MANAGEMENT OF ACUTE ATRIAL FIBRILLATION IN INTENSIVE CARE UNIT

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Content

Abstract

It is the most common arrhythmia in the clinical practice. It may be seen coincidentally in many patients presenting for both elective and emergency anesthesia. Alternatively, atrial fibrillation may occur for the first time during surgery.

Ischemic heart disease is probably the most common cause of atrial fibrillation, followed by hypertension, rheumatic heart disease, thyrotoxicosis and pneumonia. Treatment of atrial fibrillation includes management of acute onset atrial fibrillation, maintenance of sinus rhythm, control of ventricular rate and prevention of thromboembolism. The immediate management of acute onset atrial fibrillation is usually cardioversion to sinus rhythm. The most reliable method is DC cardioversion. Postoperative AF usually occurs within the first 5 days of cardiac surgery, with a peak incidence on the day 2. Recent data suggest that once AF has occurred postoperatively, rhythm control by pharmacologic means or direct current electrical cardioversion offers little advantage to a rate control strategy.

Key word

DC-AF- atrial fibrillation- intensive care unit- anaesthesia

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List of abbreviations

SAN: Sinoatrial node

AVN: Atrioventricular node

AF: Atrial fibrillation

CL: Chloride

K: Potassium

Na: Sodium

VT: Ventricular tachycardia

VF: Ventricular fibrillation

Introduction

Atrial fibrillation is an extremely common cardiac arrhythmia whose prevalence increases dramatically with age over 49 years[1,2]. The prevalence of atrial fibrillation in Framingham study is less than 1 % for the 50-60 years age decade and approaches 9 % in the 80-90 years age decade[2]. The prevalence of atrial fibrillation is approximately 5%[3]. This was confirmed by a 24 hour ambulatory ECG recording of a population study group of Americans [4]. The age-adjusted prevalence of atrial fibrillation based on biennial examinations in Framingham has nearly doubled in men but not in women. The explanation for this apparent increase in prevalence of atrial fibrillation is unknown but may have resulted from improved survival of persons with other cardiac conditions. If prevalence data can be generalized to the whole country, the impact of atrial fibrillation is very great indeed. The presence of atrial fibrillation markedly increases the risk of stroke with age over 49 years[1.2]. The independent relative risk for stroke in the presence of atrial fibrillation is 5.6 after adjustment for age, sex and hypertension[2]. The attributable risk of stroke from atrial fibrillation is 1.5 % in the 50-59 years age group[2] .

Other consequent morbidity and mortality directly attributable to atrial fibrillation are less well studied. It is rare that atrial fibrillation in itself causes mortality and when it does so, it is usually through triggering fatal ventricular tachyarrhythmia.

The major problem is reduced functional capacity due to symptoms, including palpitation, fatigue, and dyspnea, or worsening of symptoms of preexisting cardiac condition, such as angina pectoris, and congestive heart failure[2].

Aim of the work

The current study highlights established concepts and new trends regarding acute atrial fibrillation management in the intensive care unit. Determination of risk factors, tools of proper diagnosis, early management and prevention of complications will be discussed.

DEFINITION

Atrial fibrillation is an arrhythmia in which there is a complete absence of coordinated atrial systole.This arrhythmia is characterized on the ECG by the absence of consistent P wave before each QRS complex; instead there are rapid oscillations of F waves which vary in size, shape, and timing and there is usually an irregular ventricular rate(5).However, the presence of fixed RR interval is possible and the presence of idioventricular or idiojunctional rhythms associated with conduction system disease or drug therapy should be considered. The RR interval may also be regular in ventricularly-paced patients and the diagnosis in this circumstance may require temporary pacemaker inhibition in order to visualize underlying atrial fibrillatory activity.

NOMENCLATURE & types:

Atrial fibrillation is generally subdivided into two forms: paroxysmal and chronic. The term chronic is either used to categorize the history of atrial fibrillation or to describe the last episode. It is used to describe atrial fibrillation in which the episodes
last for several days or years. The term acute may describe an episode of atrial fibrillation related to an acute curable cause(6) and is also used to describe an attack of atrial fibrillation(7) . Chronic (or established or permanent) atrial fibrillation may be the final stage of paroxysmal atrial fibrillation or may represent the initial aspect in a significant proportion
of patients. Provided that the patient is symptomatic, the differentiation of paroxysmal from chronic atrial fibrillation is based on the history given by the patient and/or the ECG documentation of recurrent episodes (in the paroxysmal form) and the duration of the last episode of atrial fibrillation. In some cases, no history is available, particularly in asymptomatic or mildly symptomatic patients, and the term recent onset or recently discovered atrial fibrillation is used. The latter is particularly appropriate for atrial fibrillation of

unknown duration. In paroxysmal (recurrent) form of atrial fibrillation, the episodes are generally self terminating or persistent. The latter may require urgent medical, pharmacological or electrical

intervention. The term permanent implies that atrial fibrillation has been present for a long time, that cardioversion has not been indicated or that one or several attempts have failed to restore sinus rhythm. There is no agreement on the time frame used to characterize various forms of atrial fibrillation. A period of 7 days, has been proposed as a cut-off point to differentiate paroxysmal (less than 7 days) from chronic atrial fibrillation(more than 7 days)[6]. In the paroxysmal form, an episode lasting more than 48 h may be called persistent. This time frame represents the duration beyond which formal anticoagulation must be taken prior to cardioversion[6].

CLASSIFICATION OF PAROXYSMAL ATRIAL FIBRILLATION

The paroxysmal form of atrial fibrillation comprises a heterogenous group of patients in whom atrial fibrillation may differ by its frequency, duration, mode of termination and the presence and severity of symptoms. In the same patient, arrhythmia presentation may change over time[6]..

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A clinical classification system has been recently proposed[6] which aims at stratifying the clinical aspects of paroxysmal atrial fibrillation, as shown in table 1. Paroxysmal atrial fibrillation is subdivided into three groups:

Group I includes a first symptomatic attack of atrial fibrillation either with spontaneous termination or requiring pharmacological or electrical cardioversion.

Group II refers to recurrent attacks of atrial fibrillation when first seen, in an untreated patient and includes three subgroups: (a) no symptoms during the attack. In the latter, paroxysmal atrial fibrillation is not identified by the patient and is discovered incidentally on the ECG or the ambulatory ECG recording; (b) with an average of less than one symptomatic attack every 3 months; and (c) with more than one symptomatic attack every 3 month.

Group III includes recurrent attacks of atrial fibrillation in patients despite the use of anti-arrhythmic agents aimed at prevention of recurrence(e.g. sodium or potassium channel blocker)and consists of three subgroups(a)no symptoms (b)an average of less than one symptomatic attack per 3 month period; and(c)an average of more than one symptomatic attack per 3 month period.

These classifications characterize a patient at a given point in time. During follow up,a patient may remain in the same group, be controlled with therapy, change from one group or subgroups to another or may evolve to chronic atrial fibrillation. As with other classifications, this classification may not cover all aspects of atrial fibrillation. However, it stresses the necessity to better define the characteristics of a patient population of atrial fibrillation at a given time.

Table 1.Classification system of paroxysmal atrial fibrillation

Group I: First symptomatic episode of AF Spontaneous termination. Requiring pharmacological or electrical cardioversion.
Group II: Recurrent attacks of atrial fibrillation (untreated) Asymptomatic. Symptomatic less than 1 attack /3 months. Symptomatic more than 1 attack /3 months.
Group III: Recurrent attacks of atrial fibrillation (treated) Asymptomatic. Symptomatic less than 1 attack /3 months. Symptomatic more than 1 attack /3 months.

Epidemiology of atrial fibrillation

Atrial fibrillation is the most common sustained arrhythmia encountered in clinical practice. Data suggest that hospital stays for AF are markedly greater than for any other arrhythmia[8]. Nevertheless, information about its incidence and prevalence in a general population is rather sparse. There are fewer data on atrial flutter. Data from clinical populations are subjected to the influence of a number of factors that tend to introduce bias. The single best sources of data are reports from the Framingham study[1,2,9,10].

Prevalence of AF increases with age and is slightly more common in men than women[9]. The prevalence of AF is 0.5% for the group aged 50 to 60 years and rises to 8.8% in the group aged 80 to 90 years[2]. In 1982 the cumulative incidence of development of AF over 22 years in the Framingham study was 2.2 % in men and 1.7% in women[9]. Excluding persons with rheumatic heart disease, the 2-year incidence of development of AF in 1987 was 0.04% for men and 0% for women aged 30 to 39 years; the corresponding figures in the 80-89 years age group were 4.6 %and 3.6%[1]. In the more recently initiated cardiovascular health study, a cross- sectional population study of Americans older than 65 years, the prevalence of AF on 24-hour ECG recording was approximately 5%[3,4]. Because women have a greater life expectancy than men, the actual number of cases in elderly women (older than 75) is greater than it is in elderly men Based on biennial examination in the Framingham study, the adjusted prevalence of AF has increased substantially, practically in men, over 30 years period beginning in themed 1950s. The importance of this observation is that the impact of AF with respect to stroke and other consequences may actually be much greater than estimated[9].

The cardiac precursors of AF were slightly different in men and women in the 1982 report from Framingham[9]. In men the significant associations were stroke, cardiac failure,