SHORT REPORT
INCREASED INCIDENCE OF ALCOHOL-RELATED DEATHS FROM ACCIDENTS AND VIOLENCE IN SUBJECTS WITH ANKYLOSING SPONDYLITIS

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SUMMARY
Subjects with ankylosing spondylitis (AS) have an increased incidence of deaths from accidents and violence, which is due in part, but perhaps not entirely, to the vulnerability of the affected spine to fractures. The present study covered all the 71 subjects (58 men and 13 women) who had died in Finland in 1989 and who were entitled under the nationwide sickness insurance scheme to receive specially reimbursed medication for AS. The death certificates of an earlier cohort study dealing with mortality in AS were also re-examined. Sixteen subjects (14 men and two women) in the 1989 mortality series had died of accidents and violence. Nine of the deaths (three accidents, two suicides and four alcohol poisonings) were alcohol related. The relative risk of such deaths in subjects with AS compared to the Finnish population as a whole was 2.64 (95% confidence interval 1.44–4.84). In the cohort study, 16 deaths had been due to accidents and violence, the expected number being 11.4. Eight of the 16 deaths had been alcohol related. Uncontrolled use of alcohol is an important determinant in the surplus of deaths from accidents and violence in Finnish patients with AS.

KEY WORDS: Ankylosing spondylitis, Alcohol use, Deaths, Finland, Accidents, Violence.

THERE have been relatively few studies on the mortality of patients with ankylosing spondylitis (AS). The early ones focused on malignancies associated with radiotherapy that had been used to alleviate the spinal pain [1, 2]. A surplus of mortality has, however, also been noted in patients who have not been given radiotherapy [3–6]. The causes of this excess mortality are largely the same as in rheumatoid arthritis: infections, various cardiovascular illnesses, gastrointestinal diseases and, in some studies, amyloidosis. Yet, there is one important difference: most studies of AS have shown an excess of violent deaths. One reason for this is that the affected spine, especially its cervical region, is vulnerable to fractures [7]. However, it is not possible to decide on the basis of the published information whether there are other reasons, apart from spinal fractures, that might contribute to the excess mortality from accidents and violence.

All the mortality studies referred to above were cohort studies in which the observed deaths were compared with the expected numbers in a reference population or case controls. In the present work, we approached the issue from a different perspective; the study material consisted of all AS patients who died during a 1 yr period and who had been entitled under the nationwide sickness insurance scheme to receive specially reimbursed medication for this disease. Our findings showed that uncontrolled use of alcohol was an important determinant in the surplus of deaths from accidents and violence. Therefore, we also analyzed in greater detail the data of an earlier Finnish cohort study [6] with regard to alcohol-related deaths.

SUBJECTS AND METHODS
Since 1966, the Sickness Insurance Act has provided for the prescription of drugs free of charge for certain chronic diseases, including chronic inflammatory joint diseases (since an amendment made in 1987, 90% of the costs have been reimbursed). During the study years, glucocorticoids, non-steroidal anti-inflammatory drugs and disease-modifying anti-rheumatic drugs were reimbursed. The entitlement is usually for life. The national sickness insurance scheme covers the entire population of Finland. Eligibility requires a comprehensive medical certificate signed by the attending physician and approved by an expert adviser on behalf of the sickness insurance scheme. All inflammatory joint diseases are grouped under one code in the population register of the Social Insurance Institution. The main diagnostic headings are rheumatoid arthritis, ankylosing spondylitis, juvenile chronic arthritis, chronic reactive arthritis and psoriatic arthritis. Systemic rheumatic diseases are grouped under another code.

The subjects who died during 1989 were identified by computer linkage with the Finnish Population Registry, using the unique identification code assigned to each Finnish citizen. Altogether, 1849 subjects who died had been entitled to specially reimbursed medication for chronic inflammatory joint diseases [8]. Basic information on the subjects was obtained from death certificates as coded by the Central Statistical Office of Finland (currently Statistics Finland) and from the certificates for drug reimbursement. Information on the role of alcohol in deaths was taken directly from death certificates. For 71 subjects (58 men and 13

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women), the diagnosis on the certificate for drug reimbursement was AS. Their hospital records were obtained and analysed thoroughly. Autopsy had been performed on 38 subjects.

During the first years of sickness insurance, certificates were issued for patients under treatment. The mean age of AS patients at the time of diagnosis is ~35 yr. Accordingly, most of the subjects with AS who died in 1989 had been entitled to receive specially reimbursed medication during the early years of sickness insurance. Subsequently, the advent of the concept of HLA-B27-associated spondylarthropathies broadened the spectrum of disorders grouped under the same heading together with AS. This contributed to an increased awareness of these disorders among physicians and to a recognition of even milder cases. Thus, the AS patients in the 1989 mortality series probably represent a selected group (~25%) of more severe cases than those diagnosed nowadays [9].

Information on the underlying causes of death in the Finnish population was obtained from the official demographic statistics of Finland. Since the late 1980s, alcohol-related deaths have been listed separately.

A cohort study dealing with mortality and causes of death in 398 patients (351 men and 47 women) with AS treated for the first time at the Rheumatism Foundation Hospital (Heinola, Finland) in 1961–1969 had been carried out earlier [6]. By the end of the follow-up, 140 men and 12 women had died. Sixteen of the deaths were from accidents and violence. For the purposes of the present study, death certificates were re-examined to identify deaths related to alcohol use.

RESULTS

All the 71 subjects in the study series fulfilled the modified New York criteria for AS [10]. The mean age at death was 66 yr (range 31–88 yr) for men and 71 yr (range 44–93 yr) for women. The corresponding figures for the Finnish adult population were 71.6 and 79.5 yr, respectively. The mean duration of the disease from diagnosis was 27 yr for men and 20 yr for women.

Apart from typical AS, two subjects also had psoriasis. None had chronic inflammatory bowel disease. Altogether, 31 subjects (24 men and seven women) had had episodes of peripheral arthritis. Thirteen subjects had severe bamboo deformity and kyphoscoliosis. The cervical spine was fully ossified in 24 subjects, and four subjects also had some degree of subluxation. In three instances, the severe disabling cervical flexion hindered intubation during resuscitation at death. Nine subjects had had iridocyclitis, which was recurrent in four instances.

Although the study subjects had been selected on the basis of entitlement to specially reimbursed drugs, 10 of them had had no treatment. All the remaining subjects had used non-steroidal anti-inflammatory drugs. Only 14 subjects had been treated with diseasemodifying anti-rheumatic drugs. One subject had received radiation therapy.

As many as 14 men were alcoholics; in three cases this had led to secondary epilepsy. In addition, one subject was a drug addict. Six of the 10 subjects who had not used any drugs were alcoholics.

Table I shows the distribution of the cases according to the underlying cause of death. One male subject with a severe personality disorder had died of pulmonary tuberculosis at the age of 31. Altogether, 34 subjects (48%) had died of cardiovascular causes. In five instances, the cardiovascular illness was a probable complication of AS (two cases of aortic regurgitation, one case of mitral regurgitation and two cases of cardiomyopathy). Seven subjects (10%) had died of malignancies and six of various respiratory diseases.

In five instances, the severe bamboo deformity and kyphoscoliosis had led to marked respiratory insufficiency, but in three of these cases the death was coded as a coronary death. In three cases, the underlying cause of death was AS; all of these patients had died of amyloidosis.

Altogether, there were 16 deaths (14 men and two women) from accidents (six cases) and violence (10 cases). This is significantly more than in the Finnish population as a whole (Mantel–Haenszel weighted relative risk 1.87; 95% confidence interval 1.22–2.88).

The cohort study [6] included 16 deaths from accidents and violence, the expected number being 11.4. Eight of the 16 deaths were alcohol related (two accidents, two suicides, two suffocations from aspirated vomit and two alcohol poisonings). The expected number of alcohol-related deaths computed on the basis of mortality figures from 1989 was 4.3. However,

### TABLE I

<p>| Underlying causes of death in subjects with ankylosing spondylitis (AS) |
|---------------------------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Diagnostic category</th>
<th>Men with AS</th>
<th>Finnish males</th>
<th>Women with AS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infections</td>
<td>1</td>
<td>0.6</td>
<td>0</td>
</tr>
<tr>
<td>Neoplasms</td>
<td>6</td>
<td>21.0</td>
<td>1</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>1</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>Cardiovascular diseases</td>
<td>3</td>
<td>47.2</td>
<td>4</td>
</tr>
<tr>
<td>Respiratory diseases</td>
<td>5</td>
<td>7.8</td>
<td>3</td>
</tr>
<tr>
<td>Gastrointestinal diseases</td>
<td>0</td>
<td>3.5</td>
<td>1</td>
</tr>
<tr>
<td>Genitourinary diseases</td>
<td>1</td>
<td>0.8</td>
<td>1</td>
</tr>
<tr>
<td>Musculoskeletal diseases</td>
<td>2</td>
<td>0.3</td>
<td>1</td>
</tr>
<tr>
<td>Other diseases</td>
<td>0</td>
<td>5.0</td>
<td>0</td>
</tr>
<tr>
<td>Accidents and violence</td>
<td>14</td>
<td>13.6</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
<td>100.0</td>
<td>13</td>
</tr>
</tbody>
</table>

*Amyloidosis as the immediate cause of death.*
in the earlier years, the incidence of alcohol-related accidents was lower than in 1989; accordingly, the expected number was <4.3.

Of the eight cases not related to alcohol use, two were fractures of the spine. In addition, there was one case of spinal fracture in which AS had been coded as an underlying cause of death.

**DISCUSSION**

The lifespan of the subjects with AS in the present series was shorter by 6–8 yr compared to the Finnish population as a whole. A considerable proportion of the deaths in the study series were complications of AS, such as amyloidosis, spondylitic heart disease and respiratory insufficiency. There was also a surplus of deaths from accidents and violence. The proportion of such deaths was highest in the youngest age group. Accordingly, among subjects who have already reached the age when the diagnosis of AS is typically made, the proportion of deaths from accidents and violence is lower than in the population as a whole. This would mean that the age-adjusted surplus would have been even greater than the one now observed.

Spinal fractures only accounted for a small part of the accident cases. In addition, force associated with these cases was heavy enough to cause the fracture of an intact spine. Unexpectedly, alcohol was involved in most of the deaths from accidents and violence. Actually, the relative risk of such deaths among the subjects with AS was nearly 3-fold compared to the Finnish population as a whole. Re-examination of the death certificates of the earlier cohort study [6] revealed a similar pattern.

Earlier, the consumption of alcohol in Finland had been quite low, only ~2 l of 100% alcohol per person in a year. It rose rapidly during 1965–1975, whereafter it levelled and has remained at 6–8 l per person. This is about the same as that consumed in England and the USA [11]. The consumption in Finland, however, has always been uneven: 10% of the population consume 50% of the total amount. Moreover, when people drink, they typically drink large amounts at a time. This behaviour is reflected in the high incidence of deaths from alcohol poisoning and from other alcohol-related accidents and violence in the Finnish population. On the other hand, the incidence of alcohol-related diseases such as liver cirrhosis has so far been fairly low. The share of deaths from alcohol-related diseases and accidents in Finland is of the same order of magnitude as has been estimated for the USA [12].

Several possible factors can be considered to explain the excess of alcohol-related deaths from accidents and violence observed in our study among subjects with AS. First, alcohol or some lifestyle patterns associated with drinking, such as smoking [13], may aggravate the symptoms and signs of AS. Second, the pain of AS may cause emotional problems, which may lead to relief drinking. Along these lines, there is some evidence that alcohol is a risk factor for psoriasis in young and middle-aged men, and psoriasis may sustain drinking [14]. Third, AS patients may be prone to uncontrolled drinking, perhaps on a genetic basis.

To the best of our knowledge, the study described here is the first report on alcohol-related deaths in subjects with AS. It is of certain interest that in subjects with rheumatoid arthritis the age-adjusted mortality from alcohol-related conditions was only about a half of that in the basic population (M. Myllykangas-Luosujärvi, unpublished results). Obviously, more information is needed on drinking habits in various rheumatic diseases, particularly in relation to the early events of the disease.

**REFERENCES**

Increased incidence of alcohol-related deaths from accidents

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