

SHORT COMMUNICATION

Patients with AIDS-defining cancers are not universally screened for HIV: a 10-year retrospective analysis of HIV-testing practices in a Swiss university hospital

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Objectives

Kaposi's sarcoma (KS), invasive cervical carcinoma (ICC) and non-Hodgkin lymphoma (NHL) have been listed as AIDS-defining cancers (ADCs) by the Centers for Disease Control and Prevention since 1993. Despite this, HIV screening is not universally mentioned in ADC treatment guidelines. We examined screening practices at a tertiary centre serving a population where HIV seroprevalence is 0.4%.

Methods

Patients with KS, ICC, NHL and Hodgkin lymphoma (HL), treated at Lausanne University Hospital between January 2002 and July 2012, were studied retrospectively. HIV testing was considered part of the oncology work-up if performed between 90 days before and 90 days after the cancer diagnosis date.

Results

A total of 880 patients were examined: 10 with KS, 58 with ICC, 672 with NHL and 140 with HL. HIV testing rates were 100, 11, 60 and 59%, and HIV seroprevalence was 60, 1.7, 3.4 and 5%, respectively. Thirty-seven patients (4.2%) were HIV-positive, of whom eight (22%) were diagnosed at oncology work-up. All newly diagnosed patients had CD4 counts < 200 cells/ μ L and six (75%) had presented to a physician 12–236 weeks previously with conditions warranting HIV testing.

Conclusions

In our institution, only patients with KS were universally screened. Screening rates for other cancers ranged from 11 to 60%. HIV seroprevalence was at least fourfold higher than the population average. As HIV-positive status impacts on cancer patient medical management, HIV screening should be included in oncology guidelines. Further, we recommend that opt-out screening should be adopted in all patients with ADCs and HL.

Keywords: AIDS-defining cancers, HIV screening, HIV testing recommendations.

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Introduction

Although Kaposi's sarcoma (KS), invasive cervical cancer (ICC) and non-Hodgkin lymphoma (NHL) have been listed as AIDS-defining cancers (ADCs) since 1993 [1], HIV testing is not universally proposed in ADC treatment

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guidelines. Testing is implicit for KS, as part of staging, recommended for NHL [2], but not mentioned for ICC [3,4]. Testing is also recommended in Hodgkin lymphoma (HL) [5], given its high incidence in HIV-positive patients [6]. Testing in ADC patients is beneficial and logical: in lymphoma, outcome is optimized when co-existing HIV infection is also treated [7,8]; in ICC, the leading cause, human papillomavirus, and HIV share transmission routes.

In 2006, the Centers for Disease Control and Prevention recommended nontargeted 'opt-out' HIV testing in all settings where local undiagnosed HIV seroprevalence is $\geq 0.1\%$ [9]. In Europe, most national testing recommendations are 'opt-in': the 2008 British HIV Association guidelines recommend diagnostic testing and targeted screening [10]; in Switzerland, where estimated HIV seroprevalence is 0.4% [11], physician-initiated counselling and testing (PICT) has been recommended since 2007 [12]. The Swiss PICT recommendations list ADCs among testing indications. However, the degree of translation of these recommendations into clinical practice is unclear: there was no change in testing rates in our 1300-bed hospital when the recommendations were updated, and rates among oncology patients remained very low ($< 5\%$) [13]. The primary objective of this study was therefore to determine HIV testing rates among patients treated for ADCs and HL at our centre.

Methods

This study was approved by the ethics committee on human scientific research of the canton of Vaud, Switzerland. Patients aged ≥ 18 years treated for KS, ICC, NHL and HL between 1 January 2002 and 31 July 2012 were studied retrospectively.

HIV testing was considered as related to oncology work-up if performed within 90 days before and 90 days after the cancer diagnosis date, based on local clinical experience (SP and CA). Patients were classified as HIV 'tested' upon identification of [1] documented testing in the hospital database or [2] a reference to testing performed elsewhere. Testing date, result and, where positive, baseline CD4 count were recorded. Patients were further cross-referenced against the Lausanne arm of the Swiss HIV Cohort Study (SHCS), with an ongoing, continuous enrolment [14], to identify HIV-positive diagnoses made after the oncology event. Patients not 'tested' were classified as 'not tested', or 'missing data' when records were insufficiently comprehensive to determine testing status. Patient demographic data were recorded.

HIV testing rate was calculated using a modified equation described previously [13]:

$$\left[\frac{\text{number of patients HIV tested}}{\text{total number of patients} - \text{number of patients known to be HIV positive}} \right] \times 100.$$

HIV seroprevalence was also calculated:

$$\left[\frac{\text{number of patients identified as HIV positive at oncology work-up} + \text{number of patients known to be HIV positive}}{\text{total number of patients}} \right] \times 100.$$

Data analysis was performed after patient anonymization. Given the different demographic profiles of the ADCs examined, each ADC was analysed separately. Means were compared using Student's *t*-test and proportions compared using the χ^2 test. All analyses were performed using Microsoft Excel 2008 (Microsoft Corporation, Redmond, WA).

Results

Of 880 patients attending our centre during the study period, 10 had KS, 58 ICC, 672 NHL and 140 HL. A total of 610 patients (of 880; 69%) were 'tested', most (79%) within 90 days before and 90 days after their cancer diagnosis date. Patients tested > 90 days after their cancer diagnosis were mostly NHL patients (78%).

For HIV testing rate and seroprevalence calculations, 'missing data' patients [22 of 672 patients (3.3%) with NHL and six of 140 patients (4.3%) with HL] were grouped with 'not tested' patients. Calculations pertain to the whole study period, as rates remained static between calendar years (data not shown). Testing rates and seroprevalence figures are shown in Table 1. Mean age was lower in 'tested' compared with 'not tested' NHL patients (55 *vs* 62 years, respectively; $P < 0.0001$), and testing rate was higher among younger (≤ 55 years old) than older (> 55 years old) NHL patients (68% *vs* 54%, respectively; $P = 0.01$). No age difference was observed in other cancer categories. Testing rates did not differ with sex, marital status or origin (Table 1).

Of 37 HIV-positive patients, eight (22%) were diagnosed at oncology work-up, all with CD4 counts < 200 cells/ μL . Seven (88%) had consulted a doctor a median of 76 weeks (range 8–236 weeks) prior to their ADC presentation, and six (75%) had presented with criteria for HIV testing according to national recommendations (Table S1). No patient 'not tested' at cancer diagnosis was subsequently identified as HIV positive.

Discussion

In this 10-year retrospective analysis of oncology patients, we observe HIV testing rates of 59–60% in lymphoma patients, 11% in ICC patients, and 100% in KS patients. Among NHL patients, we observe a significant inverse

Table 1 Demographic characteristics of study patients, HIV testing rates and HIV seroprevalence, grouped by cancer diagnosis

	ICC		<i>P</i> ^a	NHL		<i>P</i> ^a	HL		<i>P</i> ^a
	Tested	Not tested		Tested	Not tested		Tested	Not tested	
Number of patients [<i>n</i> (%)]	6 (11)	51 (89)		392 (60)	261 (40)		79 (59)	54 (41)	
Number of men [<i>n</i> (%)]	NA	NA	–	230 (59)	161 (62)	> 0.5	44 (56)	32 (59)	> 0.5
Age (years) [median (IQR)]	49 (36–58)	54 (44–65)	> 0.5	57 (45–66)	62 (52–74)	0.01	32 (27–51)	36 (27–59)	0.6
Married/widowed [<i>n</i> (%)]	2 (33)	26 (51)	> 0.5	276 (70)	187 (72)	> 0.5	40 (51)	29 (54)	> 0.5
Origin [<i>n</i> (%)]									
Switzerland and North/West Europe	4 (67)	37 (73)	> 0.5	300 (77)	219 (84)	0.27	53 (67)	38 (70)	> 0.5
Other*	2 (33)	14 (27)		92 (23)	42 (16)		26 (33)	16 (30)	
HIV-positive patients [total (<i>n</i> diagnosed at oncology work-up)]	1 (0)			23 (4)			7 (0)		
HIV seroprevalence, based on all patients as denominator [% (95% CI)] [†]	1.7 (NA; < 5 HIV-positive patients [‡])			3.4 (2.0–4.8)			5 (1.4–8.6)		
HIV seroprevalence, based on 'tested' patients only as denominator [% (95% CI)] [†]	16 (NA; < 5 HIV-positive patients [‡])			5.9 (3.6–8.2)			8.9 (5.7–12.1)		

ICC, invasive cervical carcinoma; IQR, interquartile range; NHL, non-Hodgkin lymphoma; HL, Hodgkin lymphoma; IQR, interquartile range; NA, not applicable. ^a*P*-values are specified where *P* < 0.5 (χ^2 test); those for patient origin are calculated for patients from Switzerland and North/West Europe against those of all other origin. *Asia, Africa, South/East Europe, Middle East and America. [†]For cancer groups with testing rates < 100%, seroprevalence was calculated taking tested as well as all patients as the denominator, as assuming that all 'not tested' patients were HIV negative could underestimate true HIV seroprevalence. The 95% confidence interval (CI) is calculated for cancer groups with > 5 HIV-positive patients. The 10 Kaposi's sarcoma patients are not included in this table as HIV testing rate was 100%. Among these patients, nine (90%) were men, median age was 59 years (IQR 49–62 years), and seven (70%) were from Switzerland or North/West Europe; seroprevalence was six of 10 (60%), with four of the six patients being newly diagnosed at oncology work-up.

relationship between testing rate and patient age. Eight new HIV-positive diagnoses were made at oncology work-up. Assuming all untested patients were HIV negative, HIV seroprevalence among ICC, NHL and HL patients was 1.7, 3.4 and 5%, respectively; seroprevalence among KS patients was 60%.

The low testing rate in ICC patients is surprising, given that ICC is an ADC. The authors of the HIV Indicator Diseases across Europe Study (HIDES 1) recently concluded that HIV screening in patients with cervical cancer of any stage is cost effective and should be recommended [15]. However, neither European nor American ICC guidelines currently mention testing [3,4].

The testing rate in lymphoma patients is suboptimal, when treatment guidelines recommend testing [2,5]. The inverse relationship between testing rates and patient age in NHL patients goes against the emerging trend of increasing numbers of adults aged > 50 years accessing HIV care [16]. Older individuals often present at late stages of infection, with increased associated morbidity, mortality and health care costs [16,17]. Undiagnosed, and therefore untreated, infection also favours onward transmission.

Finally, it is concerning that the eight newly diagnosed patients had to develop cancer to be diagnosed with HIV infection, despite the fact that six had previously consulted for reasons that should have prompted earlier HIV testing.

This study has limitations. We examined testing performed rather than testing offered, so may have

misclassified patients declining testing as 'not tested'. Against this, we have observed that most patients are agreeable to routine testing pre-surgery [18]. Among lymphoma patients, we did not examine whether testing was prompted by diagnosis or anticipated treatment as we examined *whether* HIV testing was performed, not *why*. If testing is performed in anticipation of risk-related treatment options, this could explain the low testing rate in ICC, where chemotherapy schedules have less impact on host immunity.

In conclusion, we observed suboptimal HIV testing rates among patients with ICC and lymphoma, and lower testing rates with increasing age among NHL patients. HIV seroprevalence was at least fourfold higher than the population average. To our knowledge, this is the first study examining a decade of HIV testing rates for all three ADCs. Given the impact of HIV-positive status on the medical management of cancer patients, we propose that treatment guidelines should mention HIV testing for ICC patients, and that opt-out testing should be adopted in all patients with ADCs and HL. Exploring barriers to testing oncology patients, beyond the lack of guidelines, is a crucial parallel measure.

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Conflicts of interest: The authors have no conflicts of interest to declare.

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Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Table S1 Previous consultation histories of the eight patients newly diagnosed as HIV-positive as a result of their oncology work-ups. Abbreviations: KS, Kaposi's sarcoma; NHL, non-Hodgkin lymphoma.