

Cost and burden of poor control of the level of anticoagulation in patients with non-valvular atrial fibrillation treated with vitamin K antagonist in the Spanish National Health Service

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INTRODUCTION

- Poorly controlled non-valvular atrial fibrillation (NVAF) patients treated with vitamin K antagonists (VKA) experience higher rates of clinical events compared to well controlled patients¹⁻⁴.
- In Spain a high percentage of NVAF patients present an inadequate control of anticoagulation therapy 32.7%-60.2%⁵⁻⁶, whose economic impact is unknown.
- The objective is to estimate the impact on resource consumption, clinical events and mortality of poorly controlled ≥65 year-old NVAF patients treated with VKA in Spain.

METHODS

- A cost-consequence analytic model was developed to estimate differences on clinical events and cost between poorly controlled (TTR<65%) and well controlled (TTR≥65%) NVAF patients treated with VKA over 1 year.
- The hypothetical cohort of NVAF patients and the anticoagulation control rates (Rosendaal method) were obtained from local real-world clinical and epidemiological studies.
- Clinical event rates (ischemic stroke-IS-, hemorrhagic stroke-HS-, major bleeding-MB-, systemic embolism-SE- and death from any cause) were derived from a post-hoc analysis of SPORTIF III/IV trials⁵ (table 1).
- Societal and National Health Service (NHS) perspectives were considered. Total annual costs (€ 2018) included direct (medical and non-medical) costs and indirect costs. Unitary costs were also retrieved from national sources⁷⁻⁹ (table 1).
- Potential life years lost (PLYL) were calculated to report impact on mortality. An expert panel composed by a cardiologist, a hematologist and general practitioners validated the model inputs.
- A sensitivity analysis (SA) was performed based on a prospective single-center study carried out in Spain¹⁰, in which event rates reported were limited to IS, MB and death from any cause.

Table 1. Clinical events, mortality and costs inputs used in the analytic model (base case). Costs expressed in euros 2018

Clinical events	Poorly controlled ^a (%/patient-year)	Well controlled ^b (%/patient-year)
	Ischemic stroke ³	1.84%
Hemorrhagic stroke ³	0.20%	0.06%
Systemic embolism ³	0.07%	0.00%
Major bleeding ³	3.85%	1.58%
Death from any cause ³	4.20%	1.69%

Costs	Direct costs (€/patient-year)	Indirect costs (€/patient-year)
	Ischemic stroke ⁷	€9,037
Hemorrhagic stroke ⁷	€7,468	€398
Systemic embolism ⁸	€3,846	NR
Major bleeding ⁹	€2,982	NR

^a TTR <65% according to Rosendaal method. ^b TTR ≥65% according Rosendaal method. ^c data calculated from the Groups of Related Diagnosis 174, 175 (gastrointestinal bleeding with or without complications) and 810 (intracranial hemorrhage) published by the Spanish Ministry of Health. NR: not reported. TTR: time in therapeutic range

CONCLUSIONS

- In the Spanish NHS, around 50% of NVAF patients (≥65 years old) treated with VKA have an inadequate control of the anticoagulation therapy (287,089 patients), increasing the clinical events, mortality and costs (near to €100 million).
- Raising awareness of the consequences of poor anticoagulation control in Spain is needed for a better clinical management of patients receiving anticoagulation.

RESULTS

- The target population comprised 594,855 NVAF patients treated with VKA (mean age 73.2 years, 49.4% women, 74.1% CHADS₂≥2). Poorly controlled anticoagulated patients accounted for 48.3% of the cohort.
- The inadequate control of anticoagulation was associated with a higher incidence of clinical events compared to well controlled patients within a year (additional 2,143 IS; 390 HS; 201 SE; 6,190 MB; 6,856 deaths) (Figure 1).
- The incremental total annual costs associated to poorly controlled patients were €46,685,756.60 (€173.96/patient-year) and €97,787,872.59 (€367.51/patient-year) from the NHS and societal perspective, respectively (Figure 2). Mortality due to poorly anticoagulation control implied 80,830.65 PLYL (0.136 PLYL/patient-year). The SA confirmed the base case results (table 2).

Figure 1. Clinical events associated with poorly and well controlled NVAF patients treated with VKA in Spain (base case)

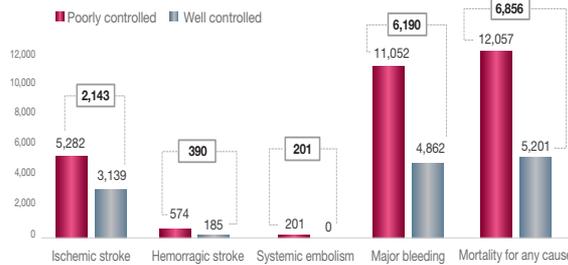


Figure 2. Costs associated with poorly and well controlled NVAF patients treated with VKA in Spain (Base Case)

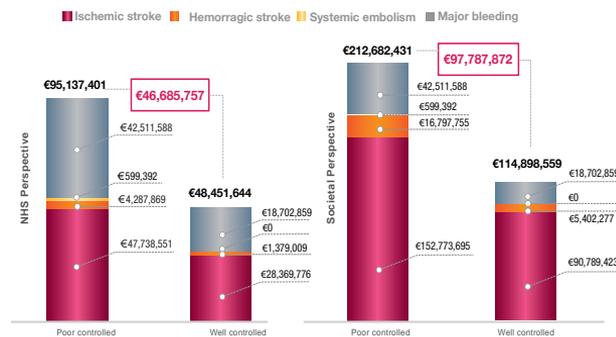


Table 2. Costs associated with poorly and well controlled NVAF patients treated with VKA in Spain (Sensitivity analyses)

	Poorly controlled	Well controlled	Difference
	NHS Perspective		
Ischemic stroke	€ 52,408,627	€ 31,429,261	€ 201,979,365
Hemorrhagic stroke	€ 33,457,172	€ 24,858,231	€ 8,598,941
Total	€ 85,865,798	€ 56,287,492	€ 29,578,306
Societal Perspective			
Ischemic stroke	€167,718,948	€100,580,439	€67,138,509
Hemorrhagic stroke	€33,457,172	€24,858,231	€8,598,941
Total	€201,176,120	€125,438,670	€75,737,450

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