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Original article

Epidemiology of community-acquired severe sepsis. A population-based study[☆]

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ARTICLE INFO

Article history:

Received 21 January 2016

Accepted 14 April 2016

Available online xxx

Keywords:

Severe community sepsis

Epidemiology

Incidence

Septic code

ABSTRACT

Background and objective: Most studies aimed at getting to know the incidence of severe sepsis have methodological limitations which condition results that are difficult to compare and are inapplicable when it comes to estimating the necessary resources. Our objective is to evaluate the incidence and epidemiological aspects of community-acquired severe sepsis which require intensive care unit admission. **Patients and method:** Prospective observational population-based study in a population of 180,000 adults over 15 years old and a general hospital with 350 beds and 14 ICU beds. All episodes of community-acquired infection requiring admission to ICU due to severe sepsis were registered over a period of 9 years. The variables analyzed were: age, sex, SAPS II score, length of stay in ICU, type of infection, isolated microorganism, and deaths during their ICU admission. A statistical bivariate analysis and a multiple logistic regression were performed.

Results: Nine hundred and seventeen episodes with an average age of 65.2 years. The most frequent infectious focus was pulmonary (55.2%). The average SAPS II severity score index was 37.87 and mortality 19.7%. The annual incidence was 51.54 episodes per 100,000 adult inhabitants, meaning 1.97 ICU beds per day. In the multivariate analysis, the SAPS II score and a known aetiology were demonstrated as mortality risk factors.

Conclusions: This study brings us some epidemiological data from a population-based perspective which help us to care for patients better in our geographical area. The average annual incidence is 51.5 cases per 100,000 adult inhabitants which means that 2 ICU beds per day to attend this population.

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Epidemiología de la sepsis grave adquirida en la comunidad. Estudio de base poblacional

RESUMEN

Antecedentes y objetivo: La mayoría de los estudios destinados a conocer la incidencia de sepsis grave poseen limitaciones metodológicas que condicionan resultados difícilmente comparables y poco aplicables a la hora de estimar los recursos necesarios. Nuestro objetivo es conocer la incidencia real de sepsis grave de adquisición comunitaria que requieren de UCI y analizar aspectos epidemiológicos relacionados. **Pacientes y método:** Estudio observacional prospectivo en una base poblacional de 180.000 adultos > 15 años y un hospital general de 350 camas de hospitalización con 14 camas de UCI. Se registraron todos los pacientes con sepsis grave o shock séptico adquiridos en la comunidad, con requerimiento de

Palabras clave:

Sepsis comunitaria grave

Epidemiología

Incidencia

Código séptico

[☆] Please cite this article as: Almirall J, Güell E, Capdevila JA, Campins L, Palomera E, Martínez R, et al. Epidemiología de la sepsis grave adquirida en la comunidad. Estudio de base poblacional. Med Clin (Barc). 2016. <http://dx.doi.org/10.1016/j.medcli.2016.04.015>

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ingreso en UCI, durante un período de 9 años. Las variables recogidas fueron: edad, sexo, SAPS II, días de estancia en UCI, tipo de infección, microorganismo aislado y fallecimientos (durante su estancia en UCI). Se ha realizado un análisis estadístico bivalente y una regresión logística múltiple.

Resultados: Se incluyeron 917 episodios en pacientes con una edad media de 65,2 años. El foco infeccioso más frecuente es el respiratorio (55,2%). El índice de gravedad SAPS II medio fue de 37,87 y la mortalidad de 19,7%. La incidencia anual media de las sepsis graves adquiridas en la comunidad ha sido de 51,54 episodios por 100.000 habitantes, precisando 1,97 camas de UCI/día. En el análisis multivariante el SAPS II y tener etiología conocida se muestran como factores de riesgo de mortalidad.

Conclusiones: El estudio aporta datos epidemiológicos desde una perspectiva de base poblacional que contribuyen a cuantificar la necesidad de recursos asistenciales para atender la sepsis grave adquirida en la comunidad en nuestra área geográfica. La incidencia anual media es de 51,5 casos por 100.000 habitantes adultos, lo que supone la necesidad de disponer de 2 camas de UCI/día para atender a dicha población.

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Introduction

Severe sepsis is defined as a systemic inflammatory response triggered by an infection that affects the dysfunction of one or more organs or systems.¹ It is a syndrome that involves a high fatality rate, being the second leading cause of hospital mortality in the United States and the only one that has increased in the last decade.² The use of health resources associated to the treatment of severe sepsis is high and correlates with the need to use intensive care units (ICU) and the number of organ failures.³ Spain has estimated an annual cost closed to 345 million euros.⁴

Recent studies have shown a high prevalence with a progressive increase in severe sepsis in the general population,⁵⁻⁷ with a higher incidence of community-acquired versus hospital-acquired sepsis.^{8,9} However, most studies are retrospective and are based on the use of patient databases at the time of hospital discharge. The methodological limitations that this entails, along with the use of different definitions and populations, determines that the results of many of these epidemiological studies are varied, difficult to compare and very limited in terms of estimating the necessary resources.

Therefore, taking into account its mortality, the cost associated with each episode of severe sepsis and the proposed implementation of a care model for the treatment of severe sepsis in inter-hospital code format, it is essential to know its incidence with accuracy.

The aim of this population-based study is to determine the incidence of severe community-acquired sepsis requiring ICU.

Materials and methods

Prospective registry of all episodes of severe sepsis or community acquired septic shock in those over 15 years of age that required ICU admission during a period of 9 years from 1st May 2002 to 30th April 2011. They were included as cases those patients with community-acquired infection, unrelated to any diagnostic or therapeutic process, which manifested itself as the cause of consultation or occurred in the first 48 h after hospital admission. Clinical monitoring was carried out until discharge from the ICU.

The study was conducted in a general hospital equipped with 350 inpatient beds and 14 ICU beds. The incidence of severe community-acquired sepsis is calculated from the area of health-care influence of the Mataró Hospital and based on the annual municipal census of population over 15 years of age according to the Statistics Institute of Catalonia. The annual incidence rates for different periods of the study are calculated from the number of new cases per 1000 inhabitants/year. Patients transferred from other centres outside our area of influence and cases with nosocomial diagnosis were excluded.

Treatment of patients with severe sepsis was established from institutional protocols in force, which included *early gold-directed therapy*¹⁰ resuscitation and prescribing syndromic empirical antibiotic treatment. For the etiologic diagnosis, at least 2 blood cultures, a urine culture and/or culture of other biological fluids were performed on all patients, depending on the clinical suspicion of the infectious focus. If the diagnosis was pneumonia, radiological confirmation was requested, together with a determination of pneumococcal antigenuria and *Legionella*.

The following variables were recorded in an Access® database: age, sex, SAPS II, date of hospital admission, date of ICU admission, discharge date, length of stay in the ICU, infection type, isolated microorganism, type of sample collected and death if it occurred during ICU stay. A statistical analysis was performed comparing those alive with those dead, using the chi-square test for percentages and the Mann-Whitney for means. *Odds ratios* were calculated for each factor in order to assess the risk of mortality, using simple logistic regression, adjusting the effect of each by multiple logistic regression, in which the factors were included with a $p < 0.10$ in the bivariate analysis.

Results

917 episodes of severe community-acquired sepsis requiring ICU admission, affecting 903 patients older than 15 years of age were included during the study period. Fourteen patients had 2 episodes during the study period. The episodes occurred predominantly in men ($n = 603$, 6575%) with a mean age of 65.2 years (± 16.1). 19.8% were under 50 years of age, 22.9% were between 50 and 64 and 57.3% over 65. The distribution of patients and fatality rate by age are shown in Fig. 1. Severity on admission assessed by

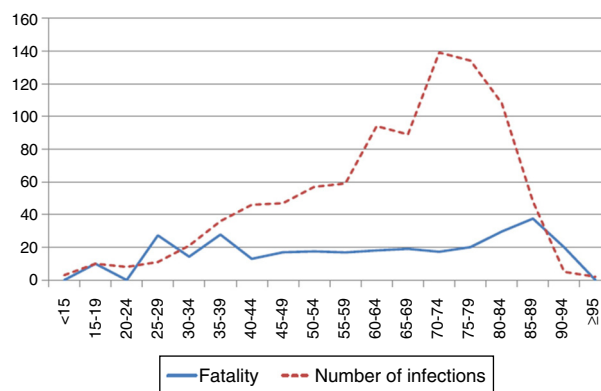


Fig. 1. Number of cases (in absolute value) and fatality rate (percentage of patients with sepsis who died versus total patients with sepsis) grouped by periods of 5 years.

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