The American Journal of Medicine (2006) 119, 851-858

ELSEVIER

THE AMERICAN JOURNAL of MEDICINE®

CLINICAL RESEARCH STUDY

AJM Theme AJM Theme Issue: Pulmonology/Allergy

Pulmonary Embolism in Patients with Chronic Obstructive Pulmonary Disease or Congestive Heart Failure

Manuel Monreal, PhD,[a] Juan Francisco Sanchez Muñoz-Torrero, MD,[b] Virjanand S. Naraine, MD,[c] David Jiménez, MD,[d] Silvia Soler, MD,[e] Ramón Rabuñal, MD,[f] Pedro Gallego, MD;[g] RIETE Investigators.

[a]Servicio de Medicina Interna, Hospital Universitari Germans Trias i Pujol, Badalona, Spain;[b]Servicio de Medicina Interna, Hospital San Pedro de Alcántara, Cáceres, Spain; [c]Division of Respirology, University of Toronto, Canada; [d]Servicio de Neumología, Hospital Universitario Ramón y Cajal, Madrid, Spain; [e]Servicio de Medicina Interna, Hospital Sant Jaume, Gerona, Spain; [f]Servicio de Medicina Interna, Complejo Hospitalario Xeral-Calde, Lugo, Spain; [g]Servicio de Medicina Interna, Hospital SAS de Jerez, Cádiz, Spain.

ABSTRACT

BACKGROUND: The diagnosis of pulmonary embolism (PE) is often unreliable in patients with chronic obstructive pulmonary disease (COPD) or congestive heart failure (CHF).

SUBJECTS AND METHODS: Registro Informatizado de la Enfermedad TromboEmbólica (RIETE) is an ongoing registry of consecutive patients with acute venous thromboembolism. In this study, the clinical characteristics, laboratory findings, and clinical outcomes of all enrolled patients with acute PE, with or without underlying cardiopulmonary diseases, were compared and contrasted. In addition, the performance of 2 clinical models for the diagnosis of PE was retrospectively evaluated.

RESULTS: As of January 2005, 4444 patients with symptomatic PE have been enrolled in RIETE. Of those, 632 patients (14%) had COPD and 422 (9.5%) had CHF. Significant differences were found in clinical presentation and 3-month outcomes among the 3 groups. With the Geneva model, there was a lower percentage of PE patients with COPD (relative risk [RR] 0.82; 95% confidence interval [CI], 0.66-1.02) or CHF (RR 0.73; 95% CI, 0.56-0.95) who fell into the low pretest probability category, compared with patients with neither. Besides, the percentage of patients with high probability of PE was similar among the 3 patient groups. The frequency of COPD (61%) and CHF (72%) patients with a high pretest probability for PE increased when using the Pisa score, but the percentage of COPD patients into the high probability group was lower (RR 0.60; 95% CI, 0.51-0.71).

CONCLUSIONS: Significant differences exist in PE patients with and without underlying cardiopulmonary diseases. The performance of the 2 clinical prediction models varied according to the presence or absence of underlying COPD or CHF.

KEYWORDS: Pulmonary embolism; Chronic lung disease; Chronic heart failure; Diagnosis

Patients with chronic obstructive pulmonary disease (COPD) or congestive heart failure (CHF) are often admitted to the hospital with an exacerbation of their disease that manifests itself with increased dyspnea, chest pain and ankle edema. Both COPD and CHF are considered risk factors for pulmonary embolism (PE), but the symptoms of these conditions overlap considerably, and the investigation of PE is often ignored or delayed in these patients. A coexisting COPD or CHF may be assumed to be the cause of the patient's symptoms, and the presence of PE may go undiagnosed in patients who can least tolerate it.

Clinical guidelines issued by the American Thoracic Society and the European Society of Cardiology recommend assessing the clinical probability of acute PE as a guide to decision-making and management.[1,2] However, the clinical validity of the 2 most commonly used clinical models in predicting the pretest clinical probability of PE has not been validated in patients with either COPD or CHF.

Supported by Sanofi-Aventis, Paris, France with an unrestricted educational grant, and partially supported by Red Respira from the Instituto Carlos III, Madrid, Spain (RedRespira-ISCiii-RTIC-03/11).

A full list of RIETE investigators is given in the Appendix.

Requests for reprints should be addressed Manuel Monreal, PhD, Servicio de Medicina Interna, Hospital Universitari Germans Trias i Pujol, 08916 Badalona, Barcelona, Spain.

E-mail address: mmonreal.germanstrias@gencat.net

0002-9343/$ -see front matter
doi:10.1016/j.amjmed.2005.11.035

The Registro Informatizado de la Enfermedad Trombo-Embólica (RIETE) was initiated in March 2001 to record current clinical management of venous thromboembolism (VTE) within Spanish hospitals. It is a multicenter, observational registry designed to gather and analyze data on treatment patterns and clinical outcomes in consecutive patients with symptomatic, objectively confirmed, acute venous thrombosis (DVT) or PE.[3-6] In this analysis, the clinical characteristics, laboratory findings, and 3-month clinical outcomes of all enrolled patients with acute PE, with or without underlying cardiopulmonary diseases, were compared and contrasted. In addition, the performance of 2 structural models[7,8] in predicting the pretest clinical probability of PE in patients with or without underlying COPD or CHF was evaluated, within the limits of the registry's data.

CLINICAL SIGNIFICANCE

- Significant differences exist in the clinical presentation of pulmonary embolism patients with and without underlying cardio-pulmonary diseases.
- The performance of the 2 clinical prediction models varied according to the presence or absence of underlying chronic obstructive pulmonary disease or congestive heart failure.

PATIENTS AND METHODS

Inclusion and Exclusion Criteria

Patients with symptomatic, acute DVT or PE, confirmed by objective tests (ie, contrast venography, ultrasonography, or impedance plethysmography for suspected DVT; pulmonary angiography, lung scintigraphy, or helical computed tomography [CT] scan for suspected PE) were consecutively enrolled in RIETE. Patients were excluded if they were participating in a therapeutic clinical trial or unavailable for follow-up. For this analysis, only patients with PE were considered.

Patient Population

Patients were divided into 3 groups: those with underlying COPD, those with CHF, and those without COPD or CHF. All patients provided oral consent to their participation in the registry, in accordance with the requirements of the ethics committee within each hospital.

Study Parameters

The parameters recorded by the registry comprise details of each patient's baseline characteristics; clinical status including any coexisting or underlying conditions such as chronic heart or lung disease; risk factors; clinical characteristics of the thrombotic event; laboratory findings including data on the electrocardiogram, chest radiograph, arterial blood gases, d-dimer levels, and other diagnostic tests; treatment received upon PE diagnosis; and clinical outcome during the first 3 months of therapy. Data were obtained from medical records and recorded on case report forms by a study coordinator. Coexisting medical conditions or comorbidities were specified according to a prespecified list.

Validation of PE Diagnosis

All patients had acute respiratory symptoms suggesting PE. The diagnosis was considered definitive if patients also had a positive helical CT scan, a high-probability ventilation-perfusion lung scintigraphy, a positive pulmonary angiography, visualization of thrombus on echocardiogram, or indeterminate-probability lung scan plus evidence of DVT in the lower limbs (by either, compression ultrasonograpy or contrast venography).

Follow-up

All patients were followed-up for at least 3 months after hospital discharge. During each visit, any signs or symptoms suggesting recurrences of DVT or PE, or bleeding complications were noted. Each episode of clinically suspected recurrent DVT or PE was documented by repeat compression ultrasonography, venography, lung scanning, helical CT scan, or pulmonary angiography. Fatal PE was defined as death shortly after PE diagnosis and in the absence of any alternative cause of death. Bleeding complications were classified as 'major' if they were overt and were either associated with a decrease in the hemoglobin level of 2.0 g/dL (20 g/L) or more, required a transfusion of 2 units of blood or more, or were retroperitoneal or intracranial. Any other clinically relevant bleeding events were considered 'minor.'

Data Collection

Data were recorded onto a computer-based case report form by a RIETE registry coordinator at each participating hospital and submitted to a centralized coordinating center through a secure website. The coordinators also ensured that eligible patients were consecutively enrolled. Patient identities remained confidential because they were identified by a unique number assigned by the study coordinator center, which was responsible for all data management. Study endpoints were adjudicated by the RIETE registry coordinators. At regular intervals, data quality was monitored and documented electronically to detect inconsistencies or errors, which were resolved by the coordinators. Data quality was also monitored by periodic visits to participating hospitals by contract research organizations that compare the medical records with the data on the secure website, as is the case for most clinical trials. In the event of substantial or unjustifiable inconsistencies from a particular center, patients enrolled from that center were not included in the database. A full data audit was performed at periodic intervals.

Clinical Models

The clinical probability of PE was retrospectively estimated according to 2 logistic regression models.[7,8] A third model,