

2-YEAR INCIDENCE OF STROKE AND HEMORRHAGES HOSPITALIZATIONS AND COSTS WITHIN ATRIAL FIBRILLATION PATIENTS IN FRANCE

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Background

- Atrial fibrillation (AF) is the most frequently observed cardiac arrhythmia in practical clinic. It is a major cause of long-term morbidity and mortality, including major life-threatening cardiovascular events such as ischemic stroke, heart failure. ¹
- One in six strokes occurs in patients with AF, and mortality is twice as high for these patients compared with subjects in sinus rhythm. ¹
- No published data was found so far addressing the whole spectrum of AF complications, especially strokes and hemorrhages.

Objectives

- To describe adult patients hospitalised for AF in France in 2008.
- To estimate the 2-year cumulative incidence and costs of hospitalizations for strokes and hemorrhages in adults hospitalized for AF and eligible for stroke prevention.

Methods

We used the French Hospital National Database (PMSI) which records diagnoses and procedures on all admissions and allows patient-level linkage. It has proven adequate to carry out cost-of-illness studies.

Patient population

Extraction

Inpatient stays (day hospital / full hospitalization) with a primary diagnosis of AF (ICD 10 code: I48*) were identified within the PMSI (acute care) and several inpatient stay descriptors were extracted.

Selection

Additional clinical data retrieved from a retrospective analysis from 2006-2008 were used to compute CHADS2 score for each patient included. Our study population targeted adult patients eligible for stroke prevention with anti-coagulants. As such, we selected the subgroup of patients older than 18 years and having a CHADS2≥1.

Follow-up of patients : longitudinal analysis of events

Patients were followed-up within PMSI database (acute care) over a two-year long period starting from their first inpatient record for AF in 2008. A medical review was performed to assign inpatients to a range of pre-specified diagnosis :

- Strokes (ischemic, hemorrhagic, other) (ICD 10 code : I60,... , I67)
- Hemorrhages (gastro-intestinal (GI bleeds), intracranial (ICH), other major and non-major hospitalized bleed)
- Cardiovascular

Severity of stroke

In case of stroke, rehabilitation care following acute care discharge was also assessed through a database linkage. Analysis of length of stay (LOS) in rehabilitation was used to infer the grade of stroke severity :

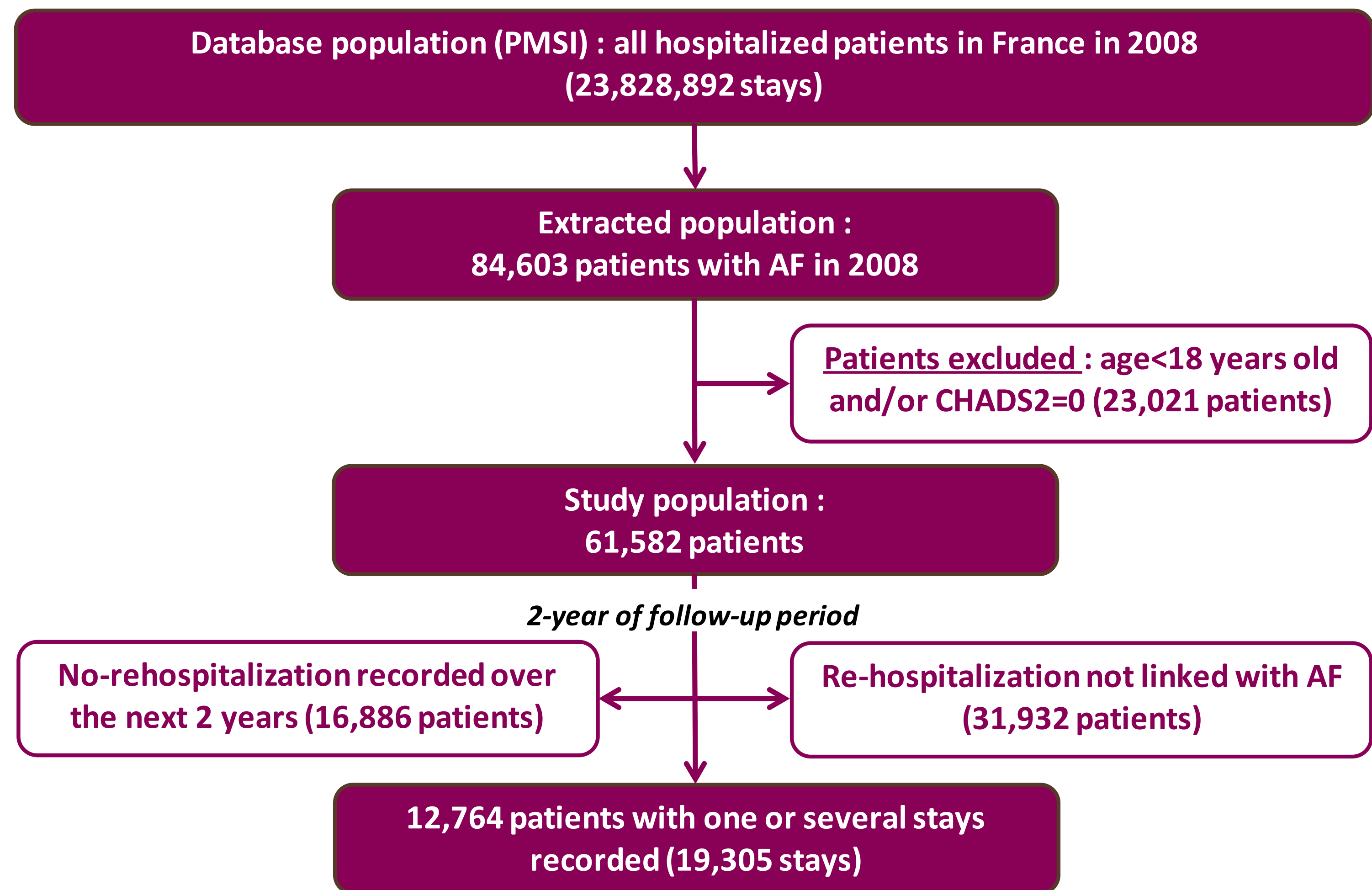
- Mild = no rehabilitation care
- Moderate = rehabilitation care period less than one month
- Severe = rehabilitation care period over one month
- Fatal = patient's death

Statistic analysis and economic evaluation

Cumulative incidence was calculated as the total number of new hospitalizations over the two years of follow-up divided by the size of the study population. Mean hospitalization costs in acute and rehabilitation care were valued based on public national tariffs and National Scale Cost respectively (€ 2011).

Results

Chart flow



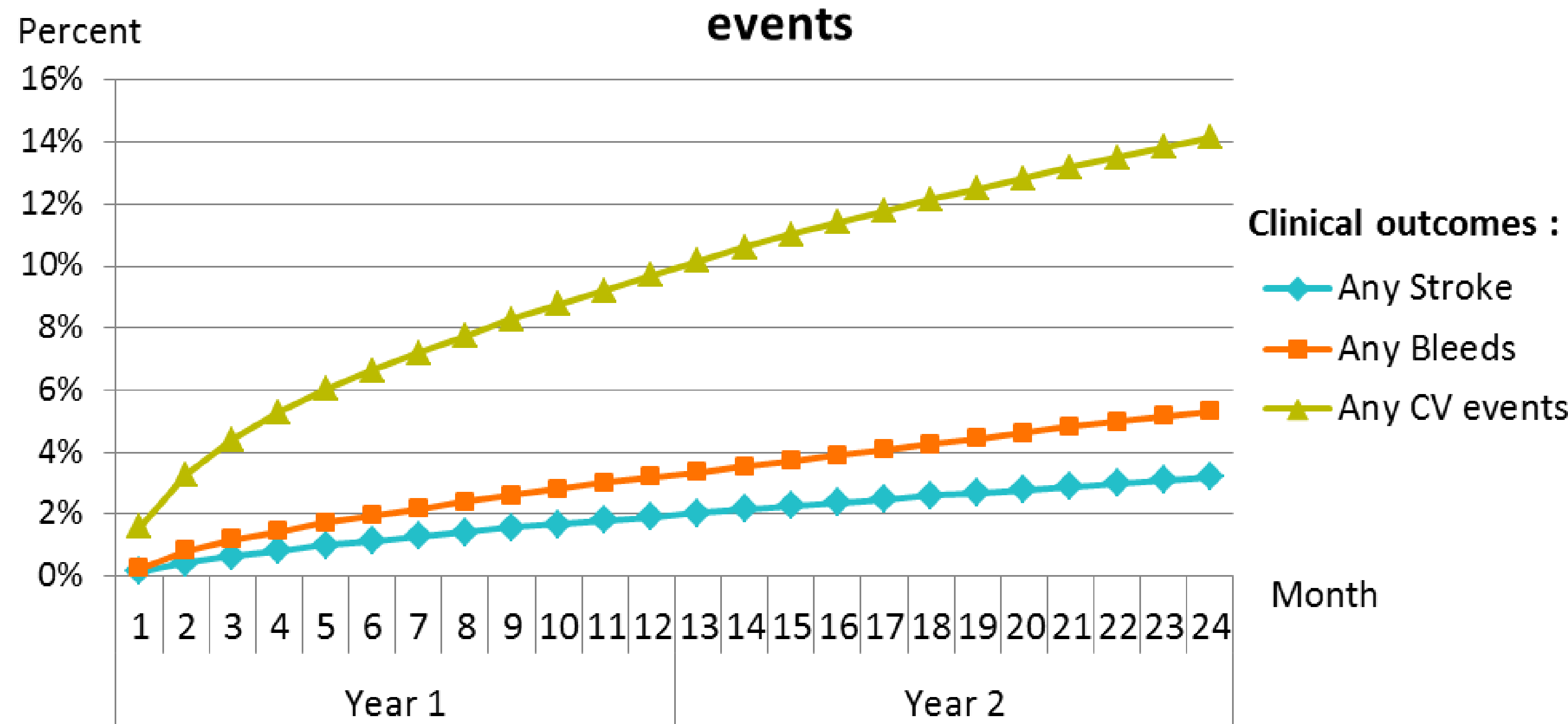
Description of patient population

- In France in 2008, 61,582 adults patients were hospitalized for AF and identified as eligible for stroke prevention with anti-coagulants (i.e CHADS2≥1).
- Patients were composed of 53% males and 47% females, with mean age of 75.0(±11.0) years old and mean score CHADS2 of 1.90(±0.99).

2-year cumulative Incidence

- 12,764 patients were re-hospitalized at least once over the 2 years of follow-up.

Cumulated incidence of re-hospitalization per type of events



- 2-year cumulative incidences of any strokes was 3.2% with 60%, 24% and 16% for ischemic, hemorrhagic and unspecified types.
- Hemorrhages occurred in 5.3% of patients, with 26% gastro-intestinal, 5% intracranial and 69% others.
- Mean risk scores (CHADS2) were 2.24(±1.14) and 2.07(±1.04) for stroke patients and patients with hemorrhagic events respectively.
- 22% and 5% of patients died among the subgroup of stroke and hemorrhagic patients.

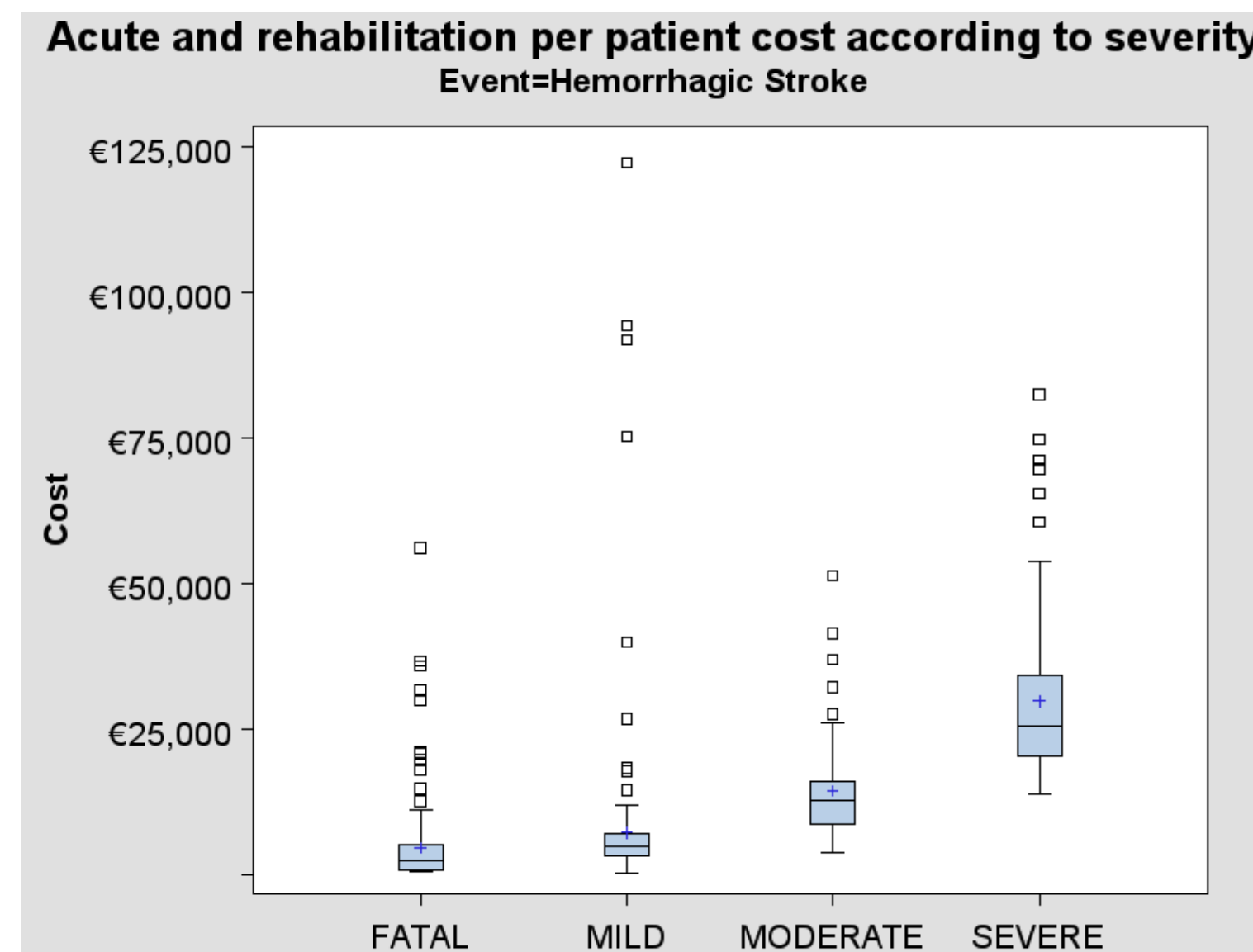
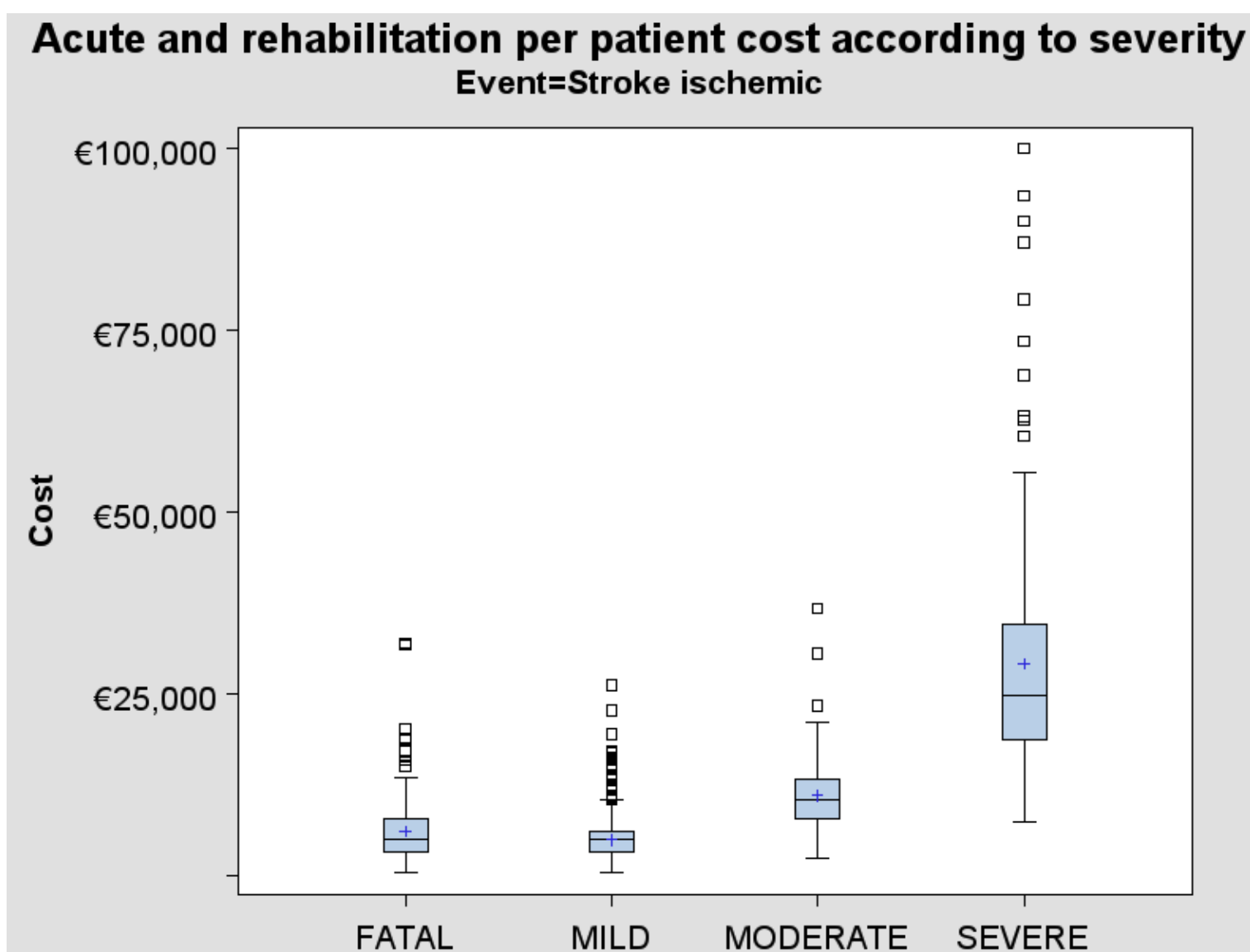
Description of inpatient stays

- 11.3% of inpatient stays were day care versus 88.7% of complete hospitalizations.
- Mean LOS was 12.8 days for stroke, and 6.3 days for hemorrhage.
- 50.2% and 41.7% of stroke and hemorrhagic patients were first admitted to emergency care.
- 27% of stroke patients were referred to rehabilitation care after their discharge from acute care.

Acute and rehabilitation per patient cost for ischemic and hemorrhagic stroke

- Mean cumulated costs over 2 years for ischemic and hemorrhagic stroke per severity :

		Mean cost	STD	Median	Q1	Q3
Stroke ischemic	Mild	€4,848	€2,888	€4,842	€3,129	€6,055
	Moderate	€10,909	€4,843	€10,332	€7,798	€13,231
	Severe	€29,065	€15,622	€24,752	€18,607	€34,552
Hemorrhagic stroke	Fatal	€6,035	€4,766	€4,842	€3,129	€7,747
	Mild	€7,183	€15,044	€4,774	€3,044	€6,815
	Moderate	€14,298	€9,029	€12,671	€8,654	€15,860
	Severe	€29,701	€14,480	€25,334	€20,357	€34,172
	Fatal	€4,590	€6,907	€2,320	€692	€5,137



Per patient cost related to hemorrhage (acute care)

Hemorrhages	Mean cost	STD	Median	Q1	Q3
GI Bleeds	€3,601	€3,107	€3,596	€1,619	€4,248
ICH	€7,331	€8,788	€5,344	€3,529	€8,375
Clinically Relevant Non Major Bleeds	€2,552	€3,568	€2,096	€1,237	€3,363
Non ICH non GI Bleeds	€3,941	€5,056	€2,720	€1,197	€4,509

Discussion

- For non-fatal strokes, mean costs per patient increase markedly with severity. When they were hemorrhagic, strokes with mild and moderate severity tended to be more costly than ischemic ones. However, for severe strokes, costs appeared similar, whatever their etiology. Regarding hemorrhages, mean costs in certain localizations such intracranial appeared higher than for ischemic stroke with mild severity. Costs estimates were found comparable with other findings from the literature: hospitalization-related costs valued at €4,603 (EUR2003) for stroke patients² and a mean hospitalization-cost ranging between €5,145 and €5,407 (EUR2006) depending on the length of intensive care³.
- PMSI enabled to carry out an exhaustive observational study within AF patients at the French national level. However, this approach has also several limitations. First, information about existing preventive treatment and type was not available. Strokes and hemorrhages incidences also reflects outcomes from the current management care of stroke prevention in France. For comparison, a recent clinical trial⁴ showed a risk of strokes of 1.60% per year in its VKA arm (>9,000 patients) which is very similar to our finding (3.21% for 2 years). However, in the same trial, hemorrhages rate for VKA patients was higher than ours, 3.09% per year compared to 5.30% for 2 years, respectively. This discrepancy may be explained by the fact that all patients are not treated by VKA in real life and that many hemorrhages are not hospitalized. Second, variability in coding across hospitals may limit utilization of PMSI for epidemiology purpose. Nevertheless, standardization of coding rules has increasingly improved data quality especially since 2005.

Conclusions

- Frequencies and cost of hospitalized hemorrhages appear important to be taking into account in the global burden of AF.
- This data should be useful for future French pharmacoeconomic evaluations of news oral anti-coagulants.
- Thus, this real world data study may be helpful to assess consistency of patients' features within recent published clinical trials.

References

[1] Cohen et al. Characteristics and management of outpatients with history of or current atrial fibrillation : The observational French EPHA study, Archives of Cardiovascular Disease (2010) 103, 376-387 [2] Colin X, Lafuma A, Gueron B. Costs of cardiovascular events of diabetic patients in the French hospitals. Diabetes Metab. 2007 Sep;33(4):310-3 [3] Gouépo A., Dr. Chevreul K., Pr. Durand-Zaleski I., Etude économique sur la prise en charge des accidents vasculaires cérébraux, juillet 2009, URC ECO, APHP. [4] Granger et al. Apixaban versus warfarin in patients with atrial fibrillation. N Engl J Med. 2011 Sep 15;365(11):981-92.



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