

ISCHEMIC STROKE BURDEN OF DISEASE IN SPAIN

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INTRODUCTION

- Stroke is the 2nd cause of death in Spain, and the 3rd in women¹, with 30% 1-year mortality rates². Ischemic strokes (IS) represent about 80%-85% of total strokes in Spain³.
- Atrial fibrillation (AF) 5-folds the risk of stroke. Moreover, strokes in AF patients are more severe, with higher mortality (one-year mortality approaches 50%)⁴ and recurrence rates, and worse disability levels⁵.
- The costs along first year post-IS are very high due to resources use like long hospital stays, physical therapies and caregiving support⁶.
- CONOCES is the first study about socioeconomic IS impact and its management in patients with or without AF in Spain.

OBJECTIVE

→ The objective of the present study was to analyse the first year post-stroke burden of ischemic stroke in non-AF or AF patients in Spain.

METHODS

- The CONOCES study "CONOCES: socioeconomic stroke costs in Spain" is an observational, multicenter, naturalistic and prospective study of stroke costs in patients with or without AF.
- The study included 16 hospitals (stroke units of National Health System hospitals) of 16 Spain regions. Period of recruiting: November 2010 to May 2011.
- Patient inclusion criteria: older than 18, clinical IS diagnostic with less of 24 hours evolution. Patient exclusion criteria: ischaemic attack, stroke history, intrahospitalary stroke. The analysis was based on IS subgroup from CONOCES study.
- Patients were recruited at IS hospitalization (1st visit). Then, monitoring was at 3 and 12 months post-IS. Patients and caregivers information was collected through direct physician interviews. Neurologic and disability levels were measured through NIH, Barthel and Rankin scales.
- The study collected all IS costs: direct healthcare and non-healthcare costs (inpatient and outpatient costs), socioeconomic costs (formal and informal care) and productivity losses costs during the first year post-IS. We obtained unit costs (€ 2013) from different official sources.

RESULTS

We recruited 291 patients with IS; 152 with AF and 139 without AF (table 1). The mean age was 72±14 years, 54% was male. Stroke Code Activation was activated in 50% of patients. Most frequent comorbidities were arterial hypertension (62.9%) and diabetes mellitus (20.2%).

Table 1. Patient characteristics

	non-AF N=139	AF N=152	Total patients N=291	p-value
Age (years±SD)	67.17±15.83	76.49±10.07	72.04±13.92	<0.001
Male	60.0%	48.0%	54.0%	0.03
Active worker	20.0%	11.0%	15.0%	
Housekeeper	13.0%	13.0%	13.0%	0.013
Pensioner	60.0%	76.0%	68.0%	
Exitus during first year post-stroke	13.7%	22.4%	18.2%	0.038
NIH scale at hospital entry (mean±SD)	7.52±5.47	11±7.58	9.34±6.87	<0.001
NIH scale at hospital exit (mean±SD)	4.34±5.86	6.26±7.39	5.31±6.74	0.017
Recurrences	5.8%	9.2%	7.6%	0.187

The main IS in AF patients was cardioembolic (84.4% AF patients). Patients mortality one year post-IS was 18.2%, and was higher in AF patients (22.4% vs 13.7%, p=0.038). AF patients showed more recurrences than non-AF but without significance (table 1).

AF costs were higher than non-AF (table 2) but only diagnostic image, support therapy and formal care costs were statistically significant. The most explicative variables for these results were age, gender, NIH stroke scale, comorbidity, mortality and recurrence along study.

Table 2. IS total costs.

	non-AF N=134 mean	AF N=145 mean	Total patients N=279 mean	p-value
Direct healthcare costs	8,213 €	9,003 €	8,623 €	0.357
Direct non-healthcare costs	17,783 €	18,927 €	18,378 €	0.714
Indirect costs	738 €	464 €	595 €	0.219
TOTAL COSTS	26,733 €	28,394 €	27,597 €	0.622

Mean duration of inpatient stay was around 10 days. Overall cost per year and patient was 27,597€ (table 2). Direct healthcare costs were 31.2% of total costs, and intrahospital costs were 69.0% of these costs. The mainly cost was hospital stay which represents 70.1% of total intrahospital costs (table 3). Direct non-healthcare costs were 67.3% of total costs, and informal care supposed 89.5% of these costs. Indirect costs were 2.1% of total costs (table 4).

Table 3. IS intrahospital costs.

	non-AF N=134 mean	AF N=145 mean	Total patients N=279 mean	p-value
INTRAHOSPITAL COSTS				
Direct healthcare costs				
Hospital stay costs	3,892 €	4,324 €	4,117€	0.283
Pharmacologic treatment costs	5.59 €	5.73 €	5.66 €	0.884
Diagnostic images costs	1,028 €	769 €	894 €	0.003
Laboratory costs	172 €	142 €	157 €	0.147
Support therapy costs	47 €	180 €	116 €	0.005
Specific treatment costs	381 €	428 €	405 €	0.737
Transport costs (Stroke Code Activation)	197€	263 €	231 €	0.136
Total direct healthcare costs	5,724 €	6,113 €	5,926 €	0.431
Direct non-healthcare costs				
Outpatient transport costs	11 €	14 €	12 €	0.133
Total direct non-healthcare costs	11 €	14 €	12 €	0.133
Total intrahospital costs	5,734 €	6,127 €	5,938 €	0.428

Table 4. IS extrahospital costs.

	non-AF N=134 mean	AF N=145 mean	Total patients N=279 mean	p-value
EXTRAHOSPITAL COSTS				
Direct healthcare costs				
Pharmacologic treatment costs	342 €	688 €	522 €	0.250
Diagnostic images costs	354 €	240 €	295 €	0.465
Laboratory costs	68 €	59 €	63 €	0.538
Specialist hospital visit costs	1,085 €	1,229 €	1,160 €	0.661
Specialist home visit costs	84 €	130 €	108 €	0.385
Orthopaedic material costs	373 €	384 €	379 €	0.927
Recurrent costs	183 €	159 €	170 €	0.885
Total direct healthcare costs	2,488 €	2,889 €	2,697 €	0.516
Direct non-healthcare costs				
Formal care costs	748€	2,131 €	1,467 €	0.012
Informal care costs	16,750 €	16,297 €	16,515 €	0.878
Other direct non-healthcare costs	272 €	485 €	383 €	0.329
Total direct non-healthcare costs	17,772 €	18,913 €	18,365 €	0.714
Indirect costs				
Temporary incapacity work costs	738 €	438 €	582 €	0.175
Early mortality costs	0 €	26 €	14 €	0.337
Total lost productivity costs	738 €	464 €	595 €	0.219
Total extrahospital costs	20,999 €	22,267 €	21,657€	0.701

CONCLUSIONS

- Ischemic stroke represents a high burden on the healthcare system and society, mainly due to hospital and informal care costs.
- AF patients were older, had a worse neurologic status, more recurrences and mortality. However we did not observe statistical differences in the costs between non-AF and AF patients.
- 1 year mortality rates were lower than the published ones^{2,3}.
- Intrahospital costs were 40% than the published diagnosis-related group in Spain⁷. Other neurologic diseases like Alzheimer or dementia represent a lower burden than stroke.

REFERENCES

- Stroke Strategy of National Healthcare System. Social Politics and Healthcare Ministry of Spain. 2009. Supported by Statistics National Institute. [Cited May 2013]. Available from: www.ine.es.
- Félix-Redondo FJ, Consuegra-Sánchez L, Ramírez-Moreno JM, Lozano L, Escudero V and Fernández-Bergés. [Ischemic stroke mortality tendency (2000-2009) and prognostic factors. ICTUS Study-Extremadura (Spain)]. Rev Clin Esp 2013; 213:0177-185.
- Diez-Tejedor E and Soler R. [Concept and classification of cerebral vascular diseases]. En: Castillo J, Álvarez Sabín J, Martí-Vilalta JL, Martínez Vila E, Matias-Guiu J. (ed.) [Handbook of cerebrovascular diseases]. 2^a ed. Barcelona: Prous Science 1999. 43-45.
- Gladstone DJ, Bui E, Fang J, Laupacis A, Lindsay MP, Tu JV, Silver FL and Kapral MK. Stroke. Potentially preventable strokes in high-risk patients with atrial fibrillation who are not adequately anticoagulated. Stroke 2009;40: 235-240.
- Lin HJ, Wolf PA, Kelly-Hayes M, Beiser AS, Kase CS and Benjamin EJ. Stroke severity in atrial fibrillation. The Framingham study. Stroke 1996; 27 (10):1760-1764.
- Mar J, Arrospe A, Begiristain JM, Larañaga I, Elosegui E and Oliva-Moreno J. The impact of acquired brain damage in terms of epidemiology, economics and loss in quality of life. BMC Neuro 2011;11:46. doi: 10.1186/1471-2377-11-46.
- Social Politics and Healthcare Ministry of Spain. Minimum Basic Data Set-hospitalization (MBDS-H): Diagnosis-related groups 2011. Social Politics and Healthcare Ministry of Spain 2013. [Cited May 2013]. Available from: www.pestadistico.inteligenciadegestion.mssi.es/.