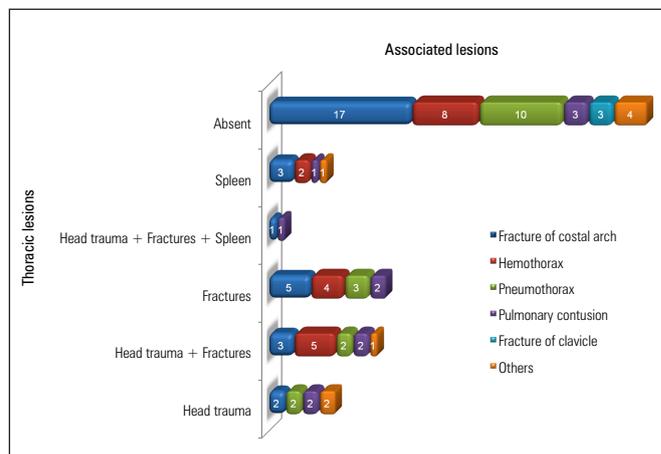


Figure 1. Lesions associated to blunt thoracic traumas

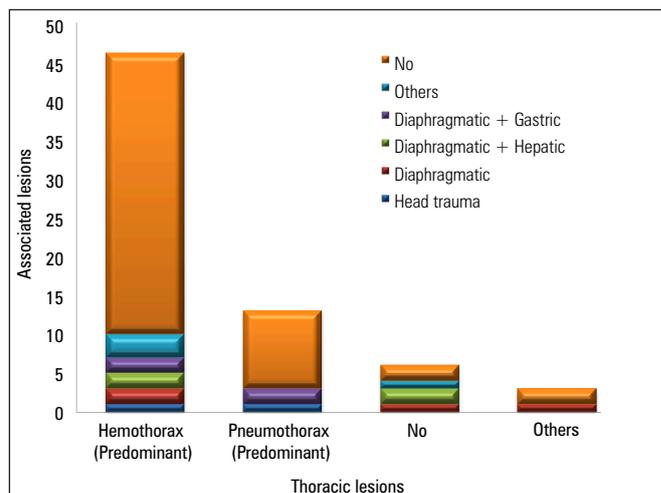


Figure 2. Lesions associated to blunt thoracic traumas

Table 1. Percentage of thoracic injuries related to unstable clinical picture of patients during the study period

Injuries	Stable (%)	Unstable (%)
Thoracoabdominal	77.3	22.7
Precordial	25	75
Diaphragmatic	40.9	0
Cardiac	66.7	34.4

hepatorrhaply, diaphragmatic repairs, cardiorrhaphy, gastrorrhaphy, vascular repair and craniotomy. In addition, 16% of patients did not undergo any procedure (Table 2). The mortality rate of the group was 8.3%. The mean RTS value calculated was 6.571, corresponding to a survival rate of approximately 95%.

Table 2. Percentage of patients submitted to different types of surgery during the study period

Surgeries	Patients (%)
Drainage	71
Diaphragmatic repairs	14
Hepatorrhaply	6
Splenectomy	5
Craniotomy	5
Cardiorrhaphy	4
Gastrorrhaphy	4
Vascular repair	4
None	16
Others	13

DISCUSSION

The epidemiological profile of the thoracic trauma patients analyzed was consistent with the literature for all types of trauma, that is: young males aged between 20 and 29 years. The surprise was the higher incidence of penetrating traumas, mainly by knives, contrary to expectations regarding the high number of gunshot wounds. The associated lesions were more common in closed trauma due to high energy mechanisms of trauma, which are generally related to patients with polytrauma. In weapon wounds, two cavities are created: a permanent one, visible upon examination, and a temporary orifice that last only a few seconds, due to the displacement of the mass resulting from dissipation of energy coming from the bullet. As to penetrating wounds related to stabbing, the mechanism is local, causing lesions only in the affected area and not creating this temporary cavity. Therefore, knife lesions resulted mainly in hemothorax and pneumothorax, which were simultaneous in many cases⁽⁵⁾.

The diaphragmatic lesions were more frequent than in the literature^(6,7). Most patients were stable despite severity of wounds. This may be attributed to the high incidence of lesions caused by stabbing, which were more localized and had less systemic effect, since isolated diaphragm lesion does not cause severe effects. The events usually associated to this lesion

may lead to immediate hemodynamic and respiratory unbalance, with reduced cardiac output and formation of hypertensive pneumothorax^(8,9).

The same applies to patients with heart lesions who are mostly stable⁽¹⁰⁾. The predominance of cases of exclusively thoracic penetrating trauma made these patients undergo drainage. In many patients this was the only definite treatment, resulting in more cases in Group II according to the classification by Saad Jr. et al.⁽³⁾, thus indicating the existence of traumas that are less complex and more localized, besides less aggressive and more effective treatment⁽⁴⁾. However, Group I, – of severe patients, was larger than expected, for having more cases with a high number of associated lesions.

Another procedure that was frequent in this study was diaphragmatic repair, mainly due to the high prevalence of diaphragmatic lesions. As to RTS, the value calculated showed a survival probability of approximately 95%, in accordance with the literature. In the present study, the patients had a 91.7% survival. The slight difference of the calculated survival probability and real survival found is related to the fact that there were many critically-ill individuals (usually the polytrauma), unlike most patients who were in Group II of the classification by Saad Jr. et al.⁽³⁾ Hence, it is worth mentioning that the RTS calculated only in patients presenting severe associated lesions revealed a lower survival probability, which justifies the probability shift. The high survival rates are explained by the low incidence of associated lesions in the cases studied. Most of these traumas affect the lungs, which are organs with their own healing and drainage mechanisms that generate effective post-trauma resolution.

FINAL CONSIDERATIONS

The increased number of stab wounds stood out. The high survival rate was associated to the limited number of cases with extra-thoracic lesions, classified as Group I, according to the classification by Saad Jr. et al.⁽³⁾. Among the injuries in transition zone, there were more stable cases and a high frequency of diaphragmatic lesions. As to precordial wounds, the same trend towards stability was observed. Thoracic drainage was the most often preformed procedure, confirming a higher prevalence cases classified as Group II, followed by diaphragmatic repairs. The data found are important to show to the Multidisciplinary Emergency Department team that it is relevant to analyze the types of lesions and check lesions associated to thoracic trauma, according to the patient profile. The analysis of consecutive studies carried out in diverse emergency departments will confirm the importance of systematizing care of thoracic trauma, in addition to contributing to planning actions regarding

care of patients with a multidisciplinary approach to always increase the survival rate of patients.

This study is expected to provide subsidies to those working in Emergency Departments so as to consider the most prevalent thoracic lesions in each Service and associated comorbidities, and also to contribute to planning actions regarding multidisciplinary emergency care of victims of thoracic injuries due to external causes.

CONCLUSION

A profile of patients with thoracic trauma and presentation of their lesions was demonstrated, as well as an estimate of their survival through trauma scores. The thoracic trauma patient more frequently found in this study was male aged 20 to 29 years, with penetrating stab wounds, clinically stable, with primarily hemothorax with no associated lesions and high probability of survival.

ACKNOWLEDGMENTS

We would like to thank the whole team of the Emergency Department of the Hospital da Irmandade da Santa Casa de Misericórdia de São Paulo and all those who directly or indirectly collaborated to this work.

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