Scientific Research Publishing

Neuroscience and Medicine, 2026, 17(1), 70-75
https://www.scirp.org/journal/nm
ISSN Online: 2158-2947
ISSN Print: 2158-2912

When Morbidity Intersects: Ischemic Stroke Related to Atrial Fibrillation in the Geriatric Population

Fatimazahra Ait Fatah, Hajar Khattab, Asmaa Sikkal, Kamal Haddou Ali, Salma Bellakhdar, Hicham El Otmani, Bouchra El Moutawakil, Mohammed Abdoh Rafai

Neurology Department, IBN Rochd University Hospital-Hassan II University, Casablanca, Morocco
Email: fatimazahraaitfatah1993@gmail.com

How to cite this paper: Ait Fatah, F.Z., Khattab, H., Sikkal, A., Haddou Ali, K., Bellakhdar, S., El Otmani, H., El Moutawakil, B. and Rafai, M.A. (2026) When Morbidity Intersects: Ischemic Stroke Related to Atrial Fibrillation in the Geriatric Population. *Neuroscience and Medicine*, **17**, 70-75.
https://doi.org/10.4236/nm.2026.171007

Received: February 1, 2026
Accepted: March 7, 2026
Published: March 10, 2026

Abstract

Background: Ischemic stroke (IS) remains one of the leading causes of disability and mortality worldwide. Atrial fibrillation (AF) is a major cardioembolic risk factor, particularly in older adults, in whom stroke often occurs on a background of frailty and multiple comorbidities. However, data focusing on the specific clinical and prognostic features of AF-related ischemic stroke in geriatric populations remains limited. Objective: To describe the clinical, radiological, and functional characteristics of ischemic stroke related to atrial fibrillation in patients aged 65 years and older, and to compare outcomes between patients with and without atrial cardiomyopathy. **Methods**: We conducted a retrospective observational study in the Neurology Department of CHU Ibn Rochd (Casablanca, Morocco) between January 2024 and June 2025. Patients aged ≥ 65 years with confirmed cardioembolic ischemic stroke due to AF were included. Patients were classified according to comorbidities (isolated AF, AF + hypertension, AF + hypertension + structural heart disease) and according to the presence of atrial cardiomyopathy (left atrial dilation and/or fibrosis). Clinical severity (NIHSS), nutritional status (MNA), frailty (Clinical Frailty Scale), functional autonomy (Katz ADL), and disability (modified Rankin Scale, mRS) were analyzed. Statistical analysis used Chi-square and ANOVA tests. **Results**: A total of 250 patients were included (mean NIHSS: 13.5). Stroke severity increased significantly with age and number of comorbidities. Atrial cardiomyopathy was present in 32% of patients and was associated with higher NIHSS scores (15 vs 12), more extensive ischemic lesions on imaging, and increased mortality. At 3 months, patients with atrial cardiomyopathy had worse functional outcomes (mean mRS 4.1 vs 3.2). Persistent dependency was observed in 59% of cases, and malnutrition affected 68% of patients. **Conclusion**: In elderly patients, ischemic stroke related to atrial fi-

brillation is strongly influenced by frailty and comorbidities. Atrial cardiomyopathy emerges as a key marker of severity and poor prognosis. Its identification may help refine risk stratification and optimize management strategies in this vulnerable population.

Keywords

Ischemic Stroke, Atrial Fibrillation, Elderly, Frailty, Atrial Cardiomyopathy, Prognosis

1. Introduction

Ischemic stroke remains one of the leading causes of mortality and long-term disability worldwide and represents a major public health challenge, particularly in aging populations [1]. Despite significant advances in acute stroke management, including reperfusion therapies and optimized stroke unit care, a substantial proportion of survivors experience persistent disability, loss of autonomy, and reduced quality of life [1] [2]. These consequences are especially pronounced in elderly patients, who constitute the fastest growing segment of the stroke population.

Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia and a well-established risk factor for ischemic stroke [2] [3]. Its prevalence increases markedly with age, affecting up to 10% of individuals over 80 years old [3]. Epidemiological studies have consistently shown that AF-related strokes are more severe, associated with larger infarct volumes, higher mortality, and poorer functional outcomes compared to other ischemic stroke subtypes [4] [5]. Consequently, AF represents the leading cause of cardioembolic stroke in elderly populations.

In older adults, ischemic stroke rarely occurs as an isolated event. Instead, it often develops in a complex clinical context characterized by multimorbidity, polypharmacy, frailty, and reduced physiological reserve [6] [7]. Frailty has emerged as a powerful predictor of adverse outcomes after stroke, independently of chronological age, and is associated with increased mortality, prolonged hospitalization, and persistent dependency [6] [7]. In addition, malnutrition is highly prevalent among elderly stroke patients and has been independently associated with poor neurological recovery, increased complications, and unfavorable functional outcomes [8].

Beyond the presence of atrial fibrillation itself, increasing attention has been paid to the concept of atrial cardiomyopathy, which encompasses structural, architectural, and functional abnormalities of the atrial myocardium, including atrial dilation, fibrosis, and impaired contractility [9] [10]. These atrial changes may promote thromboembolism independently of AF, suggesting that AF may represent a clinical manifestation of a broader atrial disease process rather than

the sole driver of stroke risk [10] [11]. This concept challenges traditional risk stratification models and may be particularly relevant in elderly patients, in whom atrial remodeling is common.

However, data on the clinical and prognostic impact of atrial cardiomyopathy in elderly patients with AF-related ischemic stroke remain limited, particularly in real-world cohorts from low- and middle-income countries.

2. Aim

The present study aims to describe the clinical, radiological, and functional characteristics of ischemic stroke related to atrial fibrillation in patients aged 65 years and older, and to assess the impact of atrial cardiomyopathy on stroke severity and functional outcome.

3. Methods

3.1. Study Design and Population

We conducted a retrospective, observational, descriptive and analytical study in the Neurology Department of CHU Ibn Rochd, Casablanca, Morocco, between January 2024 and June 2025.

Patients were eligible if they met the following criteria:

- Age ≥ 65 years;
- Acute ischemic stroke confirmed by brain imaging (CT and/or MRI);
- Cardioembolic etiology related to documented atrial fibrillation.

Patients with intracerebral hemorrhage, transient ischemic attack, or ischemic stroke due to other major etiologies (large-artery atherosclerosis, small-vessel disease, arterial dissection, or vasculitis) were excluded.

3.2. Clinical and Geriatric Assessment

Stroke severity at admission was assessed using the National Institutes of Health Stroke Scale (NIHSS). Functional outcome was evaluated using the modified Rankin Scale (mRS) at 3 months.

Geriatric assessment included:

- Autonomy: Katz Activities of Daily Living (ADL);
- Frailty: Clinical Frailty Scale (CFS);
- Nutritional status: Mini Nutritional Assessment (MNA);
- Dependency level: GIR score.

Patients were classified according to comorbidities (isolated AF, AF + hypertension, AF + hypertension + structural heart disease).

3.3. Assessment of Atrial Cardiomyopathy

Atrial cardiomyopathy was defined by the presence of left atrial dilation and/or atrial fibrosis on transthoracic echocardiography, in accordance with current consensus definitions (9).

3.4. Statistical Analysis

Quantitative variables were expressed as mean ± standard deviation and compared using ANOVA. Qualitative variables were expressed as percentages and compared using the chi-square test. A p-value < 0.05 was considered statistically significant.

4. Results

A total of 250 patients were included. The mean age was 74.6 ± 6.8 years, and 58% were female. The mean NIHSS score at admission was 13.5, indicating moderate to severe strokes.

Stroke severity increased significantly with advancing age, with the highest NIHSS scores observed in patients aged 80 years and older (Figure 1). Atrial cardiomyopathy was identified in 32% of patients and was associated with higher NIHSS scores, larger ischemic lesions, and increased in-hospital mortality.

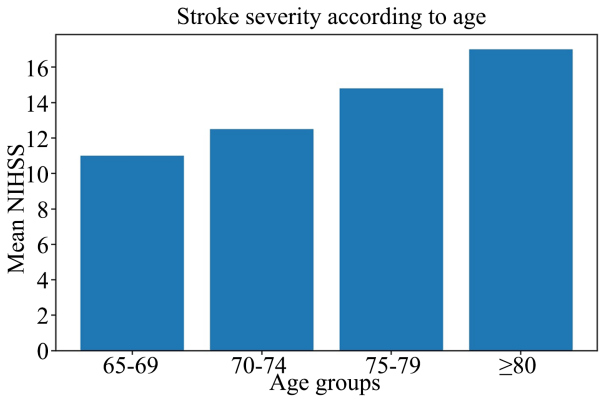

Figure 1. Stroke severity according to age.

At 3 months, functional outcomes were markedly worse in patients with atrial cardiomyopathy, with a higher proportion of severe disability or death compared to patients without atrial cardiomyopathy (Figure 2). Persistent dependency was observed in 59% of patients, and malnutrition affected 68% of the cohort.

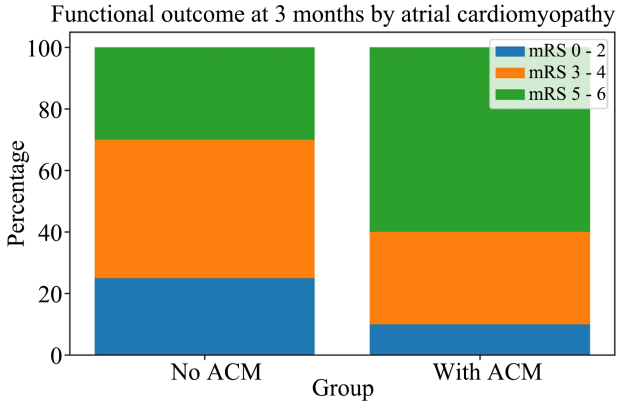

Figure 2. Functional outcome at 3 months by atrial cardiomyopathy.

Frailty and malnutrition were strongly associated with unfavorable functional outcomes.

5. Discussion

This study highlights the high burden and severity of ischemic stroke related to atrial fibrillation in elderly patients. Consistent with previous reports, AF-related strokes in our cohort were associated with high initial severity and poor functional outcomes [4] [5] [12]. The progressive increase in stroke severity with age underscores the vulnerability of very old patients and the cumulative impact of comorbidities and frailty [6] [7].

A major finding of our study is the strong association between atrial cardiomyopathy and poor neurological and functional outcomes. Patients with atrial cardiomyopathy experienced more severe strokes and worse recovery, supporting the hypothesis that atrial remodeling plays a central role in thromboembolic risk beyond the presence of AF itself [9]-[11]. This may explain why some patients with apparently well-controlled or paroxysmal AF still experience severe ischemic strokes.

The high prevalence of frailty and malnutrition further emphasizes the importance of comprehensive geriatric assessment in stroke care. These factors are often underrecognized but have a profound impact on recovery and long-term outcomes [6]-[8].

6. Conclusion

Ischemic stroke related to atrial fibrillation in elderly patients is characterized by high severity, frequent dependency, and poor functional outcomes. Atrial cardiomyopathy appears to be a key marker of stroke severity and prognosis. Its systematic assessment, combined with geriatric evaluation, may improve risk stratification and guide individualized management strategies in this vulnerable population.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Feigin, V.L., Stark, B.A., Johnson, C.O., Roth, G.A., Bisignano, C., Abady, G.G., *et al.* (2021) Global, Regional, and National Burden of Stroke and Its Risk Factors, 1990-2019: A Systematic Analysis for the Global Burden of Disease Study 2019. *The Lancet Neurology*, **20**, 795-820. https://doi.org/10.1016/s1474-4422(21)00252-0

[2] Wolf, P.A., Abbott, R.D. and Kannel, W.B. (1991) Atrial Fibrillation as an Independent Risk Factor for Stroke: The Framingham Study. *Stroke*, **22**, 983-988. https://doi.org/10.1161/01.str.22.8.983

[3] Benjamin, E.J., Muntner, P., Alonso, A., *et al.* (2023) Heart Disease and Stroke Statistics-2023 Update. *Circulation*, **147**, e93-e621.

[4] Lin, H., Wolf, P.A., Kelly-Hayes, M., Beiser, A.S., Kase, C.S., Benjamin, E.J., *et al.*

(1996) Stroke Severity in Atrial Fibrillation. *Stroke*, **27**, 1760-1764. https://doi.org/10.1161/01.str.27.10.1760

[5] Marini, C., De Santis, F., Sacco, S., Russo, T., Olivieri, L., Totaro, R., *et al.* (2005) Contribution of Atrial Fibrillation to Incidence and Outcome of Ischemic Stroke. *Stroke*, **36**, 1115-1119. https://doi.org/10.1161/01.str.0000166053.83476.4a

[6] Saposnik, G., Gladstone, D., Raptis, R., *et al.* (2013) Atrial Fibrillation in Ischemic Stroke. *Stroke*, **44**, 99-104.
Clegg, A., Young, J., Iliffe, S., Rikkert, M.O. and Rockwood, K. (2013) Frailty in Elderly People. *The Lancet*, **381**, 752-762.
https://doi.org/10.1016/s0140-6736(12)62167-9

[7] Rockwood, K. and Mitnitski, A. (2007) Frailty in Relation to the Accumulation of Deficits. *The Journals of Gerontology Series A*: *Biological Sciences and Medical Sciences*, **62**, 722-727. https://doi.org/10.1093/gerona/62.7.722

[8] Foley, N.C., Salter, K.L., Robertson, J., Teasell, R.W. and Woodbury, M.G. (2009) Nutritional Status and Stroke Outcome *Stroke*, **40**, 1744-1750.

[9] Goette, A., Kalman, J.M., Aguinaga, L., Akar, J., Cabrera, J.A., Chen, S.A., *et al.* (2016) EHRA/HRS/APHRS/SOLAECE Expert Consensus on Atrial Cardiomyopathies: Definition, Characterization, and Clinical Implication. *Europace*, **18**, 1455-1490. https://doi.org/10.1093/europace/euw161

[10] Guichard, J. and Nattel, S. (2017) Atrial Cardiomyopathy: A Useful Concept? *Journal of the American College of Cardiology*, **70**, 756-765. https://doi.org/10.1016/j.jacc.2017.06.033

[11] Kamel, H., Okin, P.M., Elkind, M.S.V. and Iadecola, C. (2016) Atrial Fibrillation and Mechanisms of Stroke. *Nature Reviews Cardiology*, **13**, 533-544.

[12] Sanders, P., Morton, J.B., Davidson, N.C., Spence, S.J., Vohra, J.K., Sparks, P.B., *et al.* (2003) Electrical Remodeling of the Atria in Congestive Heart Failure. *Circulation*, **108**, 1461-1468. https://doi.org/10.1161/01.cir.0000090688.49283.67