Cancer Epidemiology 36 (2012) e69–e73

Contents lists available at SciVerse ScienceDirect

Cancer Epidemiology

The International Journal of Cancer Epidemiology, Detection, and Prevention

journal homepage: www.cancerepidemiology.net

Comparative incidence of cancer in HIV-AIDS patients and transplant recipients

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ARTICLE INFO

Article history:
Received 19 September 2011
Received in revised form 30 November 2011
Accepted 4 December 2011
Available online 10 January 2012

Keywords:
Neoplasm
Incidence
HIV
Acquired Immunodeficiency Syndrome
Transplants

ABSTRACT

Background: Studies have found a relationship between decreased immunity and increased incidence of cancer.
Methods: A systematic review of observational studies evaluating the incidence of cancer in both organ recipients and people with HIV/AIDS compared with the general population. Eligible studies were searched up to March 2011 in the following databases: Pubmed, Embase, Scielo, Cancerlit and Google scholar. In this study, the standardized incidence ratios (SIR) of cancer in people with HIV/AIDS and of organ transplant recipients were compared with those found among the general population.
Results: Twenty-five studies of transplant and HIV-associated cancer risk, involving 866 776 people with HIV/AIDS or organ recipients and 21 260 new cases of cancer, were included. The risk for the development of new cancer cases was higher among people with HIV/AIDS (SIR = 4, IC95% 3.78–4.24) and who received organs (SIR = 3.28, IC95% 3.06–3.52) when compared with the general population.
Conclusion: Similar SIR in both immunocompromised populations suggests that the weakened immune system is responsible for the increased risk of new cases of cancer among these groups. Research investments are needed to develop effective cancer prevention strategies in these populations.

1. Introduction

Several population-based studies comparing cancer risk in HIV/AIDS patients with the general population have shown that infected people are at higher risk for specific types of cancer [1–3]. This fact is predominantly observed when the cancer is related to a known or suspected infectious cause [1].

Studies of cancer risk in other immunosuppressed people, such as transplant recipients receiving iatrogenic immune suppression, have shown similar findings. Although highly divergent, both groups have been found to be at high risk of non-Hodgkin lymphoma, Kaposi's sarcoma, non-melanoma skin cancers, and to a lesser extent, ano-genital cancers as well as Hodgkin lymphoma [4–7]. Lifestyle-related cancer risk factors differ substantially between these two groups: when cancer incidence patterns are found to be similar, immune deficiency is probably the primary cause [1].

Despite advances in medical science, cancer is now one of the leading causes of death in both immunosuppressed populations [6,8,9,10]. Kaposi's sarcoma, non-Hodgkin lymphoma and cervical cancer have long been associated with immune suppression caused by HIV/AIDS [11]. Recent studies have shown increased risk of a very wide, and remarkably similar, range of cancers in both populations [12].

The purpose of this study is to evaluate the incidence of cancer in HIV/AIDS patients and organ transplant recipients, compared with the general population. Results will hopefully shed light on carcinomas of highest incidence in these two groups and lead to specific strategies to reduce the risk of new cancer cases in these immunosuppressed patients.

2. Methods

This study adhered to MOOSE guidelines [13].

2.1. Inclusion criteria

Studies meeting the following criteria were included: [1] cohort studies of people with HIV/AIDS, or of solid organ transplant recipients; [2] adult subjects; and [3] data on cancer incidence in

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doi:10.1016/j.canep.2011.12.002

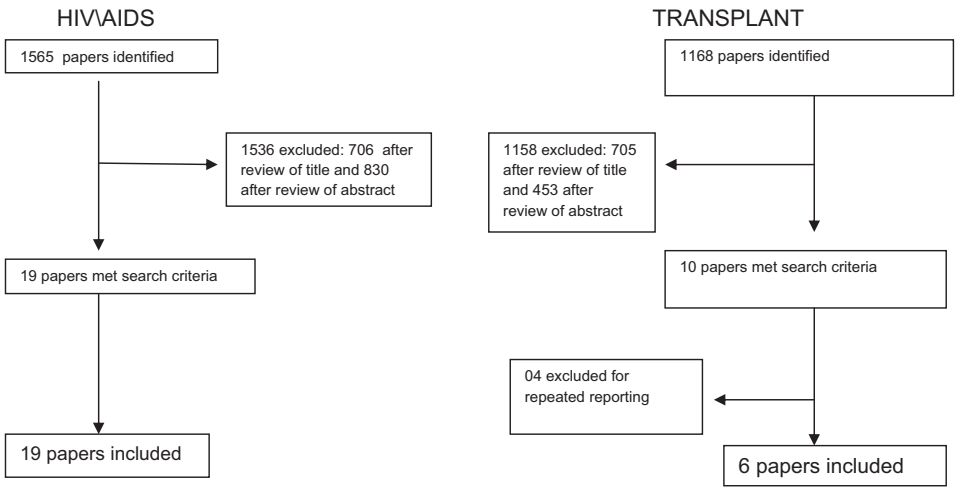

Fig. 1. Study selection.

immunosuppressed populations compared to incidence rates of the general population using SIRs.

2.2. Search and selection of literature

Eligible studies were identified by searching the following databases: Pubmed, Embase, Scielo, Cancerlit and Google scholar.

The studies were identified by a literature search of databases following medical subject heading terms and\or text words: "HIV", "AIDS", "transplant", "incidence," cohort" and "cancer". Reference lists of the identified publications for additional pertinent studies were reviewed. No language restrictions were imposed.

Three researchers (PHL, HMR and TLP) searched for articles published up to March 2011. After searching the databases, 1565 potentially relevant HIV\AIDS papers were identified, 1536 of which were excluded: 706 after review of the title and 830 after review of the abstract. For transplant recipients, the broad search identified 1168 papers: 705 of which were excluded after title review and 453 after abstract review. Reviews were done by ROC, HS and JEJ; disagreements were solved by a fourth reviewer (AKSG). Thus, 19 papers for people with HIV/AIDS and 10 papers for transplant recipients met the criteria and were reviewed in full. There were no articles in languages other than English which, based on the abstract review, met the criteria. After full review we found 04 repeated articles and there were 19 reports of cancer incidence in HIV/AIDS patients, and 6 in transplant recipients (Fig. 1).

2.3. Data extraction

Various study characteristics were extracted from the original studies and included in the systematic review. The data included the first authors' last names, year of publication, country, follow-up period, cohort entry, number of subjects, positive cancer cases and study design (Tables 1 and 2). SIRs and their 95% confidence limits for all cancer types among HIV patients and transplant recipients compared to the general population were abstracted from each study. Three blind reviewers (ROC, HS and AKSG) used the inclusion criteria to choose eligible articles. Disagreements were solved by means of mutual consensus.

2.4. Analysis

Data were entered in Review Manager (RevMan) 4.2. This software allows the user to enter protocols as well as complete reviews, including text, characteristics of studies, comparison

Table 1
Cohort study design features of cancer incidence in HIV/AIDS patients.

Study, year (reference)	Country	Period of follow-up	Cohort entry	Number of HIV-infected individuals	Number of cancers	Study type
Lyter et al., 1995 [18]	United States: Pittsburgh	1984–1993	HIV diagnosis	430	70	Cohort
Serraino et al., 1997 [19]	Italy	1980–1995	HIV diagnosis	1255	58	Cohort
Johnson et al., 1997 [20]	United States: 6 regions	1988–1994	HIV diagnosis	1073	167	Cohort
Franceschi et al., 1998 [21]	Italy: 13 regions	1976–1994	HIV or AIDS registration	6067	62	Registry match
Grulich et al., 1999 [22]	Australia	1980–1993	AIDS registration	3616	778	Registry match
Gallagher et al., 2001 [23]	United States: New York	1981–1994	AIDS registration	122 993	12 698	Registry match
Phelps et al., 2001 [24]	United States: 4 regions	1993–1995	HIV or AIDS registration	871 women	26	Cohort
Grulich et al., 2002 [25]	Australia	1978–1996	HIV or AIDS registration	13 067	196 non-AIDS cancers	Registry match
Allardice et al., 2003 [26]	Scotland	1981–1996	HIV registration	2574	162	Registry match
Dal Maso et al., 2003 [27]	Italy	1985–1998	AIDS registration	12 104	1162	Registry match
Hessol et al., 2004 [16]	United States: 6 regions	1994–2001	HIV or AIDS registration	1559	41	Cohort
Burgi et al., 2005 [28]	United States	1988–2003	HIV registration	4144	133	Cohort
Newnham et al., 2005 [29]	England	1985–2001	HIV registration	33 190	2022	Registry match
Mbulaiteye et al., 2006 [30]	Uganda	1988–2002	HIV registration	12 607	378	Registry match
Goedert et al., 2006 [31]	United States: 12 regions	1980–2002	HIV or AIDS registration	85 268 women	368	Registry match
Galceran et al., 2007 [32]	Spain	1981–1999	HIV registration	1304 men	142	Registry match
Serraino et al., 2007 [7]	France and Italy	1985–2005	HIV diagnosis	8074	625	Cohort
Engels et al., 2008 [2]	United States: 3 regions	1991–2002	HIV registration	57 350	871	Registry match
Chatuverdi et al., 2009 [33]	United States: 15 regions	1980–2004	AIDS registration	499 230	1301	Registry match