



ORIGINAL ARTICLE

Lethality by pneumonia and factors associated to death^{☆,☆☆}

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Received 21 February 2013; accepted 15 May 2013

Available online 22 October 2013

KEYWORDS

Pneumococcal pneumonia;
Penicillin G;
Case-fatality rate;
Inpatients;
Pediatric hospitals

Abstract

Objective: to describe the case-fatality rate (CFR) and risk factors of death in children with community-acquired acute pneumonia (CAP) in a pediatric university hospital.

Method: a longitudinal study was developed with prospective data collected from 1996 to 2011. Patients aged 1 month to 12 years were included in the study. Those who left the hospital against medical orders and those transferred to ICU or other units were excluded. Demographic and clinical-etiological characteristics and the initial treatment were studied. Variables associated to death were determined by bivariate and multivariate analysis using logistic regression.

Results: a total of 871 patients were selected, of whom 11 were excluded; thus 860 children were included in the study. There were 26 deaths, with a CFR of 3%; in 58.7% of these, penicillin G was the initial treatment. Pneumococcus was the most common pathogen (50.4%). From 1996 to 2000, there were 24 deaths (93%), with a CFR of 5.8% (24/413). From 2001 to 2011, the age group of hospitalized patients was older ($p = 0.03$), and the number of deaths ($p = 0.02$) and the percentage of disease severity were lower ($p = 0.06$). Only disease severity remained associated to death in the multivariate analysis (OR = 3.2; 95%CI: 1.2-8.9; $p = 0.02$).

Conclusion: when the 1996-2000 and 2001-2011 periods were compared, a significant reduction in CFR was observed in the latter, as well as a change in the clinical profile of the pediatric inpatients at the institute. These findings may be related to the improvement in the socio-economical status of the population. Penicillin use did not influence CFR.

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[☆] Please cite this article as: Ferreira S, Sant'Anna CC, March MdF, Santos MA, Cunha AJ. Lethality by pneumonia and factors associated to death. J Pediatr (Rio J). 2014;90:92–7.

^{☆☆} Study conducted at the Instituto de Puericultura e Pediatria Martagão Gesteira of the Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil.

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PALAVRAS-CHAVE

Pneumonia
pneumocócica;
Penicilina G;
Letalidade;
Pacientes internados;
Hospitais pediátricos

Letalidade por pneumonia e fatores associados ao óbito**Resumo**

Objetivo: descrever a taxa de letalidade (TL) e os fatores de risco de óbito em crianças com pneumonia grave adquirida na comunidade (CAP) em um hospital universitário pediátrico.

Método: foi desenvolvido um estudo longitudinal com dados prospectivos coletados de 1996 a 2011. Foram incluídos no estudo pacientes com idade entre 1 mês e 12 anos de idade. Foram excluídos aqueles que deixaram o hospital desconsiderando as recomendações médicas e aqueles transferidos para UTI ou outras unidades. Foram estudadas as características demográficas, clínicas e etiológicas e o tratamento inicial. As variáveis associadas a óbito foram determinadas por análise bivariada e multivariada utilizando regressão logística.

Resultados: foi selecionado um total de 871 pacientes, dos quais 11 foram excluídos; assim, foram incluídas no estudo 860 crianças. Houve 26 óbitos, com uma TL de 3%; em 58,7% desses, penicilina G foi o tratamento inicial. Pneumococo foi o patógeno mais comum (50,4%). De 1996 a 2000, houve 24 óbitos (93%), com uma TL de 5,8% (24/413). De 2001 a 2011, a faixa etária de pacientes internados foi mais velha ($p = 0,03$) e o número de óbitos ($p = 0,02$) e o percentual de gravidade das doenças foram menores ($p = 0,06$). Apenas a gravidade das doenças continuou associada a óbito na análise multivariada (RC = 3,2; IC de 95%: 1,2-8,9; $p = 0,02$).

Conclusão: quando os períodos de 1996-2000 e 2001-2011 foram comparados, foi observada uma redução significativa na TL no último período, bem como uma alteração no perfil clínico dos pacientes hospitalizados no instituto. Esses achados podem estar relacionados à melhora na situação socioeconômica da população. O uso de penicilina não influenciou a TL.

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Introduction

Community-acquired pneumonia (CAP) remains the leading cause of death in children worldwide, contributing to approximately 14% of deaths in children from 1 month to 5 years of age. It is a critical illness for countries to achieve part IV of the Millennium Development Goals: reduce by two thirds the mortality rate among children aged < 5 years from 1990 to 2015.¹

Most children aged < 5 years have four to six acute respiratory infections (ARIs) per year; 2% to 3% of ARIs develop into CAP.^{2,3}

Although mortality and morbidity rates due to CAP in children aged < 5 years have been decreasing worldwide, in developing countries the mortality is still a serious public health problem, with approximately 1.2 million deaths per year. According to the World Health Organization (WHO), between 2001 and 2003, 20% of deaths among children aged < 5 years in developing countries were caused by CAP. According to Health Informatics Department (DATASUS), there was a significant reduction in mortality from CAP in children aged < 5 years in the period 1991-2007 in Brazil.²⁻⁶ However, in spite of this reduction, most hospitalizations for pneumonia in Brazil are of children aged < 5 years and the elderly.

Pneumococcus is the main etiological agent of CAP in children aged < 5 years in developing and developed countries. The most commonly isolated etiological agents in children with CAP in developing countries are: *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Staphylococcus aureus*.⁷⁻¹⁰ In most CAP cases requiring hospitalization, treatment involves the choice of antibiotic therapy and supportive care: oxygen therapy, adequate hydration, and

nutrition. As it is usually difficult to identify the causative agent, the start of antibiotic therapy is empirical and the choice is based on personal experience or previous studies on the etiology of CAP.^{7,8,11-14} This study aimed to describe the case-fatality rate (CFR), the clinical-etiological profile, the initial treatment with antibiotics, and the factors associated with death in children admitted to a university pediatric hospital with CAP from 1996 to 2011. The current knowledge on this subject is limited, and the results will contribute to improving the care of children with this disease.

Methods

This was a longitudinal, hospital-based observational study, with prospective data collection from January of 1996 to December of 2011 at the Instituto de Puericultura e Pediatria Martagão Gesteira (IPPMG) of the Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil. IPPMG is the only university hospital that treats exclusively pediatric patients from Rio de Janeiro, and it is a referral institution in the city of Rio de Janeiro. It offers free emergency service, 900 consultations/month, pediatric intensive care unit (PICU, since September of 2007), wards, approximately 1,000 admissions/year, and outpatient pediatric service, with approximately 3,200 consultations/month.

Patients aged between 1 month and 12 years of age, hospitalized in IPPMG due to severe CAP, were included regardless of the presence of wheezing, according to the WHO classification.¹⁴ Patients who were discharged against medical advice, transferred to other health facilities, or more recently to the PICU, or patients whose data records were incomplete were excluded.

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