



## ORIGINAL ARTICLE

# Stroke-related mortality in a tertiary care hospital in Andalusia: Analysis and reflections<sup>☆</sup>



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### KEYWORDS

Stroke;  
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Haemorrhagic stroke;  
Acute coronary syndrome;  
Oral anticoagulants

### Abstract

**Objectives:** Stroke is a very common cause of death, especially in southern Spain. The present study analyses in-hospital mortality associated with stroke in an Andalusian tertiary care hospital.

**Methods:** We gathered the files of all patients who had died at Hospital Universitario Virgen de las Nieves in Granada in 2013 and whose death certificates indicated stroke as the cause of death. We also gathered stroke patients discharge data and compared them to that of patients with acute coronary syndrome (ACS).

**Results:** A total of 825 patients had a diagnosis of stroke (96 deaths, 11.6%); of these, 562 had ischaemic stroke (IS) (44 deaths, 7.8%) and 263 haemorrhagic stroke (HS) (52 deaths, 19.7%). Patients with HS therefore showed greater mortality rate (odds ratio, OR 2.9). Patients in this group died after a shorter time in hospital (median, 4 vs. 7 days; mean, 6 days). However, patients with IS were older and presented with more comorbidities. On the other hand, 617 patients had a diagnosis of ACS (36 deaths, 5.8%). The mortality odds ratio was 2.1 (stroke/SCA). Around 23% of the patients who died from stroke were taking anticoagulants. 60% of the deceased patients with IS and 20% of those with HS had atrial fibrillation (AF); 35% of the patients with IS and AF were taking anticoagulants.

**Conclusions:** Stroke is associated with higher admission and in-hospital mortality rates than SCA. Likewise, patients with HS showed higher mortality rates than those with IS. Patients with fatal stroke usually had a history of long-term treatment with anticoagulants; two-thirds of

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**PALABRAS CLAVE**

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Ictus isquémico;  
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agudo;  
Anticoagulación oral

the patients with fatal IS and AF were not receiving anticoagulants. According to our results, optimising prevention in patients with AF may have a positive impact on stroke-related in-hospital mortality.

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## Mortalidad asociada al ictus en un hospital andaluz de tercer nivel. Análisis y reflexiones

**Resumen**

**Objetivos:** El ictus constituye una causa muy frecuente de muerte, especialmente en el sur de España; se analiza la mortalidad intrahospitalaria asociada a ictus en un hospital andaluz de tercer nivel.

**Métodos:** Registro de pacientes con ictus como diagnóstico en su informe de defunción en el Hospital Virgen de las Nieves de Granada durante 2013. Se utilizan además datos globales sobre altas en ictus y se comparan con iguales variables en síndrome coronario agudo (SCA).

**Resultados:** Altas con diagnóstico de ictus 825 (96 defunciones, 11,6%); 562 isquémicos (44 fallecidos, 7,8%); 263 hemorrágicos (52 muertes, 19,7%). Los hemorrágicos, por tanto, tuvieron mayor mortalidad (OR = 2,9) y más precoz durante el ingreso (mediana 4 vs. 7 días, global 6 días), aunque los isquémicos fueron más ancianos y más pluripatológicos. Altas con SCA 617 (36 fallecidos, 5,8%); OR de mortalidad en ictus/SCA = 2,1. Un 23% de los fallecidos con ictus estaban anticoagulados cuando lo presentaron. El 60% de los ictus isquémicos y el 20% de los ictus hemorrágicos fallecidos tenían fibrilación auricular; solo el 35% de los pacientes con ictus isquémico y fibrilación auricular estaban anticoagulados.

**Conclusiones:** El ictus supera al SCA en ingresos y mortalidad intrahospitalaria. El ictus hemorrágico supera al isquémico en mortalidad asociada. La anticoagulación crónica es frecuente en pacientes con ictus fatal; 2 tercios de los pacientes con ictus isquémico mortal y fibrilación auricular no estaban anticoagulados. Según nuestros resultados, optimizar la prevención en pacientes con fibrilación auricular podría impactar favorablemente sobre la mortalidad intrahospitalaria asociada al ictus.

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**Introduction**

Stroke is one of the leading causes of death: the second most frequent in men and the first in women, according to various studies.<sup>1</sup> It is also one of the most common causes of sudden disability and dependence in adults. The Andalusian Public Health System has addressed the condition through 2 editions of an integrated care process (ICP) ("cerebrovascular accident" in 2002<sup>2</sup> and "stroke" in 2015<sup>3</sup>) and the Stroke Plan 2010-2014.<sup>1</sup> This is theoretically an adaptation of the national stroke strategy published by the Spanish Ministry of Health,<sup>4</sup> although its care proposals diverge both from those of the national strategy and from the stroke care plan published by the Spanish Society of Neurology,<sup>5</sup> essentially in that it assigns neurologists little or no role in the management of acute strokes. Death due to stroke is 50% higher in Andalusia than the national average, making the region part of the so-called "Spanish stroke belt".<sup>6,7</sup> More research is needed, particularly studies based on data from Andalusia.<sup>8,9</sup> Subjects of interest are the mortality caused by and associated with stroke<sup>9-14</sup> and the burden of the condition on hospitals in terms of incidence and mortality.

We analysed in-hospital mortality associated with stroke at a tertiary referral hospital in Andalusia over a period of one year, and contextualised this both against stroke admissions in absolute terms and against acute coronary syndrome (ACS), which is comparable to stroke in terms of epidemiology and care requirements.

**Patients and methods**

The central offices of the Andalusian Public Health Service issued all hospitals and primary care districts a document listing stroke-related in-hospital deaths in each department in 2013, inviting analysis and proposals for improvement. These series comprise those patients with stroke recorded on their hospital death certificates, either alone or with other diagnoses. This includes both ischaemic stroke (IS) and haemorrhagic stroke (HS) (subarachnoid haemorrhage [SAH], intraparenchymal haemorrhage, and other non-traumatic intra- and extracerebral cranial haemorrhages [ICH]).

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