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HIV-1-prevalence in fatalities from Hamburg, Germany

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Summary. The HIV-status of 3999 fatalities (aged 1–60 years) examined at the Institute of Forensic Medicine in Hamburg from 1989–1992 was tested. Former predictions of an enormous increase of HIV-infections, especially in the risk group of IVDA (intravenous drug addicts), did not come true. HIV-screening of fatalities is an instructive additional method of gaining information about the epidemiological development of HIV-infections.

Key words: HIV-infection – Epidemiology – HIV-prevalence – Drug deaths

Zusammenfassung. Im Rahmen eines HIV-Screening-Programmes wurde in den Jahren 1989 bis 1992 bei 3999 im Hamburger Institut für Rechtsmedizin untersuchten Verstorbenen der HIV-1-Status erfaßt. Der in der Mitte der achtziger Jahre prognostizierte steile Anstieg von HIV-Infektionen, insbesondere in der Risikogruppe der i.v. Drogenabhängigen, ist nicht eingetreten. Das beschriebene Projekt stellt eine instruktive Ergänzung anderer Methoden zur Erfassung der epidemiologischen Entwicklung bei der HIV-Infektion dar.

Schlüsselwörter: HIV-Infektionen – Epidemiologie – HIV-Prävalenz – Drogentodesfälle

Introduction

Former predictions of an enormous increase of HIV-1-seroprevalence in intravenous drug addicts (IVDA) and also in the general population initiated many studies to gain realistic knowledge concerning the spread of the HIV-epidemic [3, 4, 15, 20, 21, 23].

Our special interest was a prospective monitoring of the HIV-1 status of all deaths (< 60 years of age) that were investigated at the Institute of Forensic Medicine in Hamburg.

Conclusions could be drawn concerning the HIV-prevalence of the general population in the city and especially in the high-risk group of IVDA.

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Epidemiological characteristics of AIDS and HIV infections in Hamburg

Hamburg is one of the so-called "epicenters" of the HIV-epidemic within the Federal Republic of Germany (together with the metropolitan areas of Berlin, Frankfurt, München and Köln/Düsseldorf) [2].

The cumulated AIDS-incidence in the whole Federal Republic of Germany is 116.4 cases per million, in Hamburg 504.3 cases per million inhabitants. Up to December 31st 1992 822 AIDS cases had been registered in Hamburg (54% deaths). In 1992 there were 154 new AIDS cases (140 men and 14 women; 12% were derived from the high-risk group of IVDA; 65% were homosexuals) [2]. Compared with the data about risk-groups for the whole FRG (14.5% IVDA among the new AIDS-cases in 1992) [1, 2] the occurrence of IVDA in Hamburg is still below the average and there has been an increase of nearly 6% compared to the year 1991.

By way of the duty of notification of HIV-positive laboratory findings ("Laborberichtsverordnung") 5724 HIV-1 infections (80% males, 12% females, in 8% the sex was unknown) had been registered in Hamburg up to December 31st 1992.

Experts upon AIDS and drugs proceed from the assumption of a number of about 10,000 HIV-infected people in Hamburg; they estimate the same number of 10,000 IVDA in this city. From the epidemiological point of view Hamburg is a well-defined metropolitan area (1.6 million inhabitants, 748 km^2 area, centralized bureaucracy and authorities).

Materials and methods

In Hamburg all fatalities with unknown cause of death and unnatural deaths are brought to the Institute of Forensic Medicine. This material includes nearly all drug-related fatalities. As a basic fact for our study it has to be pointed out, that postmortem serological HIV-investigations have proven to be a safe and reproducible procedure even in cases with advanced autolysis of the body [8, 9, 11, 12, 14, 19].

HIV-testing was carried out by ELISA and Western-blot confirmation in positive cases. – Blood sampling was not possible in some cases with advanced decomposition of the body or with severe destruction and exsanguination. The study represents about 90% of all fatalities (about 95% of all drug deaths) within this age group (< 60) that were investigated in our Institute.

The exact cause of death in the HIV-1 positive cases and the drug-related fatalities was established by autopsy, histological, toxicological and serological investigations.

The question of risk-behavior of the HIV-infected was investigated by interviews with friends and relatives of the deceased and by medical records.

Results

From January 1st 1989 to December 31st 1992 3999 blood samples from persons up to 60 years of age (3074 males, 925 females) were investigated and 55 proved to be positive for HIV-1 infection. This means an overall seroprevalence of 1.4% in our material (see Table 1).[1] The prevalence of HIV-1-infections among drug-related fatalities in Hamburg since 1985 is demonstrated in Fig. 1. The rate is decreasing or at present perhaps stabilizing at an unexpectedly low level (about 5%). Among the 55 HIV-positive fatalities 7 were females (12.7%), aged between 20 and 30 years. The overall age distribution of the HIV-infected deaths lay between 19 and 59 years (mean 37.1 years; men 38.9 years and women 25.1 years, see Fig. 2). The mean age of all 3999 deaths was 42.6 years (men 42.6 years, women 42.5 years) and females represented 23% of our material.

The causes of death (see Fig. 3) of the 55 HIV-positive fatalities consisted of:

- 18 heroin intoxications (mean age: 29.6 years; 15 males, 3 females),
- 7 natural deaths (mean age: 50.5 years, 6 males, 1 female; cardiac infarction, brain haemorrhage, aortic rupture),
- 14 AIDS-deaths (4 homosexuals, 8 drug-addicts, 2 with unknown risk group),
- 10 suicides (mean age 39.2 years; shooting, jumping from a height, stabbing, hanging, drowning in freezing water, intoxication with diphenhydramine, cyanide, insulin and nifedipine),
- 3 drug-related diseases (not including AIDS: sepsis, hepatitis B),
- 1 case of homicide (stabbing),

Table 1. HIV-1-prevalence of fatalities in Hamburg (1989–1992)

	n	HIV+		
		m	f	Σ
1989	980	11	2	13 (1.3%)
1990	955	12	2	14 (1.5%)
1991	1077	10	2	12 (1.1%)
1992	987	15	1	16 (1.6%)
Total	3999	48	7	55 (1.4%)

[1] Apart from these 55 HIV-positive cases we had two additional HIV-infected males who were older than 60 years (this age group was not tested systematically): a 61-year-old homosexual, who had been intravenously drug dependent for seven years, died from an AIDS-related pneumonia; a 72-year-old man committed suicide by taking an overdose of Diphenhydramine, neither his relatives nor his physicians had known about his HIV-infection

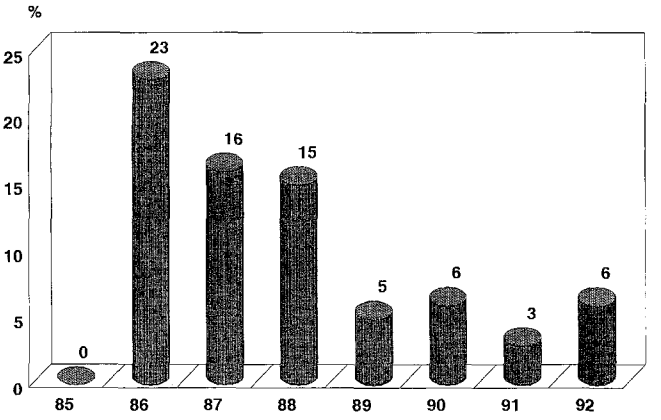

Fig. 1. HIV-1-prevalence of drug-related fatalities in Hamburg (1985–1992)

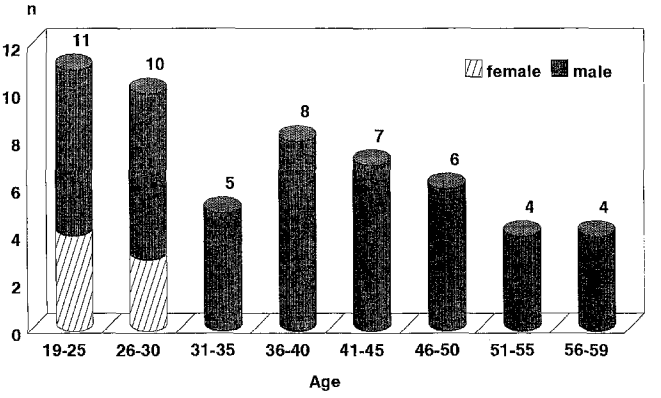

Fig. 2. Age and sex distribution of the 55 HIV-positive fatalities

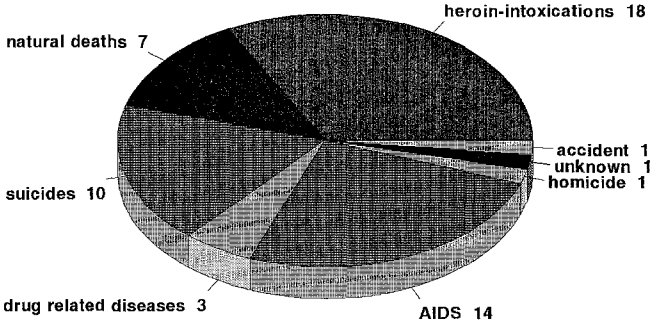

Fig. 3. Causes of deaths of 55 HIV-positive fatalities in Hamburg 1989–1992

- 1 accident (burning),
- 1 unknown case (no diagnosis reached).

Of the HIV-positive cases 27 were intravenous drug addicts (49%, mean age 30.3 years), 13 were homosexuals (24%), 3 had received blood products (haemophilia A, transfusion after polytrauma); in 12 cases no information could be obtained about a special risk constellation.

Discussion

Earlier investigations about the HIV-1-prevalence of fatalities, especially of the risk group of IVDA pointed

to an "explosive" spread of HIV-infections. However, the data from the literature are very complex and not easy to compare [3, 6, 11, 13, 17], including other studies of forensic autopsy cases [7, 12, 14, 21]. Des Jarlais (1991) discussed the hypothesis that there might be a stabilization at very different levels of HIV seroprevalence as a "normal" outcome of the HIV epidemic among IVDA [3]. The HIV-1-prevalence of fatalities in Hamburg shows the same tendency. The prevalence-rates are stabilizing in the forensic cases in general as well as in the drug-related fatalities [15, 18].

A considerable number of HIV-infected persons die from cardiovascular and other diseases not related to AIDS (9 out of 55 cases). Moreover some HIV-positive persons die suddenly and unexpectedly with no indications of the infection during lifetime (6 out of 55 cases) [16]. The consequence from the view of the forensic practitioner is that appropriate precautions have to be taken into account and should be enlarged for the daily autopsy routine [5, 10, 22].

We do not underestimate that a selected group (sudden unexpected deaths and unnatural deaths) was investigated. The drug-related fatalities especially are nearly totally represented in this forensic material. For further epidemiological evaluations therefore this special risk group (drug deaths) was excluded. Based on this supposition the HIV-1 prevalence in the investigated age group is 0.8% (28 out of 3450 cases). Proceeding from our data and the official population figures for Hamburg (about 1,270,000 persons <60 years of age) the epidemiological estimation of about 10,000 HIV-infected persons in Hamburg is confirmed.

However from a statistical point of view our data concerning the spread of HIV-infections are not comprehensive enough for generalized conclusions. Nevertheless, our findings correspond with the data of other studies and registration systems and offer complementary knowledge about the HIV-epidemiology in our well-defined metropolitan area.

Serological HIV-testing of drug deaths is a useful contribution to the epidemiological screening within this high-risk group. The data of drug-related fatalities are representative for the situation of living IVDA [13, 15, 18, 24].

Local monitoring systems of HIV prevalence in the general population and in risk groups are capable to registering regional trends of the epidemiology better and earlier than AIDS-statistics.

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