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Clinical and epidemiological characterization of acute respiratory distress syndrome in adult patients with femoral shaft fractures☆

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ABSTRACT

Objective: To describe the epidemiology of post-traumatic acute respiratory distress syndrome.

Methodology: Descriptive observational study of patients with traumatic femoral shaft fracture requiring surgical management.

The variables included in the analysis were demographics, injury severity, treatment methods, and in-hospital outcomes. A descriptive multivariate analysis was performed in order to explore the factors associated with the development of Acute Respiratory Distress Syndrome (ARDS).

Results: Of the 267 patients with femoral fractures, 86% were male patients with a mean age of 28.7 years and Injury Severity Score (ISS) of 12.7. The overall prevalence of ARDS was 8.6% while the prevalence among multiple trauma patients was 20%. Mortality was 7.5%. In the bivariate analysis, the variables associated with ARDS were the following: time between the trauma and hospital admission, ISS, contused lung, associated tibial fracture, urgent surgery requirement, and need for red blood cell transfusion. In the multivariate analysis, the associated variables were: blunt chest trauma, time elapsed until definitive fixation, and red blood cell transfusion during surgery.

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In the cohort, there was an increase in the annual prevalence of ARDS, from 4.3% in 2006 to 26.1% in 2011, as was also the case with multiple trauma, which increased from 14.5% in 2006 to 23.6% in 2011. A change in treatment was also evidenced, with increase in early total care (ETC) and damage control orthopaedics (DCO).
Conclusions: In our population, the prevalence of ARDS in patients with femoral fractures increases when associated with blunt chest trauma, delayed stabilization time, and the need for blood transfusion.

Caracterización clínica y epidemiológica del síndrome de dificultad respiratorio aguda en pacientes adultos con fractura diafisiaria de fémur

Palabras clave:
Síndrome de dificultad respiratoria del adulto
Fracturas del fémur
Fijación intramedular de fracturas
Transfusión sanguínea
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RESUMEN

Objetivo general: Describir la epidemiología del síndrome de dificultad respiratoria aguda (SDRA) postraumático.
Metodología: Estudio observacional descriptivo de pacientes con fractura traumática de la diáfisis femoral que requirieron manejo quirúrgico. Se analizaron variables demográficas, gravedad del trauma, métodos de tratamiento y desenlaces intrahospitalarios. Se realizó un análisis descriptivo y multivariado para explorar factores asociados al desarrollo de Síndrome de Dificultad Respiratoria Aguda (SDRA).
Resultados: Doscientos sesenta y siete pacientes con fractura femoral, el 86% fueron hombres con edad media de 28,7 años e Indice de Severidad del Trauma (ISS) de 12,7. Se observó una prevalencia de SDRA del 8,6%en toda la población y del 20% en politraumatizados. La mortalidad fue del 7,5%. Las variables asociadas al SDRA en el análisis bivariado fueron: tiempo entre el trauma y el ingreso, ISS, contusión pulmonar, fractura asociada de tibia, requerimiento de cirugía urgente y necesidad de transfusión de glóbulos rojos. En el análisis multivariado, las variables asociadas fueron: trauma contuso de tórax, tiempo transcurrido hasta la fijación definitiva y la transfusión de glóbulos rojos en cirugía. En la cohorte hubo un incremento en la prevalencia de SDRA anual, siendo del 4,3% en 2006comparado con el 26,1% en 2011, al igual que el politrauma que pasó del 14,5% en 2006 al 23,6% en 2011. Se evidenció también un cambio en el tratamiento, aumentando el control temprano total y el control de daño ortopédico.
Conclusiones: En nuestra población, la prevalencia de SDRA en pacientes con fracturas de fémur aumenta cuando hay trauma contuso de tórax, cuando se prolonga el tiempo de fijación y la transfusión sanguínea.

Introduction

The acute respiratory distress syndrome (ARDS) is a rapidly progressing disorder with clinical manifestations than include dyspnoea, tachypnea and hypoxaemia. In up to 43% of the cases it may evolve to respiratory failure, multiple organ failure (MOF) and death, affecting medical as well as surgical patients.[1] Muscle-skeletal trauma has been associated with post-traumatic ARDS, femoral shaft fractures having been shown to be more frequently associated with lung complications.[2]

White described a 0.5% prevalence of ARDS in trauma patients, with an increase to up to 10.2% in multiple trauma patients in the same cohort.[3] In a study of risk factors associated with ARDS development in multiple trauma patients, Navarrete-Navarro found, after a multivariate analysis, that the presence of a femoral fracture was an independent risk factor for the development of ARDS, with an OR of 3.16 (95% CI 1.41–7.03), just like an APACHE II score and the use of blood transfusion during resuscitation.[4]

The strategy for treating femoral fractures associated with multiple traumas has been a topic of discussion in the orthopaedic literature over the past decade. In a clinical trial in the late 1980s, Bone showed that early fracture stabilization (<24 h) reduced lung complications from 38% (delayed stabilization group) to 4% (early stabilization group), leading to the recommendation of early fixation.[5] However, some studies were published in the 1990s linking multiple trauma and total early fixation with the onset of the systemic inflammatory response syndrome (SIRS), ARDS and multiple organ failure (MOF).[6,7] This gave rise to questions regarding the method and the timing of bone stabilization and whether they played a role in the onset of lung complications.[6,8] Pape et al. described