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ORIGINAL

Prognostic factors associated with mortality in patients with severe trauma: From prehospital care to the Intensive Care Unit☆

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Abstract

Objective: To identify factors related to mortality in adult trauma patients, analyzing the clinical, epidemiological and therapeutic characteristics at the pre-hospital levels, in the Emergency Care Department and in Intensive Care.

Design: A retrospective, longitudinal descriptive study was carried out. Statistical analysis was performed using SPSS, MultBiplot and data mining methodology.

Setting: Adult multiple trauma patients admitted to the Salamanca Hospital Complex (Spain) from 2006 to 2011.

Main variables of interest: Demographic variables, clinical, therapeutic and analytical data from the injury site to ICU admission. Evolution from ICU admission to hospital discharge.

Results: A total of 497 patients with a median age of 45.5 years were included. Males predominated (76.7%). The main causes of injury were traffic accidents (56.1%), precipitation (18.4%) and falls (11%). The factors with the strongest association to increased mortality risk ($p < 0.05$) were age > 65 years (OR 3.15), head injuries (OR 3.1), pupillary abnormalities (OR 113.88), level of consciousness according to the Glasgow Coma Scale ≤ 8 (OR 12.97), and serum lactate levels > 4 mmol/L (OR 9.7).

Conclusions: The main risk factors identified in relation to the prognosis of trauma patients are referred to the presence of head injuries. Less widely known statistical techniques such as data mining or MultBiplot also underscore the importance of other factors such as lactate concentration. Trauma registries help assess the healthcare provided, with a view to adopt measures for improvement.

PALABRAS CLAVE
Politraumatismos;
Cuidados intensivos;
Registros de
población;
Lactato

Factores pronósticos relacionados con la mortalidad del paciente con trauma grave: desde la atención prehospitalaria hasta la Unidad de Cuidados Intensivos

Resumen

Objetivo: Identificar los factores relacionados con la mortalidad de los pacientes adultos politraumatizados, analizar las características clínicas, epidemiológicas y terapéuticas en los niveles prehospitalario, Servicio de Urgencias y Cuidados Intensivos.

Diseño: Estudio retrospectivo, longitudinal y descriptivo. Análisis estadístico a través del programa SPSS, MultBiplot y la metodología de minería de datos.

Ámbito: Pacientes adultos politraumatizados ingresados en el Complejo Hospitalario de Salamanca entre los años 2006 y 2011.

Variables de interés principales: Variables demográficas, clínicas, terapéuticas y analíticas desde el lugar del accidente hasta el ingreso en la UCI. Variables evolutivas durante el ingreso en la UCI y hasta el alta hospitalaria.

Resultados: Se incluyó a 497 pacientes, con una mediana de edad 45,5 años. Predominio de varones (76,7%). La causa principal del traumatismo fueron los accidentes de tráfico (56,1%), precipitaciones (18,4%) y caídas (11%). Los factores con mayor asociación a un incremento del riesgo de mortalidad ($p < 0,05$) fueron la edad > 65 años (OR 3,15), el traumatismo craneoencefálico (OR 3,1), las alteraciones pupilares (OR 113,88), el nivel de consciencia según la escala de Glasgow ≤ 8 (OR 12,97) y las cifras de lactato > 4 mmol/L (OR 9,7).

Conclusiones: Los principales factores de riesgo identificados en relación con el pronóstico de los pacientes politraumatizados son los relacionados con la presencia de traumatismo craneoencefálico. Mediante la utilización de distintas técnicas estadísticas menos conocidas como la minería de datos o el MultBiplot también se destaca la importancia de otros factores como el lactato. Los registros de traumatismos ayudan a conocer la asistencia sanitaria realizada para poder establecer medidas de mejora.

Introduction

Severe trauma is regarded as one of the disorders with the greatest healthcare and economic impact in society today. Worldwide, it is the leading cause of mortality in young adults, and involves the highest incidence of potential life years lost. According to the World Health Organization (WHO) in its 2011 statistical report on data referred to 2008,[1] the mortality rate associated to trauma worldwide is 78 deaths/100,000 inhabitants, ranging between 107 deaths/100,000 inhabitants in Africa and 63 deaths/100,000 inhabitants in Europe. The main causes of trauma are traffic and work accidents, while other causes comprise falls, sports accidents, etc.

The management of patients with severe trauma starts at the site of injury, where the pre-hospital healthcare services play a key role. This initial patient care has been protocolized through a series of recommendations that are regularly updated on the basis of scientific evidence–the reference of which is found in the methodology proposed by the Prehospital Trauma Life Support program, which prioritizes treatment of the most life-threatening injuries at the trauma site, and the Advanced Trauma Life Support (ATLS) program, once the patient reaches the reference hospital.[2] Following the pre-hospital phase, initial in-hospital care[3] is mainly the responsibility of the Emergency Care Departments and Intensive Care Units (ICUs). Early identification of the factors related to severity and the adoption of appropriate management measures has a clear impact on the patient prognosis and possible sequelae.

The present study describes the management of severe trauma and polytraumatized patients at the three healthcare levels in the province of Salamanca (Spain). A description is provided of the different variables that influence the final outcome starting from the actual site of injury, whether epidemiological or related to patient care, including clinical, laboratory test, diagnostic and therapeutic parameters.

Patients and methods

A retrospective descriptive study was made of the polytraumatized patients admitted to the ICU of Salamanca Hospital Complex during the years 2006–2011. The data considered to be most relevant within each link of the patient care chain were collected by reviewing the patient case histories:

- Epidemiological variables: patient age, gender, type of accident (traffic, accidental fall <50 cm or >50 cm, sports, assault [knife or gun wounds], injuries caused by cattle, and others), origin (pre-hospital or transferred from another hospital–fundamentally Avila or Zamora), and personal history.
- Pre-hospital and in-hospital emergency care clinical, diagnostic and therapeutic variables: