



ORIGINAL

## Dyslipidemia as a long-term marker for survival in pulmonary embolism

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### KEYWORDS

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### PALAVRAS-CHAVE

Dislipidemia;  
Doenças metabólicas lipídicas;

### Abstract

**Objectives:** To analyse survival rate after 24 months in consecutive patients with a diagnosis of PE as well as associated factors.

**Methods:** Prospective cohort study during a follow-up period of two years in a series of consecutive patients with PE.

**Results:** During the follow-up period, 34 out of 148 patients died (23%). Factors independently associated with reduced survival rate were: creatinine levels > 2 (OR, 8.8; 95% CI, 1.1 - 70.87), previous neoplasm (OR, 8.8; 95% CI, 3.69 - 20.98), dementia (OR, 6.85; 95% CI, 2.1 - 22.33) and dyslipidemia (OR, 5.07; 95% CI, 1.92 - 13.44). Forty four percent of the patients with dyslipidemia died vs. 20.8% of patients without this condition.

**Conclusions:** In our study dyslipidemia shows as a long-term negative prognostic marker for survival in patients with EP.

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### Dislipidemia como um marcador de longo prazo para a sobrevivência na embolia pulmonar

### Resumo

**Objetivos:** Analisar a taxa de sobrevivência após 24 meses, em pacientes consecutivos com diagnóstico de PE, bem como fatores associados.

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Embolia pulmonar;  
Análise de  
sobrevivência;  
Tromboembolismo  
venoso

**Métodos:** Estudo prospectivo durante um período de seguimento de dois anos em uma série consecutiva de pacientes com PE.

**Resultados:** Durante o período de acompanhamento, 34 dos 148 pacientes morreram (23%). Fatores independentemente associados à reduzida taxa de sobrevivência foram: os níveis de creatinina > 2 (OR, 8,8; 95% CI, 1,1-70,87), neoplasia anterior (OR, 8,8; IC 95%, 3,69-20,98), demência (OR, 6,85; 95% CI, 2,1-22,33) e dislipidemia (OR, 5,07; IC 95%, 1,92-13,44). Quarenta e quatro por cento dos pacientes com dislipidemia morreram contra 20,8% dos pacientes sem essa condição.

**Conclusões:** No nosso estudo, a dislipidemia mostra-se um marcador prognóstico negativo de longo prazo na sobrevida de pacientes com EP.

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## Introduction

Venous thromboembolic disease (VTE) is a complex condition with a multifactor aetiology in which both the clinical history of the patient and the genetic and environmental factors play a role.

Survival rate after VTE is worse than expected and it is even worse after pulmonary embolism (PE) than after deep venous thrombosis (DVT) alone<sup>1</sup>. Mortality during follow-up of patients with VTE has been the topic of several research studies and it ranges from 12.5%<sup>2</sup> to 37%<sup>3</sup>. VTE recurrence is so often that, about 30% of patients, present recurrences in the following 10 years<sup>4</sup>.

Patients with VTE show several variables associated to a decreased survival rate. From a clinical point of view, it is interesting to which those aspects can be treated.

Patients with non treated dyslipidemia have a global mortality rate a year of 9.7%<sup>5</sup>. As shown by several double-blind placebo-controlled studies, the use of statins to reduce cholesterol levels significantly decrease cardiovascular risk<sup>6</sup>. Lower levels of cholesterol achieved by the administration of statins may reduce the incidence of ictus in high risk populations and in patients with ictus or transient ischemic attack<sup>7</sup>.

Although we have found some studies which associate dyslipidemia with a higher risk of VTE<sup>8-12</sup>, none of these works has documented the prognostic role dyslipidemia may play in this type of patients.

In this paper, we present a long-term study of a series of consecutive patients diagnosed with PE aiming to analyse the main complications of such condition and their distribution in time and to establish the factors associated with a lower survival rate.

## Material and methods

### Study design

Prospective cohort study with a follow-up period of two years.

### Patients

We analysed a cohort of consecutive patients diagnosed with PE from February 2003 through September 2004 at the University Hospital Virgen del Rocío in Seville.

## Methods

We considered as diagnostic criteria for PE: 1) high probability ventilation/perfusion lung scan, 2) intermediate or low probability ventilation/perfusion lung scan with signs suggestive of arterial thrombosis as revealed by pulmonary angiography with or without signs of venous thrombosis in lower limbs through ultrasound scan or venography. 3) Intraluminal filling defect observed in pulmonary angiography or consecutive sections of the vessels or more than 2.5 mm in diameter as revealed by pulmonary angiography. 4) Intraluminal filling defect in segmentary branches or in more proximal branches as observed in helical CT scan.

### Data collection strategy during the initial PE episode

Patients were enrolled in the study through periodical visits to the Emergency Unit, Internal Medicine Unit, Pneumology, Nuclear Medicine and Radiology Units. A series of variables were noted down in a form designed for the purpose and were subsequently converted into computer format. Periodical visit were made to the units where the patients were admitted in order to confirm the correct completion of the form. We also revised in the Computer System for the Management of Clinical and Analytical Documentation (SIDCA) (Sistema Informático de Documentación Clínica y Analítica) the list of patients with the EP code (CIE9) throughout the study period. This work has been approved for Ethical Committee in our hospital.

The variables collected during the acute episode were divided into: epidemiological data (gender and age), risk factors (family history of VTE, hormone therapy, previous trauma, previous surgery, previous neoplasm (except for non-melanoma skin cancer), baseline disease (previous history of VTE, arterial hypertension, congestive heart failure, acute coronary syndrome, respiratory insufficiency, chronic airway obstruction, acute cerebrovascular accident, dementia, dyslipidemia and varicose syndrome) and prognostic and clinical characteristics (shock rate, partial oxygen pressure, heart rate, systolic arterial tension, creatinine). Dyslipidemia was defined as: hypertriglyceremia > 150 mg/dL (1.69 mmol/L) or HDL cholesterol (high-density lipoprotein) < 40 mg/dL, (1.04 mmol/L) in males and < 50 mg/dL (1.29 mmol/L) in females. Congestive heart insufficiency was defined taking into account the NYHA functional class I-IV classification. Dementia was defined according to DSM-IV criteria (memory impairment and at least one of the following

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