Nonvalvular Atrial Fibrillation and Strokes in the Aged

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Introduction

Nonvalvular atrial fibrillation (NVAF) has been associated with an increased risk of stroke. This has led to discussion of the merits and side effects of prophylactic therapy with anticoagulants, aspirin or persantine upon discovery of NVAF or after the occurrence of a stroke in the presence of NVAF, particularly in the aged.

Therefore we decided to determine the comparative risk of stroke among those with and without NVAF in the population of a long-term care facility for the aged and the cumulative risk of stroke among those with NVAF. Risk factors for stroke were also evaluated.

Material and Methods

The Kingsbridge House Division of The Jewish Home and Hospital for Aged of New York has 540 skilled nursing and 272 Intermediate Care Beds, with approximately 160 deaths, 30 permanent discharges and 190 new admissions yearly. Admission and annual examinations include an electrocardiogram. Interval electrocardiograms are taken for cause and before and after transfer to general hospitals. Reports of electrocardiograms during general hospital stays are obtained.

The study was initiated with review of all living cases with NVAF as of January 1, 1985. All new cases of NVAF at admission subsequent to that date and among those in the institution were added to the study. They were followed to death or December 31, 1986.

All strokes occurring after admission in the above group and the remainder of the population were reviewed. The records of deaths prior to 1/1/85 were not reviewed. Cases with fixed and paroxysmal atrial fibrillation were included. The diagnosis of stroke was made by the attending neurologist. Cases with transient ischemic attacks were excluded due to the difficulties in diagnosis in the aged.

The number of exposure years was calculated by totalling the number of years since the diagnosis of NVAF at admission or the first discovery of NVAF after admission to December 31, 1986, or to the occurrence of stroke or death if earlier.

The cumulative risk of stroke among those with NVAF was calculated according to the method of Merrill and Shulman. The cumulative risk of stroke among those in whom NVAF was first diagnosed after admission was calculated separately.

The incidence and prevalence of NVAF was determined for the years 1985 and 1986.

The incidence and comparative risk of strokes among those with and without NVAF was determined for 1985 and 1986 and the statistical significance of the difference calculated by chi-squared analysis.

Results

There were 166 cases with NVAF of whom 28 sustained strokes. The mean age was 86 at admission to the study with a range of 64 to 106 years (Table 1.)

The age and sex distribution was similar to that of the population as a whole. Eleven percent of those with NVAF were female. 

Table 1

<table>
<thead>
<tr>
<th>Characteristics of Cases of Nonvalvular Atrial Fibrillation (NVAF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Cases</td>
</tr>
<tr>
<td>Males</td>
</tr>
<tr>
<td>Females</td>
</tr>
<tr>
<td>Mean Age*</td>
</tr>
<tr>
<td>Age Range*</td>
</tr>
<tr>
<td>Exposure Years*</td>
</tr>
<tr>
<td>Number of Strokes</td>
</tr>
</tbody>
</table>

* At time of admission with NVAF or onset after admission.
** From time of admission with NVAF or onset of NVAF to occurrence of stroke or to December 31, 1986, or to death if earlier.

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below 80 years compared to 12.4% of the total population. Of those with NVAF 23% were males compared to 20% of the total population. The prevalence rates of NVAF in 1985 were 11.9% and 10.2% in 1986 (Table 2). The incidence rates of NVAF in 1985 and 1986 were 2.1% and 1.0% respectively (Table 2).

**Table 2**

<table>
<thead>
<tr>
<th>Year</th>
<th>No.</th>
<th>%</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td></td>
<td></td>
<td>1986</td>
<td></td>
</tr>
<tr>
<td>Prevalence*</td>
<td>137</td>
<td>11.9%</td>
<td>127</td>
<td>10.2%</td>
</tr>
<tr>
<td>Incidence</td>
<td>24</td>
<td>2.1%</td>
<td>13</td>
<td>1.0%</td>
</tr>
<tr>
<td>Number of Individuals Under Care</td>
<td>1154</td>
<td></td>
<td>1245</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Individuals living at least one day in observation period were counted in prevalence rate.

The risk of stroke for 1985 and 1986 for those with NVAF was 7.2% compared to 1.2% for the population without NVAF for the same period. This represents a sixfold increase in risk of stroke among those with NVAF, which is a statistically significant difference (95% confidence interval: 3.41-12.34). The overall risk of stroke for the entire population for 1985 and 1986 was 1.8% (Table 3).

**Table 3**

<table>
<thead>
<tr>
<th>Person-Years</th>
<th>Incidence Rate</th>
<th>Relative Risk</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>With NVAF</td>
<td>264</td>
<td>7.2%</td>
<td>6.55</td>
</tr>
<tr>
<td>Without NVAF</td>
<td>2135</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>2299</td>
<td>1.8</td>
<td></td>
</tr>
</tbody>
</table>

The cumulative risk of stroke among those with NVAF was 7.8% in the first year of follow-up, 15.8% at 5 years, 19.1% at 10 years and 20% at 15 years (Table 4a, Figure 1). A separate analysis of those who developed NVAF after admission revealed similar findings (Table 4b). The percentage incidence of stroke among those with NVAF was 16.9%. Among those who developed NVAF after admission it was 13.9%.

The mean age at time of stroke was similar for those with and without NVAF, i.e., 88 and 85 years respectively.

Where death occurred after a stroke the duration of life was shorter among those with NVAF, i.e., a mean of 5.96 months compared to 16.13 months (Table 5).

Those with NVAF at time of admission to the study had the following cardiovascular abnormalities: 13% had prior strokes and 43% had a blood pressure of greater than 140 or 90 mm Hg systolic and diastolic respectively, in whom half had a systolic level of 160 or over. In 51% there were significant electrocardiographic abnormalities. Twenty-six percent had a
Table 5
Duration of Life Following Stroke Among Deaths With and Without NVAF

<table>
<thead>
<tr>
<th></th>
<th>NVAF</th>
<th>No NVAF</th>
<th>T-Test</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Deaths</td>
<td>20</td>
<td>23</td>
<td>1.92</td>
<td>.05 &lt; P &lt; .10</td>
</tr>
<tr>
<td>Mean (± S.D.) Duration (Months)</td>
<td>5.96 (± 8.67)</td>
<td>16.13 (± 23.21)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

history of angina and 65% had some degree of congestive heart failure or myocardial infarction. Death was acute in 15 of 29 primarily due to strokes.

The 28 cases with NVAF who developed strokes differed from the 138 who did not in being younger, a greater number with more severe heart failure, and were more likely to be female and hypertensive.

The 28 NVAF stroke cases compared to the 40 non NVAF stroke cases were more likely to be older, female, with more severe heart failure and more likely to die after the stroke.

Discussion
The incidence of 1.1% and 2.0% in 1985 and 1986 of NVAF in our population is comparable to that of 2% in the female group aged 70 to 75 years in the Gothenberg Sweden study. The prevalence of 11.9% and 10.27% for 1985 and 1986 in our study is comparable to that of 5 to 9% in a younger group of the aged reported from Edinburgh, Scotland.

The sixfold increase in risk of stroke among our cases with NVAF compared to those without NVAF is close to that reported from the studies of the aged, i.e., 5.6 to 1 in the Framingham study, 6 to 1 in another population of the institutionalized aged and 7 to 1 a retirement community for the aged. In this group the annual incidence of stroke was 0.77% per annum for females and 1% for males compared to 1.8% per year in our predominantly female group.

The cumulative risk of stroke among those with NVAF was high in the first 5 years, i.e., 7.8% at one year and 15.8% at 5 years of follow-up. Sherman et al have estimated the lifetime risk of stroke among those with NVAF of all ages to be 35%.

The shorter mean duration of life after a stroke among those with NVAF of 5.96 months compared to 16.13 months among those without NVAF was attributable primarily to a greater mortality from recurrent strokes and cardiovascular disease.

Preventive and therapeutic measures for the prevalent risk factors for stroke in the entire population of congestive heart failure, hypertension and coronary artery disease, are indicated. This is of particular importance among those with NVAF with regard to congestive heart failure in view of the markedly increased prevalence of this condition among those with NVAF cases who develop a stroke.

There is no evidence at this time that anti-aggregating agents such as aspirin and persantine are of preventive value against a stroke either beginning after the onset of NVAF or after the occurrence of a stroke.

There are no adequately controlled studies to indicate that anticoagulant therapy is of value in the prevention of strokes either after discovery of NVAF or the occurrence of a stroke. Properly controlled studies of this type are indicated, especially in view of the risk of cerebral hemorrhage of 1% a year and of other major bleeding episodes of 2% a year.

Conclusions
Twenty-eight strokes occurred among 166 individuals with Nonvalvular Atrial Fibrillation, mean age 85, followed for 499.5 exposure years. The cumulative risk of stroke was 7.8% in the first, 15.8% in the fifth and 19.1% in the tenth year of follow-up. The incidence rate of stroke for 1985 and 1986 was 7.2% among those with NVAF compared to 1.2% among those without NVAF, a sixfold increase in risk.

Heart failure and hypertension were more common among those with NVAF who developed strokes.

It was concluded that the high risk of stroke among the aged with NVAF justifies a controlled study of the value and risk of anticoagulant therapy.

References