

Atrial Fibrillation In Acute Myocardial Infarction

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Background: Although atrial fibrillation (AF) is a common complication of acute myocardial infarction (MI), patients characteristics and association with outcomes remain poorly defined.

Material and method: A prospective study of 341 consecutive patients admitted to the conducted in the Clinic of Cardiology - Institute of Cardiovascular Diseases Tg Mures – from 31 Jan 08 to 31 Dec 10 with ST-segment elevation myocardial infarction. Patients underwent routine clinical exam, lab tests, echocardiogram.

Results: The incidence of atrial fibrillation complicating myocardial infarction was 11.6%. Statistically significant correlations were found between atrial fibrillation and age ($p < 0.001$), smoking ($p < 0.01$), and mitral regurgitation ($p < 0.05$).

Conclusions: Post-MI AF is more common in older patients, in patients with heart failure, and after more extensive infarction. AF is a common complication of acute MI in smoking patients and in patients with significant mitral regurgitation.

Keywords: infarction, atrial fibrillation

Introduction

Atrial fibrillation is a common complication of acute myocardial infarction (MI), with a reported incidence as high as 20% (1). AF occurs in 5% to 10% of patients who have received fibrinolysis. Despite its frequent occurrence, the causes and significance of atrial fibrillation complicating acute MI remains controversial. Although some studies have identified increased in-hospital and long-term mortality associated with atrial fibrillation [2–5] others have found no independent effect [1,6–9]. Further complicating the issue are comorbid conditions that may be associated with survival after acute MI. It remains unclear whether atrial fibrillation is a marker for overall poorer clinical status or independently influences patient outcomes. Using detailed clinical data from our clinic, we sought to determine the incidence of atrial fibrillation in patients with acute MI, clinical factors associated with its presentation, and its association with patient outcomes.

Post-MI AF is more common in older patients, in patients with heart failure, and following a more extensive infarction. Postinfarction prognosis is worse among patients complicated by AF — indeed, mortality and morbid events including stroke, thromboembolism, and heart failure are increased in this group. It is unclear as to whether AF directly reduces survival or merely demarcates patients at higher overall risk. Despite its frequent occurrence and deleterious influence on outcomes, randomized data regarding management of AF after acute MI are scarce.

Material and methods

This study was a prospective study, conducted in the Clinic of Cardiology of the Institute of Cardiovascular Diseases and Transplant Tîrgu Mureş from January 31, 2008 to December 31, 2010. We included 341 consecutive patients older than 18 years with ST-segment elevation myocardial infarction. Non ST-segment elevation myocardial infarction patients were excluded from the study. All patients were receiving specific medication for AMI, with throm-

bolytic treatment or per primam PTCA. The parameters evaluated were: sex, age, arterial hypertension, diabetes, smoking, cholesterol and triglyceride blood level, myocardial infarction territory, atrial fibrillation, atrial-ventricular blocks, bundle branch blocks, mitral failure and left ventricular ejection fraction. The following blood tests were performed: complete blood count, biochemical analysis. All patients underwent transthoracic color-Doppler echocardiography (Vingmed system) from the left parasternal window (long-axis and short-axis views) and left ventricular apex (4-chamber and 2-chamber views). Ejection fraction was determined using the formula of Simpson.

These parameters were analyzed using a chi-squared test in order to find statistically significant correlations.

Results

From the 341 patients in the study cohort, 39 patients (11.6%) had atrial fibrillation during the evolution of acute MI. Clinical characteristics of patients with acute myocardial infarction are presented in Table I.

Clinical characteristics of patients with acute myocardial infarction and atrial fibrillation are presented in Table II.

According to the statistical calculations, there is a statistically significant correlation between smoker status and

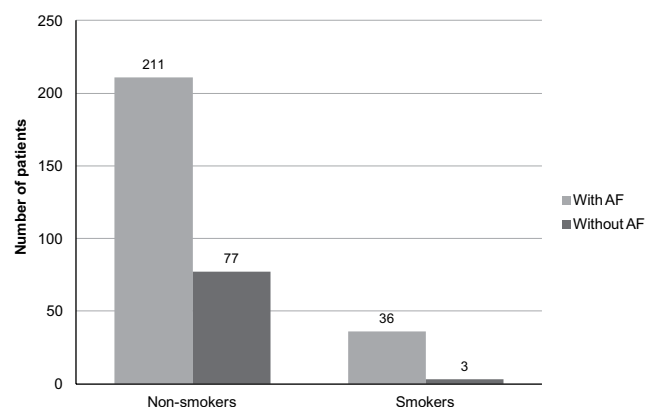


Fig. 1. Correlation between atrial fibrillation and smoking

Table I. Clinical characteristics of patients with acute myocardial infarction

Mean age, y	63.87
Male, %	63.04 (215 pts)
Female, %	36.95 (126 pts)
Diabetes mellitus, %	19.64 (67 pts)
Hypertension, %	74.78 (255 pts)
Current smoker, %	23.46 (80 pts)
Anterior MI location, %	39.88 (136 pts)
Postero-inferior location, %	20.23 (69 pts)
Infero-lateral MI location, %	22.28 (76 pts)
Lateral location, %	3.81 (13 pts)
Other location, %	1.17 (4 pts)
PTCA, %	38.12 (130 pts)
TTFL, %	13.78 (47 pts)
MR, %	38.48 (121 pts)
AF, %	11.6 (39 pts)

the occurrence of atrial fibrillation post MI ($p=0.009$), as presented in Figure 1, and also between the occurrence of atrial fibrillation post acute myocardial infarction and the presence of mitral regurgitation ($p=0.04$), as presented in Figure 2.

The degree of mitral regurgitation is also very important, severe regurgitation was statistically significant associated with a higher risk of developing AF after acute MI ($p=0.00003$), see Figure 3.

Discussion

Given that in-hospital events likely influence mortality and that we adjusted only for patient history and arrival findings, the risk of mortality attributable to atrial fibrillation developing during hospitalization may be overestimated. Atrial fibrillation is an indicator of worse prognosis after acute myocardial infarction, even in an unselected population. After adjustment for other prognostic factors, atrial fibrillation remained an independent predictor of increased in-hospital mortality. It is unclear as to whether AF directly reduces survival or merely demarcates patients at higher overall risk [1,2,5]

It is concluded that different mechanisms are responsible for the production of atrial fibrillation in the setting of acute myocardial infarction, and the prognosis of the

Table II. Clinical characteristics of patients with acute myocardial infarction and atrial fibrillation

Mean age, y	72.51
Male, %	66.66 (26 pts)
Female, %	33.33 (13 pts)
Diabetes mellitus, %	23.07 (9 pts)
Hypertension, %	56.41 (22 pts)
Current smoker, %	51.28 (3 pts)
Anterior MI location, %	51.28 (20 pts)
Postero-inferior location, %	20.51 (8 pts)
Infero-lateral MI location, %	20.51 (8 pts)
Lateral location, %	5.12 (2 pts)
Other location, %	2.56 (1 pts)
PTCA, %	28.20 (11 pts)
TTFL, %	12.82 (5 pts)
MR, %	46.15 (18 pts)
Mean EF, %	42.44

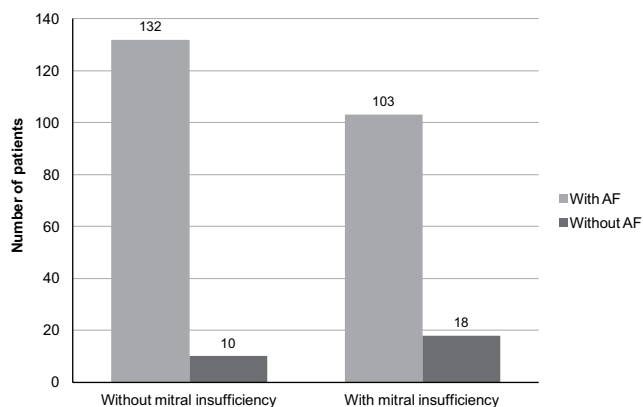
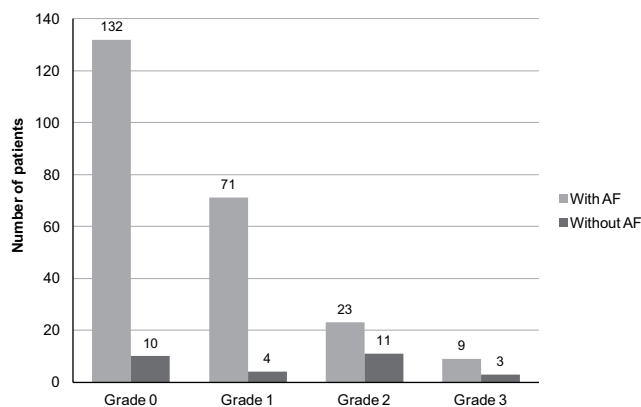
patient is related to the mechanism of production and not to the arrhythmia itself [2,6]. The possibility that atrial fibrillation is merely a marker of underlying heart disease, of course, cannot be discounted.

For now, whether atrial fibrillation is an indicator or is in itself causative of increased risk in acute myocardial infarction, should not be forgotten as an important prognostic marker when stratifying risk after myocardial infarction [4–8].

AF remains a frequent complication of AMI and is associated with a poor prognosis. Increased surveillance and targeted therapeutic approaches appear warranted for these high-risk patients [8,9].

Conclusions

Atrial fibrillation is a common complication of acute MI, occurring in 11.6% of patients in our study cohort. Post-MI AF is more common in older patients, in patients with heart failure, and after more extensive infarction. AF is a common complication of acute MI in smoking patients and in patients with significant mitral regurgitation. Although baseline clinical status may have predisposed patients to poorer outcomes, atrial fibrillation was independently associated with increased mortality. Also patients with impaired left ventricular systolic function proved to

**Fig. 2.** Correlation between atrial fibrillation and mitral insufficiency**Fig. 3.** Correlation between atrial fibrillation and the grade of mitral insufficiency

be more exposed in developing an episode of atrial fibrillation during the hospitalisation. Greater attention to the management of atrial fibrillation complicating acute MI in the elderly, particularly among high-risk patients, may be warranted.

In opposition with these data, no statistically significant correlations were found between the occurrence of atrial fibrillation post acute MI and some important risk factors such as arterial hypertension and diabetes.

References

1. Goldberg RJ, Seeley D, Becker RC – Impact of atrial fibrillation on the in-hospital and long-term survival of patients with acute myocardial infarction: a community wide perspective. *Am Heart J* 1990, 119: 996–1001.
2. Behar S, Zahavi Z, Goldbourt U, Reicher-Reiss H, for the SPRINT Study Group – Long-term prognosis of patients with paroxysmal atrial fibrillation complicating acute myocardial infarction. *Eur Heart J* 1992, 13: 45–50.
3. Eldar M, Canetti M, Rotstein Z, Boyko V, Gottlieb S, Kaplinsky E, Behar S, for the SPRINT and Thrombolytic Survey groups – Significance of paroxysmal atrial fibrillation complicating acute myocardial infarction in the thrombolytic era. *Circulation* 1998, 97: 965–970.
4. Crenshaw BS, Ward SR, Granger CB, Stebbins AL, Topol EJ, Califf RM, for the GUSTO-I Trial Investigators – Atrial fibrillation in the setting of acute myocardial infarction: the GUSTO-I experience. *J Am Coll Cardiol* 1997, 30: 406–413.
5. Sakata K, Kurihara H, Iwamori K, Maki A, Yoshino H, Yanagisawa A, Ishikawa K – Clinical and prognostic significance of atrial fibrillation in acute myocardial infarction. *Am J Cardiol* 1997, 80: 1522–1527.
6. Madias JE, Patel DC, Singh D – Atrial fibrillation in acute myocardial infarction: a prospective study based on data from a consecutive series of patients admitted to the coronary care unit. *Clin Cardiol* 1996, 19: 180–186.
7. Vaage-Nilsen M, Hansen JF, Mellegaard K, Hagerup L, Sigurd B, Steinmetz E, for the DAVIT II Study Group – Short- and long-term prognostic implications of in-hospital postinfarction arrhythmias. *Cardiology* 1995, 86: 49–55.
8. Sugiura T, Iwasaka T, Ogawa A, Shiroyama Y, Tsuji H, Onoyama H, Inada M – Atrial fibrillation in acute myocardial infarction. *Am J Cardiol* 1985, 56: 27–29.
9. Serrano CV, Ramiers JAF, Mansur AP, Pileggi F – Importance of the time of onset of supraventricular tachyarrhythmias on prognosis of patients with acute myocardial infarction. *Clin Cardiol* 1995, 18: 84–90.