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HIV disease progression in 854 women and men infected through injecting drug use and heterosexual sex and followed for up to nine years from seroconversion

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Abstract

Objective—To compare the progression of HIV-1 infection in men and women followed up for up to nine years after an accurately estimated date of seroconversion.

Design—Prospective observational study.

Setting—16 HIV outpatient clinics across Italy.

Subjects—321 women and 533 men infected with HIV through injecting drug use or heterosexual sex and with accurately estimated dates of seroconversion.

Main outcome measures—Progression to severe CD4 lymphocytopenia (CD4 lymphocyte count <200×10⁶/l), development of AIDS defining diseases, and death from AIDS.

Results—Thirty two women and 67 men developed AIDS at Kaplan-Meier progression rates of 25% (95% confidence interval 13·8% to 35·5%) and 23% (15·6% to 30·4%), respectively, 7 years after seroconversion. In a Cox proportional hazards model the relative hazard was 0·93 (that is, a slightly lower hazard in women) before and 1·10 (0·70 to 1·72) after adjusting for age, HIV exposure group, and year of seroconversion. When CD4 lymphocytopenia and death from AIDS were used as end points the results were similar, with adjusted relative hazards of 0·95 (0·63 to 1·42) and 0·72 (0·48 to 1·79) respectively. In both women and men the risk of developing AIDS before the CD4 lymphocyte count had declined below 200×10⁶/l was small (3% in women, 6% in men). The estimated median count at which AIDS developed in women (34×10⁶/l; 10×10⁶ to 44×10⁶) was similar to that for men (44×10⁶/l; 22×10⁶ to 60×10⁶).

Conclusion—There seems to be little evidence for appreciable differences in the natural course of HIV infection between men and women followed up from the time of seroconversion.

Introduction

Half of the HIV cases in the developing world are in women, and in industrialised countries the proportion of cases of HIV infection and AIDS reported in women is increasing.[1][2] However, the natural course of HIV infection in women has not been studied extensively and little is known about markers and risk factors for disease evolution. Progression rates to AIDS and clinical manifestations of diseases associated with HIV infection might differ between women and men because of biological and socioeconomic factors. In several countries access to care and treatment is an important issue for HIV infected women, most of whom belong to ethnic or racial minorities.[3] Moreover, diseases now indicative of AIDS, such as cervical cancer might determine an excess of morbidity and mortality in women as compared with men.

Several case reports and cross sectional and retrospective studies lacking detailed descriptions of research methodology have been published, but there are very few prospective studies of HIV progression among women.[4] Furthermore, most workers have investigated gender as a cofactor in studies of survival with AIDS[5–10] or in longitudinal studies of seroprevalent cohorts of HIV infected women without knowing the seroconversion date.[11–14] To our knowledge, with the exception of two preliminary reports coauthored by some of us[15][16] the only incident cohort study addressing this issue was conducted in a population of women working as prostitutes in Nairobi without any referent male population.[17] Recently a multicohort analysis project workshop held in Cambridge[18] marginally considered gender differences in terms of disease progression and marker paths in five seroconverter cohorts, including our own.

To address these issues we followed up a large number of HIV infected women and men with accurately estimated dates of seroconversion to eval-

uate the influence of gender in HIV disease progression in a country (Italy) with universal access to care and treatment. Particular attention was also given to comparing the risk of progressing to AIDS at different CD4 lymphocyte counts among men and women.

Patients and methods

We enrolled patients from 16 outpatient facilities in Italy, including AIDS or sexually transmitted disease clinics and drug dependency units, who had been serially tested and who seroconverted between 1980 and 1992. The seroconversion date was estimated as the midpoint between the last negative and first positive HIV serological test result. Other details of the study design were as reported.[19][20] All participants underwent interview, medical examination, and venepuncture for laboratory assays roughly every six months. HIV serological status was ascertained by enzyme linked immunosorbent assays (ELISA). Reactive samples were confirmed by western blot. CD4 cell counts were obtained by flow cytometry with OKT4 monoclonal antibodies (Ortho Diagnostics, Raritan, New Jersey).

We included only participants infected through injecting drug use or heterosexual intercourse, which are the main routes of transmission of HIV in women. The end points were severe CD4 lymphocytopenia (CD4 count $<200 \times 10^6$/l), AIDS diagnosed according to the 1987 Centers for Disease Control and World Health Organisation case definition,[21] and death from AIDS. With regard to CD4 lymphocytopenia as outcome, the analysis was restricted to those who had at least one CD4 count and seroconverted after 1985. Subjects who seroconverted before 1986 were excluded because we thought that the infrequency of their CD4 measurements led to an underestimate of progression to 200×10^6 cells/l. To maximise the completeness of follow up for the progression to AIDS and death reports were also obtained by linkage with the Italian national AIDS registry.

STATISTICAL METHODS

Frequencies of diseases indicative of AIDS by gender were calculated. Differences between women and men were evaluated by χ^2 and Fisher's exact tests (Fisher's test was used when at least one expected cell count was less than 5). Resulting P values were reported as significant only when below 0·05.

To estimate cumulative progression probabilities for each end point we used the Kaplan-Meier survival method.[22] Comparisons between progression curves were tested for statistical significance with the log rank test. Crude and adjusted relative hazards for gender were calculated with the Cox proportional hazards model.[22]

When the end point was AIDS or death from AIDS we considered the time from seroconversion to the date of the event. When a patient was event free we considered the time from seroconversion to 1 January 1993. When the end point was severe CD4 lymphocytopenia we considered the time from seroconversion to the time at which the patient's CD4 cell count declined below 200×10^6/l. This point was estimated by linear interpolation as the time at which the line joining the first count below 200×10^6/l and the previous count crossed 200×10^6/l.

Follow up of patients whose counts did not decline below 200×10^6/l was censored six months after the last measurement. Censoring at the time of last follow up produced a bias towards overestimating the progression to a CD4 count of 200×10^6/l, as patients with stable counts were seen less regularly than those with more rapidly declining counts. However, different choices of time of censoring led to similar

relative hazards in the Cox regression for all cofactors analysed.

The cumulative probability of progressing to AIDS before reaching a given CD4 lymphocyte count was calculated as described.[23]

All analyses were repeated, stratifying by transmission category.

Results

Eight hundred and fifty four participants enrolled up to December 1992 entered the analysis. Table I gives their descriptive characteristics. Among the 321 women, 195 (60·7%) were injecting drug users and 126 (39·3%) heterosexual contacts. Among the men, 476 (89·3%) were injecting drug users and only 57 (10·7%) heterosexual contacts. The median age at seroconversion was 24 years in the women (range 14-51) and 25 years in the men (16-59). This difference was not significant. The median lag between the last negative and first positive HIV test result was eight months for men and nine months for women. In both groups 95% of the participants had a seroconversion interval shorter than two years. The median follow up times for women and men were 4·5 years (range 0·1-11·2) and 4·7 years (0·1-13·3) respectively.

TABLE I—Descriptive characteristics of 854 seroconverters by sex

	Women	Men
No enrolled (% of total)	321/854 (37·6)	533/854 (62·4)
No of injecting drug users (% of group)	195/321 (60·7)	476/533 (89·3)
No of heterosexual contacts (% of group)	126/321 (39·3)	57/533 (10·7)
Median age at seroconversion (range)	24 (14-51)	25 (16-59)
Median lag time (months) (range)	9 (1-59)	8 (0·5-56)
Median years of follow up (range)	4·5 (0·1-11·2)	4·7 (0·1-13·3)
No with CD4 count $<200 \times 10^6$/l (% of group)†	56/283 (19·8)	71/425 (16·7)
No of AIDS cases (% of group)	32/321 (10·0)	67/533 (12·6)
No of deaths from AIDS (% of group)	13/321 (4·0)	39/533 (7·3)
No of non-AIDS deaths (% of group)	9/321 (2·8)	12/533 (2·3)
No given antiretroviral treatment before AIDS (% of eligible patients)‡	94/197 (47·7)	121/326 (37·1)
No given prophylaxis against Pneumocystis carinii pneumonia before AIDS (% of eligible patients)§	16/62 (25·8)	21/94 (22·3)

†For this outcome a total of 146 patients (38 women, 108 men) were excluded: 18 women (5·6% of 321) and 30 men (5·6% of 533) because they had no CD4 measurement; 19 women (5·9%) and 69 men (12·9%) because they seroconverted before 1986; and one woman (0·3%) and nine men (1·7%) because they had no CD4 measurement and seroconverted before 1986.
‡Patients whose CD4 count was under 500×10^6/l during the whole study period were considered eligible for antiretroviral treatment (197 women, 326 men).
§Patients whose CD4 count was under 200×10^6/l during the whole study period were considered eligible for prophylaxis (62 women, 94 men).

During the study 56 women (19·8% of the 283 who seroconverted after 1985 and for whom at least one CD4 count was available) and 71 men (16·7% of 425) developed severe CD4 lymphocytopenia. Thirty two AIDS cases (10·0%) were observed in women and 67 (12·6%) in men. Thirteen women (4·0%) and 39 men (7·3%) died of AIDS. Death from non-AIDS causes occurred in nine women (2·8%) and 12 men (2·3%). Overdose was the most common cause of non-AIDS death both among women (four cases; 1·2%) and among men (five cases; 0·9%). Accidental death was more common among men (four cases; 0·8%) than among women (one case; 0·3%).

Patients in whom the CD4 cell count declined under 500×10^6 and 200×10^6/l were considered eligible for antiretroviral treatment and prophylaxis against opportunistic infections respectively. Ninety four women (47·7% of 197 eligible) and 121 men (37·1% of 326) received antiretroviral treatment while AIDS free, and 16 women (25·8% of 62) and 21 men (22·3% of 94) received prophylaxis against opportunistic infections. These differences by gender almost dis-

appeared after stratifying by transmission category. Among heterosexual contacts, 46 out of 86 women (53·5%) and 23 out of 39 men (59·0%) received antiretroviral treatment, and eight out of 31 women (25·8%) and four out of 13 men (30·8%) received prophylaxis. Among injecting drug users, 43·2% of women (48 out of 111) and 34·1% of men (98 out of 287) as well as 25·8% of women (eight out of 31) and 21·0% of men (17 out of 81) received antiretroviral and prophylactic treatment respectively. Very similar results were obtained when a CD4 cell count of 200×10⁶/l was used as the cut off for antiretroviral treatment and 500×10⁶/l used as the cut off for prophylaxis against opportunistic infections.

TABLE II—*Absolute frequencies of diseases indicative of AIDS among women and men*

	First AIDS diagnosis†		All AIDS diagnoses‡	
	No (%) of women	No (%) of men	No (%) of women	No (%) of men
Candida albicans oesophagitis	13 (38·2)	21 (28·0)	13 (31·7)	26 (26·3)
Penumocystis carinii pneumonia	6 (17·6)	17 (22·7)	7 (17·1)	19 (19·2)
Wasting syndrome	5 (14·7)	9 (12·0)	6 (14·6)	13 (13·1)
Disseminated cytomegalovirus infection	4 (11·8)	0	7 (17·1)	2 (2·0)
Toxoplasma gondii encephalitis	3 (8·8)	7 (9·3)	3 (7·3)	8 (8·1)
Atypical mycobacteriosis	1 (2·9)	2 (2·7)	1 (2·4)	3 (3·0)
Kaposi's sarcoma	1 (2·9)	3 (4·0)	1 (2·4)	3 (3·0)
HIV encephalitis	1 (2·9)	7 (9·3)	2 (4·9)	9 (9·1)
Herpes simplex (chronic or ulcerative)	0	3 (4·0)	0	3 (3·0)
Cryptosporidiosis	0	2 (2·7)	0	3 (3·0)
Recurrent salmonella septicaemia	0	1 (1·3)	0	1 (1·0)
Extrapulmonary tuberculosis	0	3 (4·0)	1 (2·4)	5 (5·1)
Extrapulmonary cryptococcosis	0	0	0	1 (1·0)
Progressive multifocal leucoencephalopathy	0	0	0	1 (1·0)
Non-Hodgkin's lymphoma	0	0	0	2 (2·0)
Total	34 (100·0)	75 (100·0)	41 (100·0)	99 (100·0)

†Two women and six men had two concomitant AIDS defining diseases; one man had three concomitant AIDS defining diseases.
‡Five women and 18 men had two AIDS defining diseases; two women and four men had three AIDS defining diseases; two men had four AIDS defining diseases.
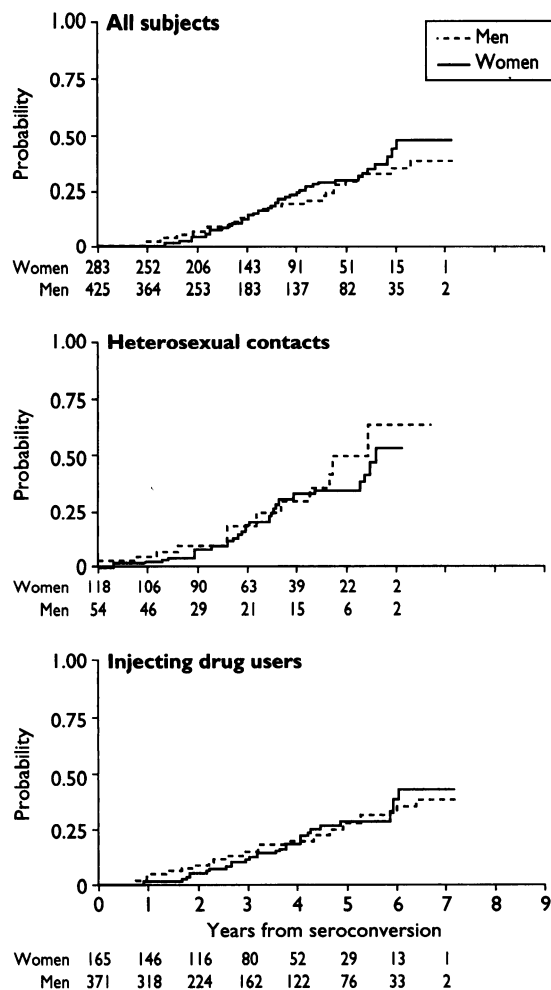

FIG 1—*Kaplan-Meier estimates of cumulative probability of CD4 cell count declining below 200×10⁶/l by years from seroconversion among all subjects, heterosexual contacts, and injecting drug users. Numbers of subjects at risk of event at various time points are listed beneath time scales*
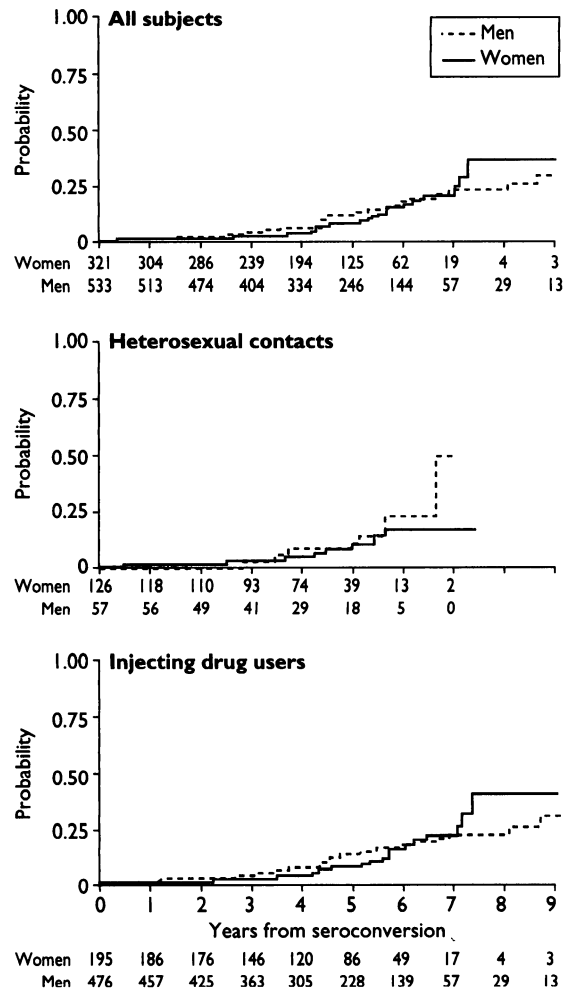

FIG 2—*Kaplan-Meier estimates of cumulative probability of AIDS by years from seroconversion among all subjects, heterosexual contacts, and injecting drug users. Numbers of subjects at risk of developing event at various time points are listed beneath time scales*

The frequencies of diseases indicative of AIDS at first diagnosis were similar in women and men (table II). Disseminated cytomegalovirus infection as a first AIDS diagnosis was not reported among men, but four cases (11·8%) were observed among women (Fisher's exact test, P=0·008). When we considered all AIDS diagnoses reported the higher frequency of disseminated cytomegalovirus infection among women was confirmed. We used the Centers for Disease Control 1987 AIDS definition. However, we received information about all possible clinical findings, including those conditions newly added in the 1993 definition.[24] No case of cervical cancer was reported during the study.

The risk of the CD4 lymphocyte count declining below 200×10⁶/l was not significantly different between women and men (P=0·54; fig 1). We observed a slight tendency for women to progress faster after about five years from seroconversion, but this seemed to be more attributable to HIV exposure category than to gender (fig 1).

Progression to AIDS was slightly slower among women than among men, but the difference was not significant (P=0·7; fig 2). The cumulative incidence of AIDS up to five years after seroconversion was 9% among women (95% confidence interval: 4·7% to 12·5%) and 12% among men (8·7% to 15·3%). After seven years it was 25% among women (13·8% to 35·5%) and 23% among men (15·6% to 30·4%). No differences were found after stratifying the curves by risk group (fig 2). The cumulative mortality from AIDS tended to be lower in women than in men, but the difference was not significant (P=0·3; fig 3). After
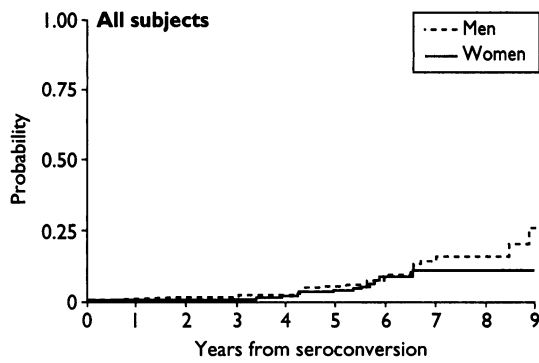
FIG 3—Kaplan-Meier estimates of cumulative probability of death from AIDS by years from seroconversion amonf all subjects. Numbers at risk of the event at various time points are listed beneath time scale

drug users (median 43×10^6 cells/l (10×10^6 to 69×10^6) in women compared with 45×10^6/l (15×10^6 to 56×10^6) in men) (fig 4).

Discussion

Our study was based on a large number of women and men with known seroconversion dates, belonging to the same transmission categories, and recruited with the same protocol and in the same clinical centres. This unique setting allowed us to evaluate differences in HIV progression rates and their determinants, avoiding possible bias due to unknown date of seroconversion.[25] For this analysis, and to reduce problems related to possible low reliability of the case definition, we used three different end points; severe CD4 lymphocytopenia ($<200 \times 10^6$ cells/l), AIDS diagnosis, and death from AIDS.

To evaluate possible differences in clinical presentation we compared the frequency distribution of diseases indicative of AIDS between women and men. Except for a higher frequency of disseminated cytomegalovirus infection in women there were no significant differences, though our study had low statistical power to detect them. The diagnosis of Kaposi's sarcoma in women was rare, but the frequency was similar to that in men belonging to the same transmission category. Our findings do not differ from those of other studies comparing the distribution of diseases indicative of AIDS in women and heterosexual men.[26]

stratifying by risk group differences were still not significant (data not shown).

Univariate relative hazards (for women versus men) of progressing to severe CD4 lymphocytopenia (CD4 count $<200 \times 10^6$/l), AIDS, and death from AIDS estimated by Cox proportional hazards models were 1·12 (95% confidence interval: 0·78 to 1·59), 0·93 (0·61 to 1·42), and 0·72 (0·38 to 1·35) respectively. After adjusting for age, exposure category, and year of seroconversion (table III) the estimated relative hazards among women versus men were still close to one. Interestingly, the estimated relative hazard of severe CD4 lymphocytopenia among injecting drug users versus heterosexual contacts was 0·63 whereas that of AIDS was 1·08 and death from AIDS 2·18.

TABLE III—Estimated relative hazards (95% confidence interval) of progressing to severe CD4 lymphocytopenia (CD4 count $<200 \times 10^6$/l), AIDS, and death from AIDS according to sex, age at seroconversion, risk group, and year of seroconversion. Data obtained by fitting variables as covariates in Cox proportional hazards model

	CD4 count $<200 \times 10^6$/l†	AIDS	Death from AIDS
Sex: women v men	0·95 (0·63 to 1·42)	1·10 (0·70 to 1·72)	0·93 (0·48 to 1·79)
Age at seroconversion (years):			
20-29 v <20	0·87 (0·47 to 1·62)	1·63 (0·74 to 3·60)	2·01 (0·61 to 6·64)
>29 v <20	1·26 (0·81 to 2·75)	3·09 (1·32 to 7·23)	4·09 (1·03 to 13·25)
Risk factor: injecting drug users v heterosexual contacts	0·63 (0·42 to 0·96)	1·08 (0·60 to 1·92)	2·18 (0·68 to 5·80)
Year of seroconversion	1·03 (0·89 to 1·20)	0·99 (0·86 to 1·14)	0·99 (0·81 to 1·21)

†This model was fitted over subset of 698 patients who seroconverted after 1985 and had at least one CD4 measurement.

When fitting the models presented in table III we also considered that our results might be affected by pooling the data across several centres. For example, if a particular centre had recruited a higher than average proportion of women and the centre in general had a higher than average progression rate, then this would create bias. We therefore repeated the analyses in table III, adjusting also for centre. The results changed very little for each end point. We also assessed whether the gender effect differed between centres by fitting the interaction between gender and centre. No evidence for differences in gender effect was found (data not shown).

Figure 4 shows the relation between the CD4 lymphocyte count and risk of progressing to AIDS. Women tended to develop AIDS at lower CD4 counts (median 34×10^6 cells/l; 95% confidence interval 10×10^6 to 44×10^6) than men (median 44×10^6/l; 22×10^6 to 60×10^6), but the difference was not significant (log rank test, 1·87; P=0·17). When we stratified results by HIV exposure category this difference (though not significant) was higher among heterosexual contacts (median 25×10^6 cells/l (95% confidence interval 0 to 40×10^6) in women compared with 49×10^6/l (0 to 67×10^6) in men) than among injecting

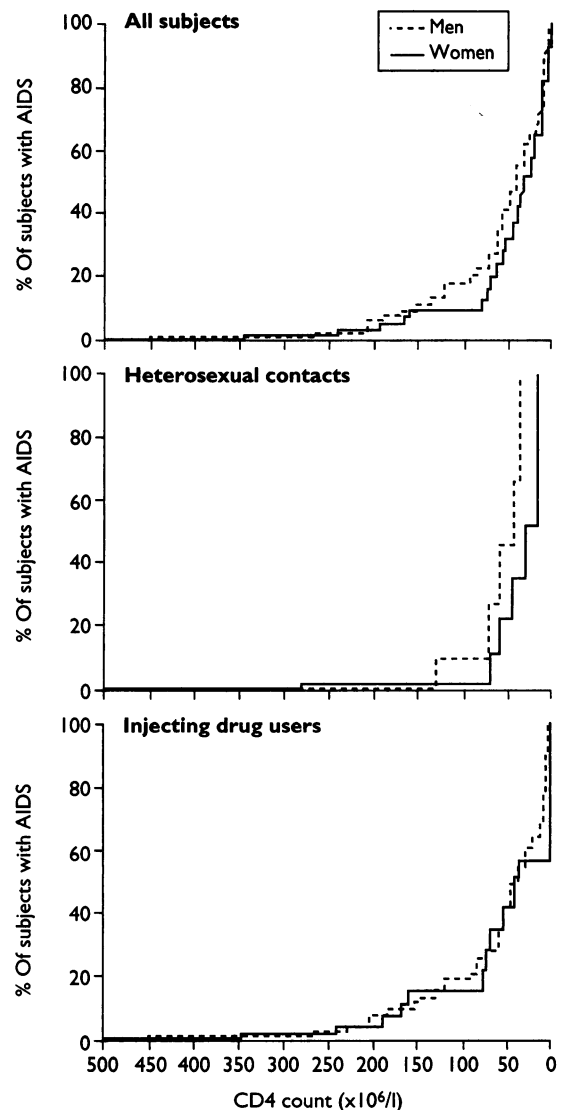FIG 4—Cumulative risk of AIDS according to minimum CD4 lymphocyte count attained among all subjects, heterosexual contacts, and injecting drug users

Key messages

- The number of women with HIV infection and AIDS is increasing throughout the world

- The few studies that have compared the risks of HIV disease progression between women and men have had conflicting results due to methodological limitations

- This study shows that the risk of progressing to AIDS, death from AIDS, and a CD4 lymphocyte count lower than $200 \times 10^6/l$ after HIV seroconversion seems to be similar among women and men

- Women may progress to AIDS at a lower CD4 count than men

- Among opportunistic infections indicative of AIDS, disseminated cytomegalovirus infection seems to be more common among women

Progression towards the different end points did not differ significantly between women and men, the results of various analyses showing good consistency. Univariate risk estimates as well as stratified analyses did not provide evidence for any difference in findings for the three end points. Furthermore, after controlling for other cofactors, such as age, year of seroconversion, and transmission category, the adjusted relative hazards were closer to one than in the univariate analyses. Adjustment for year of seroconversion ensured that our results were not biased by any tendency for women to seroconvert, on average, later than men. However, the confidence intervals around our relative hazard estimates should be noted. For example, we could not exclude the possibility that the AIDS rate was up to 72% higher in women than in men (table III). It is noteworthy that the estimated power of the log rank test to detect at least a 50% higher AIDS rate in women than men five years after seroconversion was higher than 70% (type I error=0·05).

Women tended to develop AIDS at marginally lower CD4 counts than men, but the difference was not significant (fig 4). Moreover, the difference might have been more attributable to an effect of transmission category than to gender alone. Injecting drug users tended to develop AIDS at higher CD4 counts when compared with heterosexual contacts. This finding could be due to a higher proportion of eligible patients being treated among heterosexual contacts than among injecting drug users. Finally, there was a tendency towards a lower mortality in women than in men, but this slight difference was not significant and in large part was attributable to a transmission category effect.

Our findings can help clarify reports evaluating survival differences with AIDS[5-10] as well as estimates of AIDS free survival time based on seroprevalent cohorts.[11-14] With regard to survival of AIDS patients, some studies have found a poorer survival of women than men in the United States,[5 6 8] though these differences have not been confirmed.[7 9 10] This issue might in part be explained by a less frequent use of antiretroviral treatment among women with AIDS in the United States.[8] It might also be that women develop AIDS at a lower CD4 count than men, as observed in our study. Regarding the progression to AIDS evaluated in many seroprevalent cohorts, no study has shown a significant difference between women and men.[11 14] However, not knowing the interval from infection to enrolment precluded these reports from definitively describing the actual disease progression. Our findings agree with those of the multicohort analysis project workshop,[18] which included data from this cohort as well as data from a cohort of injecting drug users in Scotland with known dates of seroconversion. In particular, that study provided no evidence for significant differences between women and men in the progression to AIDS

and death and in the rate of decline of the CD4 count.

Possible biases and limitations of our study need to be examined before drawing firm conclusions. Firstly, there was the problem of temporary loss to follow up. At the cut off date for this analysis 30% of the patients not known to have died had not been seen for one year. This figure was 27% for women and 35% for men. However, we minimised this problem by cross checking our data with those of the national AIDS registry, so that this bias is unlikely to explain our observations. Secondly, HIV positive women may have an increased risk of some diseases that are not indicative of AIDS owing to the fact that in the past mainly men have been studied. Gynaecological abnormalities are possible candidates.

Unfortunately, gynaecological examination was not routine in this study, resulting in a possible under-recording of diseases such as cervical neoplasia and vaginal candidiasis. This was particularly true for cervical intraepithelial neoplasia, which is reportedly very common among HIV positive women[27-30] and has been included in the Centers for Disease Control and Prevention staging of HIV infection.[24] Because of the lack of clinical symptoms this potentially risky condition may have been underdiagnosed among HIV infected women unless they were effectively counselled and referred to a gynaecologist. On the other hand, cases of invasive cervical cancer, recently included among the diseases indicative of AIDS,[31] would more easily have been detected. However, neither cases nor deaths from cervical invasive cancer were reported in our population during the study. Finally, we did not address the issue that pregnancy could be a specific cofactor for clinical progression as a result of the induction of immunosuppression.[32] We intend to explore this as more evidence becomes available.

In conclusion, the clinical course of HIV infection in countries with ready access to care and treatment seems not to differ between women and men after controlling for age and transmission category. However, there is a lack of detailed information on gynaecological abnormalities which may result in an underestimate of the impact of HIV infection in women. Even if these understated causes did not seem to determine an excess of mortality among women enrolled in our cohort, there is a need for collaboration between HIV physicians and gynaecologists in order to evaluate in detail the importance of genital tract diseases among HIV positive women.

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National survey of hospital patients

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Abstract

Objective—To survey patients' opinions of their experiences in hospital in order to produce data that can help managers and doctors to identify and solve problems.

Design—Random sample of 36 NHS hospitals, stratified by size of hospital (number of beds), area (north, midlands, south east, south west), and type of hospital (teaching or non-teaching, trust or directly managed). From each hospital a random sample of, on average, 143 patients was interviewed at home or the place of discharge two to four weeks after discharge by means of a structured questionnaire about their treatment in hospital.

Subjects—5150 randomly chosen NHS patients recently discharged from acute hospitals in England. Subjects had been patients on medical and surgical wards apart from paediatric, maternity, psychiatric, and geriatric wards.

Main outcome measures—Patients' responses to direct questions about preadmission procedures, admission, communication with staff, physical care, tests and operations, help from staff, pain management, and discharge planning. Patients' responses to general questions about their degree of satisfaction in hospitals.

Results—Problems were reported by patients, particularly with regard to communication with staff (56% (2824/5020) had not been given written or printed information); pain management (33% (1042/3162) of those suffering pain were in pain all or most of the time); and discharge planning (70% (3599/5124) had not been told about warning signs and 62% (3177/5119) had not been told when to resume normal activities). Hospitals failed to reach the standards of the Patient's Charter—for example, in explaining the treatment proposed and giving patients the option of not taking part in student training. Answers to questions about patient satisfaction were, however, highly positive but of little use to managers.

Conclusions—This survey has highlighted several problems with treatment in NHS hospitals. Asking patients direct questions about what happened rather than how satisfied they were with treatment can elucidate the problems that exist and so enable them to be solved.

Introduction

The Patient's Charter and the review of the NHS highlighted the need for providers of hospital care to assess and improve the quality of care they offer and to continue expanding their use of questionnaires and surveys.[1][2] Patients are aware of health issues to the extent that they have been described as "expert witnesses" to the health care process,[3] so it is important that managers and clinicians plan their services to reflect the needs of patients.

Previous surveys of patients' opinions have been criticised as being unclear in their objectives,[4] being administered haphazardly,[5] using a wide variety of incompatible methods[4][6] that often focused on easily measured elements of care, particularly hotel aspects such as food and amenities,[7] and having a poor response rate.[8][9] Patient satisfaction may be an important predictor of compliance with treatment,[7] and the psychological happiness of the patient is an important part of recovery.[10] Patients' satisfaction ratings are, however, invariably high despite evidence to the