

## Pulmonary embolism as a cause of unexpected sudden death in people aged 1-35 years

### *Tromboembolismo pulmonar como causa de muerte súbita inesperada en personas de 1-35 años*

Joaquín Lucena Romero<sup>1</sup>✉, MD; José L. Laborda Gálvez<sup>1</sup>, MD; and Lucía Rodríguez González<sup>2</sup>, MD

<sup>1</sup> Servicio de Patología Forense, Instituto de Medicina Legal. Sevilla, España.

<sup>2</sup> Instituto de Medicina Legal. Badajoz, España.

*Este artículo también está disponible en español*

#### ARTICLE INFORMATION

Received: April 18, 2017

Accepted: May 18, 2017

**Key words:** Pulmonary embolism, Sudden death, Young adult, Risk factors

**Palabras clave:** Tromboembolismo pulmonar, muerte súbita, Adulto joven, Factores de riesgo

#### To the Editor:

Venous thromboembolic disease (VTE) is a very common pathological process. Its most serious manifestation, pulmonary embolism (PE), has an incidence in Spain of 28.000 cases per year, with a mortality of up to 16.7% of cases<sup>1</sup>. On the other hand, more than 90% of deaths due to PTE occur in undiagnosed individuals and, therefore, not treated<sup>2</sup>.

It is accepted, for the most part, that the incidence of PTE increases with age, and doubles every decade until reaching its peak in the cohort of 70-80 years. General etiological factors include: age itself, prolonged immobilization, history of VTE, use of oral contraceptives, and pregnancy<sup>2</sup>.

An age group of particular interest is that of young subjects in whom, in the absence of general etiological factors, the incidence of death from massive PTE should be noticeably low<sup>3</sup>.

The aim of this study was to analyze the mortality of massive PTE in our setting in subjects aged 1-35 years and to identify those etiological indicators which are potential risk factors.

A retrospective descriptive study on deaths due to PTE in people of this age was carried out, who underwent a legal autopsy at the Forensic Pathology Service, Institute of Legal Medicine, in Seville, Spain over a period of 12 years (2004 -2015).

The total average population at that time was 1.9 million inhabitants, with 863454 individuals between 1-35 years.

The following data were collected in each of the cases studied: personal, family and clinical background, circumstances of death, examination of the death scene, gross macro- and microscopic complete autopsy and chemical toxicological analysis.

✉ J Lucena Romero  
Prado de San Sebastián s/n  
Edificio de los Juzgados. 1ª planta 41071  
Sevilla, España.  
E-mail address: joaquin.lucena@gmail.com

Over the study period a total of 10,743 autopsies were performed (**Figure**), 1618 (15%) in people aged 1-35 years, and in 243 cases of this age group (15%), death occurred suddenly and unexpectedly. In 20 cases (8.23%) it was caused by a TEP, 55% were women and the average age was  $26.1 \pm 7.7$  years (range 18.4-33.8).

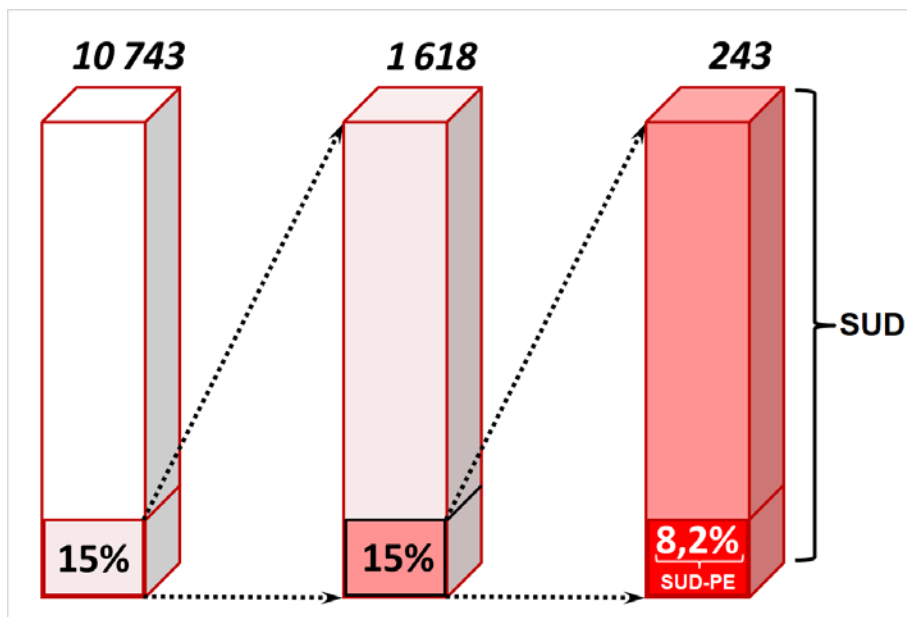
Nine cases (45%) had a recent traumatic history, 6 (30%) had morbid obesity, 15% had a history of phlebitis or kidney disease and 20% of women used oral contraceptives. Another 6 cases (30%) requested, days or hours before death, medical assistance directly related to VTE symptoms, local (pain in limb) or distant (dyspnea, arrhythmia), and in none of them were properly diagnosed.

Death occurred at home in 70% of cases, while the person was at rest (20%) or asleep (80%). Arrhythmias (40%), syncope (25%) and dyspnea (15%) were the initial symptoms for the thromboembolic episode.

It is worth noting that in the anthropometric data 85% of cases had a body mass index higher than 30 and, if the abdominal perimeter/height index was taken as a measure of overweight (when considering values higher than 50%) we find that 100% of the individuals were overweight in the sample analyzed.

In the necropsy results, a greater than expected cardiac weight stands out in 55% of the sample. When differentiated by sex, 66% of men exceeded the expected value (mean 476 g, expected average weight 399 g,  $p=0.074$ ) while this occurred in 45% of women (mean 404 g, expected average weight 335 g;  $p=0.050$ ); In addition, the toxicological study showed recent ingestion of psychotropic drugs at therapeutic doses (25%), ethanol in blood (15%) and metabolites of cocaine (5%).

We concluded that, in Seville, TEP represents 8.23% of unexpected sudden deaths in the population aged 1-35 years, for a mortality rate of 0.2 cases per 100 thousand inhabitants per year, with a slight predominance of women. Among the risk factors are obesity (85% total and 30% morbid) and recent traumatic



**Figure.** Cases studied from the total number of necropsies performed. SUD, sudden unexpected death; PE, pulmonary embolism.

history (45%); in addition, 30% of cases requested medical assistance in the previous days, due to symptoms compatible with VTE, but none received a correct diagnosis.

### CONFLICT OF INTERESTS

None

### REFERENCES

1. Guijarro R, Trujillo-Santos J, Bernal-Lopez MR, de Miguel-Díez J, Villalobos A, Salazar C, *et al.* Trend and seasonality in hospitalizations for pulmonary embolism: a time-series analysis. *J Thromb Haemost.* 2015;13(1):23-30.
2. Konstantinides SV, Torbicki A, Agnelli G, Danchin N, Fitzmaurice D, Galiè N, *et al.* 2014 ESC guidelines on the diagnosis and management of acute pulmonary embolism. *Eur Heart J.* 2014;35(43):3033-69, 3069a-3069k.
3. Priori SG, Blomström-Lundqvist C, Mazzanti A, Blom N, Borggrefe M, Camm J, *et al.* 2015 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: The Task Force for the Management of Patients with Ventricular Ar-

rhythmias and the Prevention of Sudden Cardiac Death of the European Society of Cardiology (ESC). Endorsed by: Association for European

Paediatric and Congenital Cardiology (AEPC).*Eur Heart J.* 2015;36(41):2793-867.