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American vs. European Trauma Centers: A Comparison of Preventable Deaths☆

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ABSTRACT

Introduction: The aim is comparing the quality of care at a typical American trauma center (USC) vs an equivalent European referral center in Spain (SRC), through the analysis of preventable and potentially preventable deaths.

Methods: Comparative study that evaluated trauma patients older than 16 years old who died during their hospitalization. We cross-referenced these deaths and extracted all deaths that were classified as potentially preventable or preventable. All errors identified were then classified using the JC taxonomy.

Results: The rate of preventable and potentially preventable mortality was 7.7% and 13.8% in the USC and SRC respectively.

According to the JC taxonomy, the main error type was clinical in both centers, due to errors in intervention (treatment). Errors occurred mostly in the emergency department and were caused by physicians. In the USC, 73% of errors were therapeutic as compared to 59% in the SRC (P=.06). The SRC had a 41% of diagnosis errors vs just 18% in the USC (P=.001). In both centers, the main cause of error was human. At the USC, the most frequent human cause was 'knowledge-based' (44%). In contrast, at the SRC center the most common errors were 'rule-based' (58%) (P<.001).

Conclusions: The use of a common language of errors among centers is key in establishing benchmarking standards. Comparing the quality of care of an American trauma center and a Spanish referral center, we have detected remarkably similar avoidable errors. More diagnostic and 'ruled-based' errors have been found in the Spanish center.

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Comparación de la mortalidad evitable de un *trauma center* americano vs. un centro de referencia europeo

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RESUMEN

Introducción: El objetivo del estudio es comparar la calidad asistencial de un *trauma center* americano (USC) vs un centro equivalente de referencia europeo (SRC) en España, a través del análisis de la mortalidad evitable.

Métodos: Estudio comparativo que evalúa pacientes politraumatizados mayores de 16 años que han sido exitus durante su hospitalización. Se han identificado las muertes evitables o potencialmente evitables, analizando los errores en el manejo, clasificándolos según la taxonomía de la *Joint Comission*.

Resultados: La incidencia de mortalidad evitable y potencialmente evitable fue del 7,7% en el USC, y del 13,8% en el SRC.

Según la taxonomía de la *Joint Comission*, el principal tipo de error fue clínico en ambos centros, debido a errores de intervención (tratamiento). Los errores ocurren en urgencias y fueron causados por médicos. En el USC, el 73% de los errores fue de tipo terapéutico comparado con el 59% en el SRC ($p = 0,06$). El SRC tuvo un 41% de errores diagnósticos vs solo el 18% en el USC ($p = 0,001$). En ambos centros, el principal tipo de error fue humano, siendo tipo *knowledge-based* el más frecuente en el USC (44%) vs *rule-based* en el SRC (58%) ($p < 0,001$).

Conclusiones: El uso de un lenguaje común para analizar los errores de manejo es una clave esencial para establecer puntos de referencia estándares y universales. Comparando la calidad asistencial de un *trauma center* americano con la de un centro de referencia español, hemos detectado unos errores evitables extraordinariamente parecidos. Se han hallado más errores diagnósticos y de tipo *ruled-based* en el centro español.

Introduction

Polytrauma continues to be one of the leading causes of death in people under the age of 40.[1] Analyzing the quality of the treatment of polytrauma patients is essential in order to improve morbidity and mortality results, but it is not easy to establish quality standards. Evaluations of the quality of management of polytrauma patients reveal that it is frequently below recognized standards.[2,3] An excellent way to determine quality is by analyzing preventable or potentially preventable deaths.

The definition of each type of mortality (preventable, potentially preventable, and inevitable) is controversial. According to a systematic review published by Costanti et al.,[4] 89.7% of publications define the 3 types of mortality according to the analysis of errors produced in the management of polytrauma patients based on clinical guidelines such as ATLS®,[5] 62.1% define them according to severity criteria like the Injury Severity Score (ISS),[6] 55.2% according to the probability of survival determined by the Trauma-Injury Severity Score (TRISS),[7] and 3.4% by a combination of elements such as patient comorbidity, initial physiological conditions, anatomical injuries, etc. Following the classification of mortality according to the analysis of errors, preventable mortality is caused directly by an avoidable error, potentially preventable mortality could have been caused by an avoidable error, and inevitable mortality would have occurred regardless of the appearance of treatment errors in these patients.[8–14]

Most authors analyze errors that have caused avoidable or potentially avoidable deaths, using a classification of these errors.[15–25] Although the analysis of errors is an essential mechanism to identify areas for improvement, the use of a non-standardized classification is a serious problem for the comparison of results among hospitals. The use of well-standardized terminology, such as that of the Joint Commission on Accreditation of Healthcare Organizations (JCAHO),[26] widely applied in other clinical fields of medicine, allows errors to be recorded, analyzed and corrected. Only Ivatury et al. and Montmany et al.[8,9] apply the taxonomy of JCAHO in the analysis of errors that cause preventable and potentially preventable mortality in polytrauma patients. The main limitation of the use of the JCAHO taxonomy is the use of unfamiliar and complex language until one becomes familiarized with it.

The aim of this study is to compare the mortality analysis from an American trauma center[8] and one from a Spanish referral hospital.[9] Errors were classified by the same person at both hospitals, thereby ensuring that the same language was used within the JCAHO taxonomy.

Methods

This is a comparative, retrospective and descriptive study including patients who were prospectively registered in a protected database at a US trauma center between 2002 and 2010[8] and a Spanish referral hospital from 2006 to 2016.[9]

The trauma center records data from all patients over the age of 16 treated under the polytrauma code, while the Spanish referral hospital registers all patients over the age of 16 treated and admitted to the critical care unit.