Subarachnoid Hemorrhage in an Isolated Population
Incidence on the Faroes During the Period 1962–1975

POUL JOENSEN, M.D.

SUMMARY In a retrospective study of a 14-year period (1962–1975) the annual incidence of subarachnoid hemorrhage (SAH) was found to be 7.4 per 100,000 in an isolated population of about 40,000. The age-specific incidences in the age groups from 15–25 to 60 years are on the same level as found in Sweden, Rochester USA, England, and Iceland, but lower than the findings in Finland. The age-specific incidence among persons over 60 years of age was far lower than in Sweden, Rochester USA, and Finland. The possible causes of the lower incidence in all age groups than reported in the above-mentioned studies are discussed.

Forty patients had a history of SAH. Two months after the episode 38% had died and at the end of 5 years 53%. The recurrence rate at 5 years was 24%.

THE FAROES are situated around 62° northern latitude and 6–7° western longitude. The population is believed to descend from Norwegians and Celts who settled on the island in the 9th century A.D. To what extent other ethnic groups have contributed to the present population is unknown.

The present study was undertaken to establish the incidence of subarachnoid hemorrhage in retrospect.

Material and Method

In January 1962 the population was 35,748, in 1970 it was 38,612, and at the end of the period under review 41,211. The average population was calculated as the mean of these three figures. The relative age distribution and sex ratio were calculated on the basis of the census findings in 1960, 1965, and 1975. The population data are derived from the Standard Statistical Yearbook of Denmark and the Faroes. Table 1 gives the age distribution. Of the population 52% were females.

Subarachnoid hemorrhage (SAH) is defined as a condition of headache, with or without disturbed consciousness, and a stiff neck, in which blood is demonstrable in the subarachnoid space, either as xanthochromic spinal fluid or the bleeding is confirmed at autopsy. Traumatic cases were excluded. Only patients who had their first SAH during the period January 1962 to December 1975 were admitted to the material. In retrospect, it was not possible to determine whether aggravation during the acute phase was due to cerebral vasospasm or recurrence. Therefore, the analysis of recurrence was restricted to cases in which another SAH occurred after the patient had been rehabilitated, mobilized, and discharged to his/her home after a minimum stay in hospital of about 2 months because of SAH. There are three hospitals on the islands, one in Tórshavn with 214 beds, one in Klaksvík with 48 beds, and one in Tvøroyri with 36 beds. Patients with SAH are as a rule treated initially in the Medical Department of Landssjúkrathús, Tórshavn, by bed rest and regulation of hypertension, if present. When, after 4–6 weeks’ bed rest, the patient is considered fit for transportation, he/she is transferred either to the Department of Neurology or the Department of Neurosurgery in Rigshospitalet, University of Copenhagen, with a view to cerebral angiography, possible myelography, and possible surgical treatment of an aneurysm.

To find patients with SAH the diagnostic files of the three Faroese hospitals and of the Department of Neurology, Rigshospitalet, Copenhagen, were searched for the diagnoses: cerebral stroke, cerebral arterial aneurysm, unspecified cerebrovascular disease, arteriovenous malformation, transient cerebral ischemia, cerebral hemorrhage, and subarachnoid hemorrhage. All disablement declarations issued on the Faroes during the period 1962–1976 were perused. These declarations include data concerning case history, objective findings, and stay in hospital. All death certificates issued during the period 1962–1976 were perused. In all cases but five in which SAH was demonstrated at autopsy, the diagnosis of SAH had been confirmed by bloody spinal fluid showing xanthochromia after centrifugation. Nineteen of the patients were admitted to Rigshospitalet, Copenhagen, five refused to be transferred to Rigshospitalet, three were not transferred because of advanced age, and thirteen died before they could be transferred.

By reviewing the case records in the Faroese hospitals and in the Neurological and Neurosurgical Departments of Rigshospitalet, Copenhagen, it was assured that the criteria of SAH had been fulfilled.

The general practitioners were asked whether the patients had had recurrent hemorrhage.

The National Registry was asked whether the patients were alive in December 1980.

Results

During the period 1962–1975 SAH occurred in 40 cases among the average population of 38,523, 23 in females and 17 in males. In 10 of them aneurysms were demonstrated and in one arteriovenous malfor-
mation. In 10 patients intracranial aneurysm (ICA) and A-V malformation were excluded by bilateral carotid angiography and bilateral vertebral angiography. In 21 cases no angiography was performed, either because the patient did not want to be transferred to Rigshospitalet, Copenhagen (5 patients), or because the patient did not want to be treated to angiography and bilateral vertebral angiography. In 10 patients intracranial aneurysm (ICA) and A-V malformation were excluded by bilateral carotid angiography, six developed fatal recurrent hemorrhage from the aneurysm. Two of them died postoperatively, while the other six were alive in December 1980. One patient with an inoperable aneurysm was also alive in December 1980. None of these patients developed recurrences.

The age-specific incidences rose with advancing age, until the over-60 age groups (tables 1, 2, and 3).

In the over-60 age groups the age-specific incidences are far lower than those found in Rochester, Minnesota, USA and in Finland (tables 2 and 3), but on a level with those found in Carlisle, England and in Iceland (table 2).

The age-specific incidence for the under-20 age groups is very low, 0.5 in 100,000 (table 3) and in the same order as in other materials (tables 2 and 3). The age-specific incidences for the age groups from 20–25 years up to 60 years are in the same order as in Rochester, Minnesota, USA, England, and Iceland (tables 2 and 3), but lower than in the three Finnish materials (tables 2 and 3).

The sex difference is not statistically significant (p > 0.05).

Course (Fatality and Recurrences)

Thirteen patients died before angiography could be carried out. Among them there was one case of intracranial aneurysm and one of A-V malformation, both confirmed at autopsy.

Eight patients underwent operation with ligation of the aneurysm. Two of them died postoperatively, while the other six were alive in December 1980. One patient with an inoperable aneurysm was also alive in December 1980. None of these patients developed recurrences.

Among the 10 patients subjected to four-vessel cerebral angiography without aneurysm or A-V malformation being demonstrated, eight were alive five years later, while two had died of other diseases. None of these patients had developed recurrences.

Of the eight patients discharged after the first episode of SAH without having been subjected to angiography, six developed fatal recurrent hemorrhage from 4 months to 3 years after the first episode, while the remaining two were alive in December 1980.

The mortality of SAH for all 40 patients is then: 15 patients died during the acute phase, viz. 38% two months after the onset of SAH. Thus, the fatality rate in the early phase (2 months) is lower than found in

### Table 1: Subarachnoid Hemorrhage (SAH) Diagnosed Clinically 1962 through 1975

<table>
<thead>
<tr>
<th>Age</th>
<th>Rate of incidence in age groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean population</td>
</tr>
<tr>
<td>0–19 years</td>
<td>15.910</td>
</tr>
<tr>
<td>20–39 years</td>
<td>9.708</td>
</tr>
<tr>
<td>40–59 years</td>
<td>8.244</td>
</tr>
<tr>
<td>60+ years</td>
<td>4.661</td>
</tr>
<tr>
<td>All ages</td>
<td>38.523</td>
</tr>
</tbody>
</table>

*95% confidence for rate.

### Table 2: Annual Age-specific Incidences of SAH in 100,000 in Various Populations in the Age Groups from 0—14 Years and 65 Years and Over

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.6</td>
<td>5.7</td>
<td>16.0</td>
<td>29.0</td>
<td>13.3</td>
<td>7.4</td>
</tr>
<tr>
<td>0—14 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15—44 years</td>
<td>5.7</td>
<td>5</td>
<td>24</td>
<td>27</td>
<td>13.3</td>
<td>11.6</td>
</tr>
<tr>
<td>45—54 years</td>
<td>16.0</td>
<td>24</td>
<td>21.8</td>
<td>33.8</td>
<td>37.8</td>
<td>23.9</td>
</tr>
<tr>
<td>55—64 years</td>
<td>29.0</td>
<td>27</td>
<td>33.8</td>
<td>48.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65+ years</td>
<td>13.3</td>
<td></td>
<td>37.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All ages</td>
<td>7.4</td>
<td></td>
<td>11.6</td>
<td></td>
<td></td>
<td>23.9</td>
</tr>
</tbody>
</table>

*This study included only the age groups from 15—65 years.

†Annual incidence rate calculated by the present author from data given in the reference.

### Table 3: Annual Incidence of SAH in 100,000 in the Age Groups 0—19 Years up to 60 Years and Over in Various Populations

<table>
<thead>
<tr>
<th>Study and years of study</th>
<th>Present study 1962—75</th>
<th>Carlisle 1955—61</th>
<th>Helsinki 1954—61</th>
<th>Iceland 1958—68</th>
<th>Mid-Finland 1976—78</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.5</td>
<td>0.7</td>
<td>8.4</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>20—39 years</td>
<td>6.7</td>
<td>9.7</td>
<td>22.6</td>
<td>32.1</td>
<td>18</td>
</tr>
<tr>
<td>40—59 years</td>
<td>16.3</td>
<td>32.1</td>
<td>26.8</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>60+ years</td>
<td>13.5</td>
<td>29.5</td>
<td>39.8</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>All ages</td>
<td>7.4</td>
<td>10.9</td>
<td>15.7</td>
<td>8.0</td>
<td>19.4</td>
</tr>
</tbody>
</table>

*Annual incidence calculated by the present author from data given in the reference.
†Annual incidence rate estimated from a diagram given in the reference.
USA, the Framingham study,\(^{10}\) in which the 30-day survival was around 50%, and also lower than in the Finnish studies in which the fatality rate in the early phase of the disease was 41–51%.\(^{1,9}\) At the end of 5 years the fatality was 53%.

Out of the 25 patients who survived the first attack and were discharged to their homes, six developed fatal recurrence. The recurrence rate in 5 years is thus 24%.

**Discussion**

The incidence of subarachnoid hemorrhage (SAH) in the well-defined, isolated Faroese population of around 40,000 proved to be 7.4 per 100,000. This rate was found after reviewing all sources where patients with SAH may be imagined to have been recorded. It must be expected, therefore, that all diagnosed cases have been included.

As autopsy is not a routine procedure on the Faroes, the incidence found must be considered a minimum.

It was found also in the present study that only 48% of all cases of SAH occurring in this population were admitted to neurological or neurosurgical departments.

The incidence on the Faroes does not differ significantly (\(p > 0.05\)) from that reported in other populations except in Finland,\(^{2,9}\) where a significantly higher incidence (\(p < 0.05\)) has been found. The findings in other materials\(^{7,9}\) of a much higher age-specific incidence in the over-60 age groups than in the present study afford partial explanation of the low overall incidence of 7.4 in this material. The explanation of the low age-specific incidence in the age groups above 60 years may be erroneous diagnoses, e.g. intracerebral hematoma, especially as routine autopsy with opening of the skull was not done in Faroese hospitals during the period concerned. Another cause may be that patients over 60 with SAH may in some cases have died at home before getting medical treatment, and may have been diagnosed erroneously as intracerebral hemorrhage, cf. the fact that in the Rochester\(^4\) series 9% of the patients with SAH died before getting medical treatment. In cases of sudden, unexpected deaths in the younger age groups autopsy is usually done as a link in the medicolegal investigation, and thereby the diagnosis of SAH will be confirmed. As the Faroese population is a young one, in which 40% are younger than 20, and as the incidence in these age groups is very low, the distribution of the population also contributes to a lower incidence than in most other materials\(^{2,9,11}\) of older populations in which the under-20 age groups make up about 30%. The age-specific incidences on the Faroes cannot be compared with the Norwegian ones\(^2\) as no mention is made of the age distribution of the population in that study.

The conclusion of the present study, then, is that the incidence of SAH on the Faroes in the age groups under 20 years is in the same order as in other populations studied, viz. close on 0, but in the age groups over 60 the incidence is far lower than in other populations studied, except for those from Carlisle, England\(^5\) and Iceland.\(^6\) In Finland\(^6\) the incidence in the age groups from 15–20 years to 60 years is far higher than that for corresponding age groups on the Faroes. In these age groups the incidence on the Faroes is in the same order as in Sweden,\(^2\) Rochester, Minnesota, USA,\(^4\) England,\(^2\) and Iceland\(^6\) (tables 2 and 3).

The lower incidence in all age groups of the present study may therefore be explained in part by a young population and in part by a very low incidence in the age group over 60 years which is presumably due to under-diagnosis in this group on the Faroes, cf. the increasing incidence with advancing age in other populations.\(^4,9\)

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**References**


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