

Features And Causes Of Death Of Patients With Atrial Fibrillation Seen In French Hospitals In 2012

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INTRODUCTION

- Atrial fibrillation (AF) has been associated with worse clinical outcomes in many cardiovascular (CV) disease states. [1]
- In men who are 65-74 years, 70% of AF patients died at 10 years of follow-up. In the Framingham study [2]
- Ischemic stroke (IS) and intracranial hemorrhage (ICH) resulting from AF are more severe and more often cause disability or death.
- In a previous study, characteristics of patients and predictors of IS- and ICH-related deaths were assessed using a clinical trial, including selected patients, all of whom being treated with oral anticoagulation [3]. There is a lack of data on real world specific causes of deaths in AF patients.

OBJECTIVES

- To provide features and causes of deaths of all patients with AF seen in French hospitals in 2012
- To identify determinants of death in patients who deceased from IS or ICH.

METHODS

Data Source

- Patients were identified through the French National hospital discharge database (PMSI). This database contains all daycare, inpatient stays and deaths occurring during a stay in private and public French hospitals. In this study, we used PMSI-MCO (Medicine, Surgery, Obstretic) and PMSI-SSR (Post-acute care and rehabilitation).

Study Population

- All adults with an AF diagnosis (i.e. ICD-10 code: I48) in 2012 were identified.
- Inclusion criteria were :
 - Patients with a hospitalization stay for any reason in 2012
 - And with a diagnosis of AF, coded either in principal, related or significantly associated diagnosis, including valvular and non-valvular AF.
 - And aged ≥ 18 years.
- Dead AF patients were identified through the death date.

Study Design

- This was a retrospective analysis using PMSI.
- Characteristics and history of all and dead patients were described using all their hospital stay records occurring since January 1st 2007.

Statistical Analyses

- Qualitative variables were described using tables and/or figures. Continuous quantitative variables were described with the mean and standard deviation.
- Stroke and hemorrhage risk scores were calculated using comorbidities and history data.
- Cause of death was determined using the principal diagnosis of the stay during the death occurred.
- Only variables used in the multivariate analyses were statistically significant in univariate analyses (5%)

RESULTS

Characteristics

- In 2012, 533,044 patients with an AF were identified through PMSI. Among them, 51,065 patients (9.4%) died in French hospitals. Characteristics of these patients are summarized in **Table 1**.

RESULTS (cont'd)

Table 1. Characteristics of patients

	All patients N=533,044	Alive patients (N=482,879)	Dead Patients (N=50,165)	P-value
Socio-demographic				
Mean age (years)	78.0	77.6	82.3	<0.0001
Sex (% women)	47.1	47.1	47.6	0.025
Comorbidities (%)				
Hypertension	70.2	69.9	73.0	<0.0001
Diabetes mellitus	24.2	24.0	26.7	<0.0001
Renal failure	22.8	21.2	39.1	<0.0001
Liver failure	4.7	4.3	8.8	<0.0001
Thyroid disease	13.4	13.3	14.3	<0.0001
Lung disease	22.5	21.3	34.2	<0.0001
Inflammatory disease	9.8	9.5	11.9	<0.0001
Neurologic diseases	10.4	9.9	15.6	<0.0001
Anemia	23.8	22.6	35.5	<0.0001
Cancer	19.0	17.8	30.2	<0.0001
Alcohol	6.1	5.9	7.5	<0.0001
History (%)				
Stroke	8.1	7.9	9.6	<0.0001
Ischemic	6.3	6.2	7.3	<0.0001
Hemorrhagic	1.1	1.1	1.5	<0.0001
Unspecified	1.7	1.6	2.2	<0.0001
Major hemorrhage	2.4	2.4	3.3	<0.0001
ICH	0.5	0.5	0.7	<0.0001
Gastrointestinal hemorrhage	1.0	0.9	1.5	<0.0001
Any severe bleeding	1.1	1.1	1.5	<0.0001
Transient ischemic accident	3.0	3.0	3.3	0.0007
Systemic embolism	3.1	3.0	4.4	<0.0001
Vascular disease	17.7	17.2	22.4	<0.0001
Myocardial Infarction	8.0	7.8	9.6	<0.0001
Peripheral arterial disease	9.8	9.4	13.4	<0.0001
Occlusions	4.4	4.2	5.7	<0.0001
Other ischemic heart disease	22.1	21.7	25.6	<0.0001
AF symptoms	7.3	7.4	6.5	<0.0001
Heart failure	29.5	28.3	41.8	<0.0001
Cardiac dysrhythmia	7.6	7.6	8.3	<0.0001
Abnormal cardiac conduction	16.3	16.0	18.9	<0.0001
Valvular disease/surgery	13.8	13.5	17.3	<0.0001
Mitral stenosis	0.8	0.8	0.9	0.0135
Fall	10.0	9.5	15.4	<0.0001
Risk scores (mean; SD and %)				
CHA2DS2-VASc	4.0 ; 1.8	4.0 ; 1.8	4.6 ; 1.6	<0.0001
0-3	37.2	38.6	24.3	<0.0001
4-6	54.8	53.8	63.9	<0.0001
7-9	8.0	7.6	11.8	<0.0001
HAS-BLED	2.2 ; 1.1	2.1 ; 1.1	2.6 ; 1.1	<0.0001
0-1	26.5	27.6	16.1	<0.0001
2-4	70.9	70.1	78.8	<0.0001
5-7	2.6	2.4	5.0	<0.0001

RESULTS (cont'd)

Causes of hospitalization and death

- Among AF patients, 267,681 were hospitalized for a CV reason. CV-related deaths represent 34% of all deaths. (**Figure 2A & 2B**)

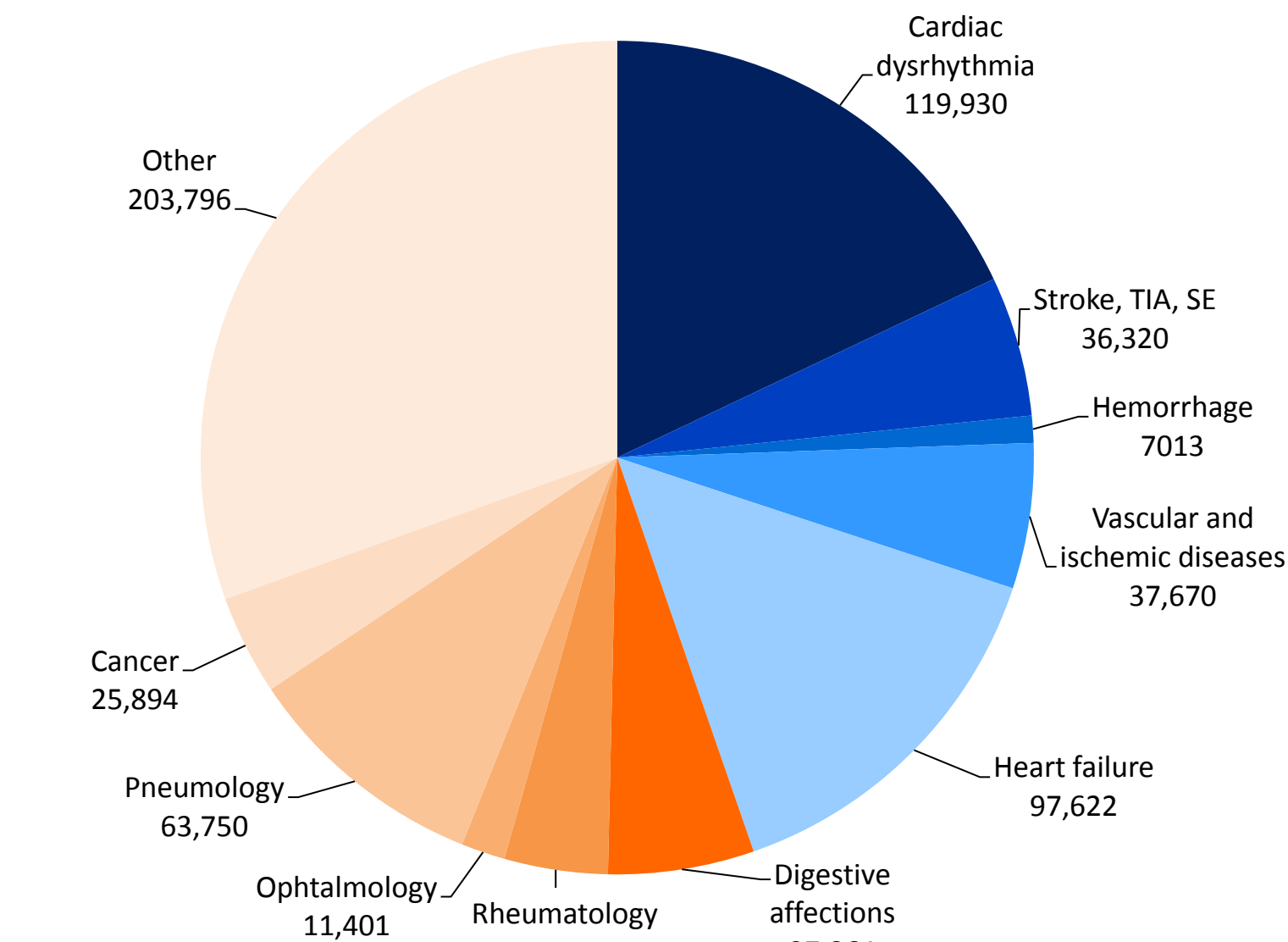


Figure 2A. Principal diagnosis of hospitalizations at index date* (N=533,044 patients)
*Patients may have several stays

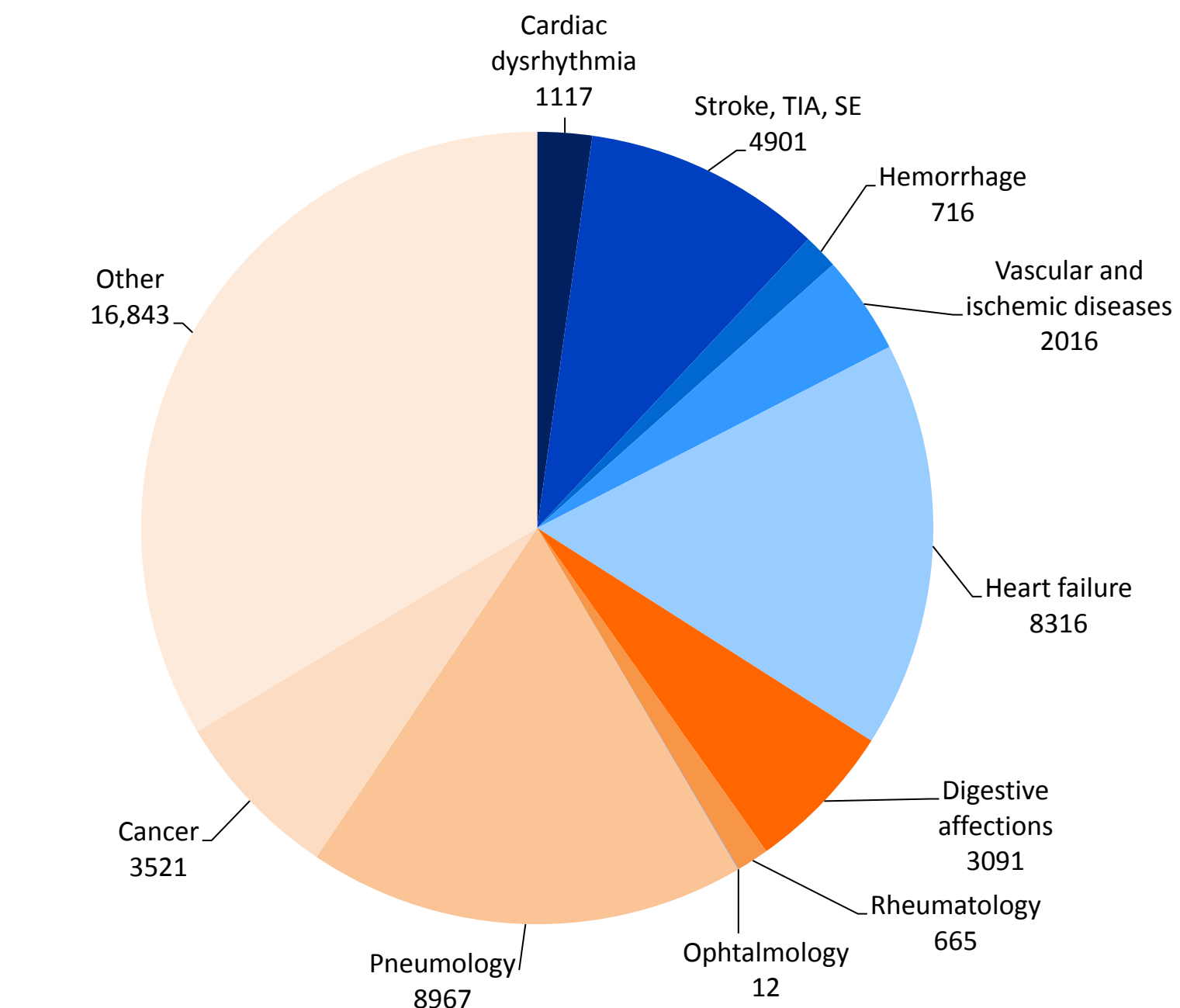


Figure 2B. Principal diagnosis of hospitalizations when death occurred (N=50,165 patients)

RESULTS (cont'd)

Table 3. Deceased patients and relative weight of overall deaths

	Number of patients dying at hospital	Relative weight of overall deaths (%)
TOTAL*	50,165	100
TOTAL non-CV events*	33,099	66
TOTAL CV events*	17,066	34
Cardiac dysrhythmia	1117	2.2
Stroke, TIA, SE	4 01	9.8
ischemic stroke	2614	5.2
hemorrhagic stroke	1334	2.7
unspecified	294	0.6
TIA	69	0.1
SE	590	1.2
Hemorrhage	716	1.4
ICH	335	0.7
gastro-intestinal	130	0.3
Other	251	0.5
Vascular and ischemic diseases	2016	4.0
Heart failure	8316	16.6

*patients may have several hospitalizations

Determinants of deaths after an IS

- 19,909 patients had an IS, and among them 2614 (13.1%) died in hospital.
- Advanced age (≥65years), female gender, history of peripheral arterial disease, renal failure, lung disease and heart failure increased the risk of death from an IS (**Table 4**).

Table 4. Uni and multivariate analyses of risk factors of death for an IS

Death after an ischemic stroke	Univariate analysis			Multivariate analysis		
	Alive (N=19,909)	Dead (N=2614)	p-value	OR	IC 95%	p-value
Demographic						
Age						
<65 years (%)	15.3	8.1	-	-	-	-
65-74 years (%)	8.1	2.5	0.0003	1.62	1.22 - 2.15	0.0009
≥75 years (%)	76.6	89.4	<0.0001	3.30	2.56 - 4.26	<0.0001
Sex						
Women (%)	56.5	61.7	<0.0001	1.18	1.08 - 1.29	0.0002
Comorbidities (%)						
Vascular disease						
Myocardial Infarction	5.7	7.5	0.0004	-	-	-
Peripheral arterial disease	6.8	10.3	<0.0001	1.32	1.14 - 1.53	0.0002
Renal failure	14.8	21.8	<0.0001	1.30	1.16 - 1.44	<0.0001
Thyroid disease	11.4	12.9	0.0253	-	-	-
Lung disease	16.9	30.0	<0.0001	1.95	1.77 - 2.15	<0.0001
Neurologic disease	12.4	15.8	<0.0001	-	-	-
Anemia	14.7	19.1	<0.0001	-	-	-
Cancer	11.8	13.8	0.0028	-	-	-
History						
Other ischemic heart disease	15.3	18.9	<0.0001	-	-	-
Heart failure	19.1	28.3	<0.0001	1.28	1.16 - 1.41	<0.0001
Abnormal cardiac conduction	11.5	14.3	<0.0001	-	-	-
Valvular disease/surgery	9.0	11.8	<0.0001	-	-	-

RESULTS (cont'd)

Determinants of deaths after an ICH

- Over 1,785 patients with an ICH, 335 (18.8%) died in hospital.
- Age, pulmonary disease, and vascular disease/surgery were added in the multivariate analysis and were predictors of death next to an ICH. (**Table 5**) Nevertheless, previous ICH reduced the risk of death due to a new ICH.

Table 5. Uni and multivariate analyses of risk factors of death associated with an ICH

Death after an intracranial hemorrhage	Univariate analysis			Multivariate analysis		
	Alive (N=1,782)	Dead (N=335)	p-value	OR	IC 95%	p-value
Demographic						
Age						
<65 years (%)	12.8	7.5	-	-	-	-
65-74 years (%)	5.9	2.1	0.2572	-	-	-
≥75 years (%)	81.3	90.4	0.0039	2.191	1.48 - 3.24	<0.0001
Sex						
Women (%)	41.6	41.2	0.8956	-	-	-
Comorbidities (%)						
Vascular disease						
Peripheral arterial disease	7.7	11.9	0.0134	-	-	-
Renal failure	19.5	26.0	0.0089	-	-	-
Lung disease	17.4	26.0	0.0003	1.687	1.27 - 2.24	0.0003
Anemia	20.8	26.6	0.0224	-	-	-
History						
Major hemorrhage						
ICH	8.1	4.2	0.0144	0.465	0.26 - 0.83	0.0088
Heart failure	26.8	35.5	0.0014	-	-	-
Valvular disease/surgery	12.0	17.9	0.0041	1.578	1.14 - 2.19	0.0057

CONCLUSIONS

- Over 533,044 AF patients hospitalized in 2012, almost 10% of these patients died during hospital stay. Dead patients were older, had more comorbidities and higher risk scores.
- Principal diagnosis of hospitalization were CV for half of these patients (53.2%). However, CV-related deaths occurred for one third (34.0%) of patients.
- Determinants of death associated with an IS were age ≥ 65years, women, peripheral arterial disease, renal failure, lung disease and heart failure. Determinants of death associated with an ICH were older age, pulmonary disease, valvular disease/surgery. Previous ICH would protect of dying with a new ICH episode.

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