Bone and joint tuberculosis in Denmark

Increase due to immigration

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ABSTRACT – We studied the epidemiology of bone and joint tuberculosis (TB) in Denmark during the period 1993–1997, using data in the national Danish TB register. We found 95 cases, accounting for 4% of all tuberculosis cases and 15% of extrapulmonary cases, giving a mean annual incidence of 0.4 per 10^5 in the period. 26 cases were found among native Danes (3–8 cases per year) with a median age of 66 (10–92) years and giving a mean annual incidence of 0.1 per 10^5. Among immigrants, an increasing number of cases of bone and joint TB were diagnosed, increasing from 5 in 1993 to 28 in 1997, giving a total of 69 cases with a mean age of 35 (11–75) years and a mean annual incidence of 4 per 10^5 in the period.

The spine was affected in half of the cases. 28 patients had active TB elsewhere in the same period. In most patients, there were no predisposing or risk factors for disease except for ethnicity. Compared to a study of bone and joint TB in Denmark in the 1980s, the total incidence is the same, but there has been a shift in patients from old Danes to young immigrants. The increasing number of bone and joint TB cases among immigrants is due to recent immigration of Somalian refugees, who have a high incidence of TB and a high proportion of extrapulmonary TB. The diagnosis was often delayed several months or years. This study shows that attention must be paid to this condition, particularly in young patients from an endemic immigrant population.

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Tuberculosis (TB) has reemerged in Europe due to several factors: immigration, the HIV-epidemic and a declining public health interest in TB control (Raviglione et al. 1995). Increased immigration from countries with high TB prevalence has resulted in cases among immigrants outnumbering the indigenous cases in many western European countries. In Denmark, the number of TB cases has doubled as a result of recent immigration of refugees from Somalia and in 1997, TB in immigrants accounted for two thirds of all cases (Poulsen et al. 1999), giving a total incidence of 10 per 10^5 and 3 per 10^5 among native Danes. Extrapulmonary TB is much commoner among immigrants than Danes and a number of extrapulmonary sites including TB of bones and joints are now re-emerging.

We report the clinical and epidemiological characteristics of bone and joint TB in Denmark in recent years and how they relate to immigration.

Patients and methods

In the Danish national TB register, we studied retrospectively all notifications of bone and joint TB during the 5-year period 1993–1997 and compared these to the total number of cases among Danes and immigrants. The TB register is based on individual notifications from physicians and laboratory results of sputum smear examinations and culture. All cultures for Mycobacterium tuberculosis in Denmark are performed at Statens Serum Institut in Copenhagen and results of positive specimens are sent to the TB register in the Department of Epidemiology.

85% of all TB cases are confirmed by positive cultures. When cultures are negative, the diagno-

Table 1. Bone and joint TB and mean annual incidence in Danes and Immigrants

Year	Danes			Immigrants		
	Total TB	Bone and joint TB n	%	Total TB	Bone and joint TB n	%
1993	216	6	3	195	5	3
1994	235	8	3	260	11	4
1995	179	4	2	269	11	4
1996	195	5	3	289	14	5
1997	175	3	2	380	28	7
Total	1000	26	2.6	1393	69	5.0

Table 2. Age at diagnosis of bone and joint TB in Danes and immigrants

Age	Danes	Immigrants
10–19	1	8
20–29	2	24
30–39	1	16
40–49	1	9
50–59	5	3
60–69	3	7
70–79	6	2
> 80	7	0

sis is based on radiography and histology and it is revised after termination of treatment. Extrapulmonary cases are classified according to the site of the disease on the basis of information on the notifications at the time of diagnosis and information about the type of specimens received in the laboratory.

In this study using the TB register, immigrants are defined as all persons born outside Denmark, including their children under 25 years of age, irrespective of whether they acquired Danish nationality. Population data have been derived from the Danish National Statistics. On 1 January 1997, the population of Denmark was 5.3 million inhabitants. 322,000 immigrants and their children lived in Denmark. More than half were immigrants from Europe and nearly one third were from Asia. In the period 1992–1997, approximately 12,000 Somalian refugees and their families arrived in Denmark.

Results

The number of TB cases in Denmark increased from 411 cases in 1993 to 555 cases in 1997 (Table 1). In 1994, for the first time there were more cases of TB in immigrants than in Danes and in 1997, TB in immigrants accounted for two thirds of all cases. Half of th cases in immigrants were diagnosed in refugees from Somalia. Extrapulmonary TB was commoner in immigrants, accounting for 40% of cases in immigrants and only 15% of cases in Danes.

During the 5 year period 1993–97, 95 cases of bone and joint TB were detected in Denmark (54 men), accounting for 4% of all cases and 15% of extrapulmonary cases, giving a mean incidence of 0.4 per 10^5 in the period. There were 26 cases among native Danes and 69 cases among immigrants (Table 1). Among Danes, there was a low number, ranging from 3-8 cases a year, giving a mean annual incidence of 0.1 per 10^5 for the period. Among immigrants, an increasing number of bone and joint TB cases were diagnosed, rising from 5 cases in 1993 to 28 cases in 1997, and giving a mean annual incidence of 4 per 10^5 in the period. The number of bone and joint TB cases increased concurrently with the increasing number of TB cases in immigrants. Bone and joint TB accounted for 3% of cases in Danes and 5% of cases in immigrants.

The median age of Danes was 66 (10–92) years and of immigrants 35 (11–75) years (Table 2). Almost half of the patients were from Somalia. The countries of origin and the numbers of affected foreigners were as follows: Somalia 44 patients, Denmark 26, Pakistan 7, India 4, Bosnia 2, Vietnam 2, Lebanon 1, Ethiopia 1, Morocco 1, Kuwait 1, Sri Lanka 1, Thailand 1, Afghanistan 1, Sudan 1, Turkey 1 and The Philippines 1.

The spine was affected in 50% and major joints (hip, knee, shoulder and elbow) in 23% (Table 3). In 28 cases, simultaneous extraskeletal active TB was found: 23 pulmonary (8 Danes and 15 immigrants), 2 mediastinal (immigrants), 1 skin (immigrant), 1 peritoneal (immigrant) and 1 miliary infection (immigrant).

A history of TB of some sort was given by 12 patients (9 Danes and 3 immigrants). All had previously received chemotherapy. Possible predisposing factors were a history of trauma to the af-

Table 3. Location of bone and joint TB in Danes and immigrants in 1993–1997

Site of location	Danes	Immigrants
Spine	14	33
Hip	4	2
Knee	2	5
Femur	1	4
Tibia + fibula	0	2
Foot	0	5
Sternoclavicular joint	0	3
Shoulder	1	3
Elbow	0	5
Humerus	2	2
Radius + ulna	0	1
Hand	2	2
Ribs	0	2
Total	26	69

Table 4. Interval from first symptoms to diagnosis

Months from onset of symptoms to diagnosis	Danes	Immigrants
< 1	2	3
1–3	11	18
3–6	3	11
6–12	1	15
> 12	5	12
Unknown	4	10
Total	26	69

fected site (4 cases) or operations (2 cases). Other associated conditions included HIV (3 cases) and intravenous heroin addiction (3 cases). In most cases, no predisposing or risk factor was recorded. The mean interval from onset of symptoms to diagnosis was 7 months in Danes and 10 months in immigrants. In 17 cases, the diagnosis was made more than 12 months after the onset of symptoms. 120 separate diagnostic procedures were assessed: abscess drainage in 51 cases, bone biopsy in 29, joint aspiration in 13, expectorate in 23, soft tissue biopsy in 3 and sinus swab in one case. In 2 patients, TB was diagnosed at autopsy.

Discussion

The TB register we used for this study is valid and complete regarding the diagnosis of TB and classification of pulmonary and extrapulmonary TB. However, a minor misclassification on the extrapulmonary cases is possible regarding site of disease, since this is recorded only at the time of diagnosis. Bone and joint TB of the spine and hip often presents with abdominal symptoms and some of these cases might be classified as gastrointestinal TB. The number of cases of bone and joint TB in our study must be regarded as minimal.

We found an increasing number of bone and joint TB cases in immigrants and an incidence among immigrants which was almost 50 times higher than among Danes. Almost half of the cases were diagnosed in refugees from Somalia. The increase in bone and joint TB among immigrants can be explained by the high incidence of TB (1.5%) and a high proportion of extrapulmonary TB among Somalian refugees (Poulsen 1999). Bone and joint TB was mainly seen in young immigrants, reflecting the median age of TB in immigrants of 29 years in 1997 (Poulsen and Miörner 1998), which again reflects the immigration of chiefly young adults.

The mean incidence of $0.4/10^5$ was the same as that in a similar study from 1980–1985 (Autzen and Elberg 1988). However, in the previous study, bone and joint TB was mainly found in elderly Danes, whereas in our study, bone and joint TB was commonest in young immigrants. This reflects the change in TB epidemiology in recent years, the Danish TB patients being young or middle-aged and most TB cases occurring in foreigners (Poulsen et al. 1999).

In our series, TB in bones and joints made up 4% of all cases and 15% of the extrapulmonary cases, which is a higher proportion than has been reported previously (Newton et al. 1982, Hugosson et al. 1996). It has been shown in other studies that the clinical presentation of TB varies with ethnicity (Newton et al. 1982).

The commonest location is the spine, which accounts for 50% of cases (Davidson and Horowitz 1970, Chapman et al. 1979). The most frequently involved joints are the major ones such as the hip, knee, shoulder or elbow (Vallejo et al. 1995).

Concomitant pulmonary TB occurs in 12–50% of the patients (Chapman et al. 1979, Elder et al. 1992), we found 24%. It is reported to be frequent at young ages (Goldblatt and Cremin 1978), but

we observed this condition only among immigrants.

The difficulties and delays in diagnosing bone and joint TB are well recognized (Enarson et al. 1979, Fancourt et al. 1986). There are many reasons for this. Patients may give a confusing history of trauma (Davidson and Horowitz 1970) and active pulmonary involvement need not be present. Delay in diagnosis may damage joints and spinal TB can result in compression of the spinal cord, resulting in paralysis (Darbyshire 1998).

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