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### Atrial Fibrillation

#### Epidemiology of paroxysmal atrial fibrillation

J. Goudevenos, J. Vekalis, V. Lathribou, E. Pappa, A. Papathanasiou, L. Michalis, D. Sideris. Department of Cardiology, University Hospital of Ioannina, 45110 Ioannina, Greece

**Background.** Despite its high prevalence little is known regarding the epidemiology of paroxysmal atrial fibrillation (PAF). The aim of the study was to determine the incidence and other epidemiological features of PAF.

**Methods.** Over a 4-year period we conducted a prospective, population-based survey of cases of PAF in a closed population (160,000 inhabitants). Sources for identification of potential cases were the two general district hospitals which serve the studied population. Only patients who suffered at least one episode of PAF (<7 days duration, with abrupt well defined onset of symptoms) out of hospital were included. Patients with PAF complicating acute myocardial infarction, acute pericarditis or acute infection were excluded.

**Results.** We identified 391 patients (236 men-155 women) with PAF. The overall annual incidence was 9 cases per 10,000 inhabitants (male: 12/10,000/year vs female: 6/10,000/year). PAF occurred in lower age in men (mean age 57 ± 16 years) than in women (mean age 64 ± 16 years) [p < 0.001]. The incidence rises with the highest rates of incidence among people 60–69 years (8/10,000 for men, 18/10,000 for women). In the elderly (> 70 years) the incidence was almost doubled for both sexes (19/10,000 for men, 15/10,000 for women). 122 (31%) patients had more than one episode (23% before and 8% after enrollment). In 37% of cases no cardiovascular risk factor was identified. This was more common for the population < 70 years (45%) compared with the elderly (12%) [p < 0.0005]. Hypertension was the most common risk factor especially in men (38% vs 23% in women). Other heart diseases were more frequent in men (28%) than in women (18%). The duration of AF before treatment was 21.7 ± 30.4 hours (range 1.5–175 hours). Sinus rhythm, n = 239: 93% 6 h 33 49 Heart rate comp. to baseline (placebo only), n = 122: -4.4 -10.1 -9.6 -3.9 Cox regression model; predictors of conversion to SR. 

In conclusion; the spontaneous rate of conversion to sinus rhythm is nearly 50% within 12 hours, with the highest rate during the first hours. The heart rate remains high in patients still in AF during 16 hours of observation.

#### Natural history of acute atrial fibrillation

Björn Hornestam, Peter Held. Dept. of Medicine, Östra University Hospital, Göteborg, Sweden

Acute atrial fibrillation (AF) is a common arrhythmia with a considerable rate of complications. The natural course during the acute phase is not well described.

In the recent DAAF trial 110 female and 129 male patients, with a mean age of 65.2 years (range 21–89), with acute AF within 7 days of onset were blindly allocated to treatment with i.v digoxin or placebo. After 16 hours, a similar number of patients in each treatment group had converted to sinus rhythm (SR).

We have therefore used the total patient material to describe the natural course.

A Cox regression model was developed, utilizing clinical data at baseline, to define factors predictive of conversion to SR. The duration of AF before treatment was 21.7 ± 30.4 hours (range 1.5–175 h) and the heart rate at inclusion 122.0 ± 23.0 bpm (range 62–180).

<table>
<thead>
<tr>
<th>Duration of AF</th>
<th>Heart rate at inclusion (placebo only), n = 122: 23.0 ± 4.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinus rhythm</td>
<td>n = 239: 93% advert, 49% 6 h 33 49 Heart rate comp. to baseline (placebo only), n = 122: -4.4 -10.1 -9.6 -3.9 Cox regression model; predictors of conversion to SR.</td>
</tr>
</tbody>
</table>

In conclusion: The spontaneous rate of conversion to sinus rhythm is nearly 50% within 12 hours, with the highest rate during the first hours. The heart rate remains high in patients still in AF during 16 hours of observation.

A short duration of AF was the most predictive factor, and female sex is associated with a positive trend, for conversion to sinus rhythm. Heart failure, high heart rate at inclusion and earlier AF were associated with lesser chance of conversion, but this effect did not reach statistical significance.

#### Chronic atrial fibrillation: success rate of serial cardioversion therapy and long-term safety and efficacy of oral anticoagulation

I.C. Van Gelder, H.J.G.M. Crijns, R.G. Tieleman, J. Brögemann, P.J. De Kam, A.T.M. Gosselink, F.W.A. Verheugt, K.I. Lie. Thoraxcenter, University Hospital Groningen; University Hospital Nijmegen, The Netherlands

The purpose of this study was to determine the long-term success rate of the serial electrical cardioversion (ECV) approach in patients with chronic atrial fibrillation (AF) and to assess the efficacy and safety of oral anticoagulation in these patients.

**Methods.** Patients with chronic (≥24 hours) AF received ≥ 4 weeks anticoagulant therapy (OAC) prior to ECV. No prophylactic antiarrhythmic agent was given after the first ECV. Relapses were managed by repeated ECVs whereafter serially antiarrhythmic drugs were instituted. OAC was withdrawn after 4 weeks sinus rhythm.

**Results.** 236 patients were followed for 3.7 ± 1.6 years. Mean age was 63 ± 12 years. Underlying disease was coronary artery disease in 28%, rheumatic disease in 17%, non-rheumatic valvular disease in 16%, hypertension in 17% and 22% had "lone" AF. Median duration of AF was 9 months, left atrial size was 46 ± 8 mm. The actuarial cumulative percentages of patients maintaining sinus rhythm after serial ECV treatment was 42% and 27% after 1 and 4 years, respectively. Multivariate analysis showed that factors which were associated with failure of this approach included: arrhythmia duration ≥ 36 months (risk ratio 5.0, p < 0.001), peak heart rate ≥ 120 (functional class III), age > 65 (risk ratio 1.8, p < 0.001), and age > 56 years (risk ratio 1.5, p = 0.038). The anticoagulation level of INR 2.4–4.8 was associated with an incidence of thromboembolism and bleeding complications of 0.2% and 1.5%, respectively.

In conclusion; this study shows that many patients with AF fail to respond to the serial ECV strategy. However, this approach postpones the continuous presence of AF and allows for reduced the exposure time to the deleterious events related to AF. In addition, thromboembolic events were infrequent in the patients who were subject to this regimen.

#### Effects of intravenously administered digoxin in acute atrial fibrillation, compared to placebo

B. Hornestam 1, P. Held 1, T. Carlsson 1, L. Falk 2, B. Karlsson 4, T. Lundström 5, M. Pettersson 6, for the DAAF Study Group. 1 Department of Medicine, Östra University Hospital, Göteborg; 2 Department of Medicine, Växjö University Hospital; 3 Department of Medicine, Möln达尔 Hospital; 4 Department of Medicine, Uddevalla Hospital; 5 Department of Medicine, Skåne Hospital; 6 Department of Medicine, Linköping University, Sweden

Acute atrial fibrillation (AF) is a common arrhythmia. Although no controlled clinical trial investigating the effects of acute intravenous (i.v) treatment with digoxin has been reported, this treatment is widely used to control heart rate and to regain sinus rhythm.

In a randomized, doubleblind, multicenter trial we compared the effects of i.v administered digoxin with placebo in 239 patients (110 female/129 male, mean age 68.2, range 21–89 years) with atrial fibrillation of maximally 7 days duration (mean duration 22.0 h, range 1.5–174.5 h). 129 patients had their first episode of AF, 110 had recurrent AF. Digoxin was given i.v at times 0, 2 and 6 hours after inclusion, in the dose of 0.5 mg (mean 0.46 mg, 0.31 mg and 0.32 mg). The primary end-point was conversion to sinus rhythm. Effects on heart rate were one secondary end-point. The duration of the study was 16 h, from inclusion. The groups were demographically well matched. 117 patients were randomized to digoxin, and 122 to placebo.

There were no significant differences in rate of conversion to sinus rhythm between the groups. Conversion to sinus rhythm occurred earlier in the digitialis treated group compared to placebo, but the difference was not quite statistically significant. The heart rate at 16 h was significantly lower in the digitalis treated group, in patients still remaining in AF.

<table>
<thead>
<tr>
<th>Duration of AF</th>
<th>HR at baseline</th>
<th>HR 16 h in AF</th>
<th>Sinus rhythm success</th>
<th>Time to SR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digoxin</td>
<td>20.7 ± 22.8</td>
<td>120 ± 23</td>
<td>91 ± 20</td>
<td>60/117</td>
</tr>
<tr>
<td>Placebo</td>
<td>22.7 ± 31.0</td>
<td>123 ± 25</td>
<td>116 ± 25</td>
<td>56/120</td>
</tr>
<tr>
<td>p-value</td>
<td>n.s</td>
<td>p &lt; 0.0001</td>
<td>n.s</td>
<td>p = 0.18</td>
</tr>
</tbody>
</table>

5 digitalis treated patients experienced significant bradycardia, but none needed treatment other than observation.

In conclusion intravenously administered digoxin results in a statistically nonsignificantly earlier conversion to sinus rhythm and a significant decrease in heart rate in patients still in atrial fibrillation, compared to placebo. Digitalis does not differ from placebo in the total conversion to sinus rhythm during 16 hours of treatment and observation.