

Short communication

Trends of Kaposi's sarcoma at AIDS diagnosis in Europe and the United States, 1987–94

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Summary As a proportion of AIDS-defining illnesses, Kaposi's sarcoma (KS) decreased from 1987–89 to 1993–94 in homosexual and bisexual men in all European regions and in the United States. Albeit underestimated, AIDS KS rates in the general male population at ages 25–49 are higher than those of the majority of cancer sites in the same age group.

Keywords: Kaposi's sarcoma; AIDS; incidence

A steady decline, in terms of the percentage of Kaposi's sarcoma (KS) as an AIDS-defining illness, was first reported among homosexual and bisexual men in the United States (US) (Des Jarlais et al, 1987). The broadening of the definition of an AIDS case in 1987 does not entirely explain this decline, as it persists when analyses of trends are restricted to KS and *Pneumocystis carinii* (i.e. two conditions that have always been part of AIDS definition) (Beral et al, 1990).

The relative decline in KS was confirmed in AIDS surveillance data or clinical series in several developed countries, such as the United Kingdom (UK) (Peters et al, 1991), Germany (Schwartländer et al, 1992), Italy (Serraino et al, 1992) and Australia (Elford et al, 1993). It is at least partly attributed to the shorter latency period between HIV infection and KS onset than in other AIDS-defining illnesses (Hermans et al, 1996). According to some investigators (Elford et al, 1993; Dore et al, 1996), however, the relative decrease in KS might reflect a reduced prevalence and/or virulence of the postulated KS agent following the adoption of safer sexual practices by homosexual men.

Up to the end of 1994, approximately 440 000 AIDS cases had been recorded in official data in the US and about 140 000 in Europe. About 20% of AIDS patients had KS at the time of presentation. It is therefore possible to review systematically recent trends in KS in major European regions, and to assess separately non-homosexual men and women, groups that were little studied in the early phase of the epidemic on account of the low frequency of the disease. Finally, in order to quantify the minimum size of the epidemic of AIDS-associated KS at a population level, age-standardized incidence rates have been computed from AIDS surveillance data.

MATERIALS AND METHODS

Official AIDS notification numbers from 1987 to 1994 for countries belonging to World Health Organization (WHO) European Region were derived from the European Non-Aggregate AIDS

Data Set (ENAADS), updated to June 1995. Data for the US were derived from the AIDS Public Information Data Set, updated to December 1994. AIDS notifications include, among other items, information on age group, sex, AIDS-defining illness(es) (Centers for Disease Control and Prevention, 1987, 1992; Ancelle-Park, 1992) and HIV transmission group of each case. For the present report, all AIDS cases in which KS was mentioned, alone or in combination with opportunistic infections, were considered. Homosexual and bisexual men who reported injected drug use were included in the homosexual and bisexual group, whereas all other modes of HIV transmission were categorized as non-homosexual men. More details about these data sources are available elsewhere (Dal Maso et al, 1995).

The comparability between European and US data has been hampered since 1993 by the case definition change in the US (i.e. reliance also on immunological criteria, $<200 \text{ CD4}^+ \mu\text{l}^{-1}$), (Ancelle-Park, 1992; Centers for Disease Control and Prevention, 1992). Although, in principle, US surveillance data using a case definition similar to the European one can be obtained after the change, a concurrent or prior KS diagnosis might not have been reported accurately. Thus, US data for 1993 and 1994 must be interpreted with caution and considered as minimum KS estimates.

European countries were divided into four regions: (1) north (Denmark, Iceland, Ireland, The Netherlands, Norway, Sweden and the UK); (2) central (Austria, Belgium, France, Germany and Switzerland); (3) south (Greece, Israel, Italy, Portugal and Spain); (4) east (Croatia, Czech Republic, Hungary, Poland, Romania, Slovakian Republic and Slovenia).

Sex-specific incidence rates of KS as an AIDS-defining illness at all ages and in young adults (i.e. 25–49 years) were also computed for various European countries and the US. In order to correct for reporting delay, the method described by Rosenberg (1990) was used for the last 20 three-month periods in each country. Direct age standardization was carried out using the world standard population.

RESULTS

Table 1 shows numbers and percentages of KS as an AIDS-defining illness in four European regions and in the US by ethnic

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Table 1 Number and percentage of Kaposi's sarcoma as an AIDS-defining illness by year of diagnosis among homosexual or bisexual men, non-homosexual men and women in European regions and the United States, 1987–1994

| Group | Area | | Year of diagnosis | | | | | | χ^2 (trend) |
|----------------------------|---------------|---------|-------------------|------|---------|------|---------|------|---------------------|
| | | | 1987–89 | | 1990–92 | | 1993–94 | | |
| | | | Cases | (%) | Cases | (%) | Cases | (%) | |
| Homosexual or bisexual men | Europe | North | 702 | (20) | 878 | (18) | 552 | (17) | 9.8 ^a |
| | | Central | 2484 | (29) | 3136 | (28) | 1743 | (25) | 46.1 ^a |
| | | South | 639 | (26) | 1110 | (24) | 723 | (21) | 22.1 ^a |
| | United States | East | 15 | (17) | 9 | (6) | 6 | (4) | 9.8 ^a |
| | | White | 10122 | (22) | 10666 | (19) | 2339 | (15) | 430.6 ^a |
| | | Black | 1259 | (10) | 1685 | (9) | 545 | (8) | 29.8 ^a |
| Non-homosexual men | Europe | Other | 1710 | (20) | 2262 | (18) | 641 | (14) | 74.6 ^a |
| | | North | 24 | (3) | 57 | (4) | 33 | (3) | 0.4 |
| | | Central | 249 | (6) | 338 | (5) | 223 | (4) | 11.3 ^a |
| | United States | South | 214 | (3) | 430 | (3) | 367 | (3) | 1.7 |
| | | East | 4 | (2) | 8 | (1) | 9 | (1) | 0.4 |
| | | White | 282 | (4) | 504 | (5) | 223 | (5) | 7.9 ^a |
| Women | Europe | Black | 297 | (3) | 478 | (2) | 218 | (2) | 3.3 |
| | | Other | 229 | (3) | 397 | (4) | 141 | (3) | 0.4 |
| | | North | 4 | (2) | 24 | (4) | 23 | (3) | 1.0 |
| | United States | Central | 50 | (2) | 74 | (2) | 49 | (2) | 3.4 |
| | | South | 40 | (2) | 63 | (1) | 76 | (2) | 0.0 |
| | | East | 1 | (1) | 6 | (1) | 4 | (1) | 1.0 |
| | Other | White | 48 | (2) | 65 | (1) | 21 | (1) | 3.3 |
| | | Black | 96 | (2) | 150 | (1) | 65 | (1) | 6.2 ^b |
| | | Other | 50 | (2) | 72 | (2) | 30 | (1) | 1.9 |

From AIDS surveillance data. ^a $P < 0.01$. ^b $P < 0.05$.

Table 2 Number and annual incidence rates per million of Kaposi's sarcoma as an AIDS-defining illness (AIDS-KS) by year of diagnosis and sex in selected European countries and the United States, 1987–94

| Country (no. AIDS-KS) | Annual incidence rate per million ^a | | | | | |
|-----------------------|--|---------|---------|-----------|---------|---------|
| | All ages | | | 25–49 yrs | | |
| | 1987–89 | 1990–92 | 1993–94 | 1987–89 | 1990–92 | 1993–94 |
| <i>Men</i> | | | | | | |
| Austria (107) | 2.2 | 3.7 | 3.1 | 5.9 | 9.1 | 8.6 |
| Belgium (245) | 4.1 | 5.8 | 6.1 | 11.3 | 16.3 | 17.7 |
| Denmark (189) | 6.8 | 8.5 | 7.8 | 17.8 | 21.8 | 20.9 |
| France (5778) | 18.4 | 24.3 | 25.2 | 47.6 | 64.9 | 67.6 |
| Germany (2149) | 5.5 | 5.1 | 4.3 | 14.5 | 13.2 | 11.5 |
| Greece (131) | 1.4 | 3.6 | 3.9 | 4.1 | 9.2 | 10.1 |
| Italy (1453) | 3.7 | 6.0 | 7.8 | 9.6 | 16.0 | 20.4 |
| Netherlands (451) | 5.7 | 7.5 | 4.9 | 16.1 | 20.4 | 12.8 |
| Portugal (329) | 4.6 | 7.9 | 12.1 | 11.8 | 19.3 | 28.7 |
| Spain (1920) | 6.6 | 13.0 | 15.2 | 17.4 | 33.2 | 39.0 |
| Sweden (117) | 3.2 | 3.5 | 2.0 | 8.9 | 8.9 | 6.0 |
| Switzerland (543) | 14.9 | 17.2 | 16.5 | 38.5 | 45.2 | 42.4 |
| United Kingdom (1526) | 4.8 | 6.1 | 7.5 | 13.8 | 16.9 | 20.6 |
| United States (29083) | 28.5 | 30.3 | 16.3 | 77.8 | 84.6 | 44.4 |
| <i>Women</i> | | | | | | |
| France (131) | 0.3 | 0.6 | 0.6 | 0.7 | 1.4 | 1.5 |
| Italy (99) | 0.2 | 0.3 | 0.7 | 0.5 | 1.0 | 1.9 |
| Spain (78) | 0.3 | 0.4 | 0.8 | 0.7 | 0.7 | 1.8 |
| United Kingdom (44) | 0.0 | 0.3 | 0.3 | 0.0 | 0.4 | 1.0 |
| United States (416) | 0.3 | 0.4 | 0.4 | 0.8 | 1.1 | 1.1 |

From AIDS surveillance data, adjusted for reporting delay. ^aAge-standardized, world population.

group, separately for homosexual and non-homosexual men, and for women. Significant declines in the proportion of KS among homosexual and bisexual men were noticed in all regions examined. Decreases were greatest among US whites (from 22% in 1987–89 to 15% in 1993–94). Throughout the period studied the highest proportions of KS were observed in central Europe (from 29% in 1987–89 to 25% in 1993–94) and the lowest among US blacks (10% and 8% respectively). Among non-homosexual men changes over time were less clear: the proportion of KS declined significantly in central Europe (from 6% in 1987–89 to 4% in 1993–94), whereas it increased slightly (from 4% to 5% respectively) among US whites. Among women, the proportion of KS ranged between 1% and 4%, and did not show variations, except for a moderate but significant decline among US blacks (Table 1).

Incidence rates of KS as an AIDS-defining illness in the general population are given in Table 2. In most countries, male rates increased from 1987–89 to 1990–92, and then stabilized or declined. Upward trends were still present in 1993–94 in Italy, Spain and the UK. In 1993–94 the most elevated incidence rates were found in France (25.2), Spain (15.2), Switzerland (16.5) and the US (16.3). The lowest rates (< 4 per million males) were seen in Austria, Greece and Sweden. Thus, a more than tenfold difference was observed between the highest and the lowest incidence countries.

Incidence rates in women were 10 to 20 times lower than those in men, but have increased (Table 2). In 1993–94, the highest rates were recorded in Italy (0.7 per million) and Spain (0.8). On account of the relatively young age of AIDS patients, 25- to 49-year truncated rates were two- to threefold higher than all-age rates in both sexes.

DISCUSSION

The present report shows that the proportion of KS as an AIDS-defining illness was still decreasing in the early 1990s in Europe and the US. This phenomenon is clear among homosexual and bisexual men. Modest but significant declines emerged also, however, among non-homosexual men in central Europe and black women in the US.

In contrast, in the same period, in several well-defined cohorts of HIV-infected individuals, the incidence of KS had remained approximately stable (Jacobson et al, 1990; Muñoz et al, 1993; Montaner et al, 1994; Lundgren et al, 1995; Veugelers et al, 1995; Hermans et al, 1996). Conversely, declines in the cumulative incidence of KS from the early 1980s to the early 1990s were reported in two cohorts of AIDS patients from San Francisco, US (Katz et al, 1994), and Australia (Dore et al, 1996).

In agreement with the survey by Hermans et al (1996), the highest percentages of KS at AIDS presentation were found in central Europe. This applies to homosexual as well as non-homosexual men but has no clear explanation, as systematic surveys of KS-associated herpesvirus prevalence have not been performed in Europe.

In order to estimate the impact of AIDS-associated KS at a population level, we have presented also age-standardized incidence rates. They show a greater than tenfold variation between European countries, attributable chiefly to the different size of the AIDS epidemic and the proportion of homosexual and bisexual men among AIDS cases (Dal Maso et al, 1995).

These rates are probably underestimated. Overall, AIDS report in developed countries is approximately 85% complete (Buehler et al, 1992). About one-third of KS in HIV-positive individuals develop

after AIDS diagnosis (Hoover et al, 1993). Furthermore, the 1993–94 incidence is influenced by the correction for reporting delay, a procedure that is less reliable for the most recent period (Dal Maso et al, 1995). It is, however, worth noting that estimated KS incidence rates for the US are similar to the population-based rates reported in the same period by the combination of Surveillance Epidemiology and End Results collection areas (Kosary et al, 1995).

Given the persisting upward trends of AIDS in the last decade, the relative declines of KS as an AIDS-defining illness have not prevented incidence rates from increasing at least up to the late 1980s (Biggar et al, 1989; Chow et al, 1989; Rabkin and Yellin, 1994; Kosary et al, 1995). AIDS-associated KS have thus attained, in men of the most affected developed countries, rates at all ages comparable to those of cancer of the bone, connective tissues or thyroid (Parkin et al, 1992). In young male adults (i.e. < 50 years), rates of AIDS-associated KS in the early 1990s were similar to incidence rates, for instance, of cancer of the testis, brain, Hodgkin's disease or leukaemia and higher than those of the majority of other neoplasms in the same age group (Levi et al, 1995). However, the incidence of AIDS-associated KS, even in the highest risk developed countries, such as France, Spain or the US, remained much lower than in Central Africa, where rates in men exceeded 250 per million (Wabinga et al, 1993; Bassett et al, 1995).

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