

Routine HIV Screening in Cancer Patients in the Emergency Department

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Abstract

Treatment of human immunodeficiency virus(HIV) in cancer patients improves outcomes and reduces transmission of this oncogenic virus. HIV testing rates of cancer patients are similar to the general population (15-40%), despite the association with cancer. Our aim was to increase HIV screening in the Emergency Department(ED) of a comprehensive cancer center through a quality initiative. Testing increased significantly during the intervention ($p<0.001$; 0.15/day to 2.69/day). Seropositive HIV rate was 1.4% (12/852), with incidence of 0.3%. All patients were linked to care. Incident cases were between 36 and 55 years of age. Barriers encountered included confusion regarding the need for written consent for HIV testing, failure to consider ordering the test, and concerns regarding linkage to care.

Keywords

HIV, opt-out testing, cancer, oncology

Introduction

Human immunodeficiency virus (HIV) is classified as an oncogenic virus.¹ An estimated 1.2 million persons living in the US have HIV, 14% of whom are undiagnosed.² Patients continue to be diagnosed with HIV at a late stage of disease.³ Persons with undiagnosed HIV infection are estimated to account for nearly half of newly transmitted infections.⁴⁻⁶ Patients with HIV infection are at increased risk for AIDS-defining cancers (i.e. Kaposi sarcoma, non-Hodgkin lymphoma, and cervical cancer) and non-AIDS-defining cancers (e.g. lung cancer, anal cancer, melanoma, and Hodgkin lymphoma).^{7,8} Cancer is one of the leading causes of death in HIV patients.^{9,10}

Undiagnosed, untreated HIV infection increases morbidity, mortality, and cancer treatment complications. Routine HIV screening, therefore, may improve treatment outcomes among cancer patients who have HIV infection by enabling early diagnosis and control of the infection in addition to coordination of treatment of both diseases.¹¹ Furthermore, diagnosis of HIV infection in cancer patients enables oncologists to identify patients subsequently at high risk for relapsed or secondary cancers.¹²

Since 2006, the U.S. Centers for Disease Control and Prevention (CDC) recommended routine opt-out HIV screening (i.e. screening of all patients unless they decline) of patients aged 13-64 years, regardless of risk factors. In 2013, the U.S. Preventive Services Task Force (USPSTF) joined the CDC, providing a Grade A recommendation for HIV screening.¹³ Despite these recommendations, HIV testing is still low in the US,^{14,15} with baseline testing rates of 17-

19% for cancer patients undergoing chemotherapy at our tertiary cancer center.¹⁶ Only 41% of U.S. cancer survivors younger than 65 years have ever been tested for HIV, based on data from the 2009 Behavioral Risk Factor Surveillance System.¹²

The emergency department (ED) is an important health-care setting for HIV screening because patients who are at increased risk for HIV infection and without regular access to primary care use the ED more than other settings for their medical care.^{14,17,18} The ED of our comprehensive cancer center also attracts patients who have limited access to medical care. Informal survey of other known cancer emergency departments, including Barretos Cancer Hospital in Brazil, Asan Medical Center in South Korea, Ohio State University Wexner Medical Center, and Memorial Sloan Kettering Cancer Center in New York, has revealed that HIV screening is not routinely performed in the EDs of cancer centers. Retrospective review of HIV testing in our cancer center ED revealed a testing rate of 0.42% (53/12,663) during 2013. Based on this very low testing rate and the unique role of the emergency department as a setting for other preventive measures, such as smoking cessation and immunizations, collaboration between infectious disease and emergency medicine resulted in a quality improvement (QI) initiative for routine HIV screening in the ED of our comprehensive cancer center. Our objectives were to increase HIV testing in the ED and confirm linkage to care for positive patients, with a long-term objective of increasing HIV screening throughout our institution and the cancer care community.

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Methods

This QI project was conducted at MD Anderson Cancer Center ED, a forty-three bed EC with, over 25,000 annual visits staffed by sixteen faculty physicians. A joint effort was initiated between the Department of Emergency Medicine and Department of Infectious Diseases, Infection Control and Employee Health to explore the feasibility of routine opt-out HIV testing on patients presenting to the institution through the ED. Billing and laboratory informatics databases were utilized to provide baseline and post-intervention testing rates. Demographic information was obtained through institutional administrative databases. HIV screening was conducted as per institutional protocol, with 3rd generation antibody test followed by 4th generation testing.

Gilead Sciences' HIV on the Frontline of Communities in the United States (FOCUS) program provided a startup fund to provide infrastructure to initiate routine opt-out HIV testing in the ED of our cancer center. The QI initiative commenced on July 1, 2014. The implementation of this QI project required multiple interventions: (1) integration of HIV testing into the institutional consent for treatment form, (2) educational activities directed to institutional committees and providers regarding the importance of HIV screening in cancer patients, (3) improvements to the electronic health records to simplify ordering and documentation, (4) incorporation of HIV testing into the existing clinical workflows to ensure sustainability of the intervention, and (5) development of algorithms for result verification, reporting, and linkage to care.

The Quality Improvement Assessment Board at our institution approved our QI initiative. Educational efforts to institutional and clinical service committees were conducted, focusing on the important relationship between HIV and cancer, recommendations for routine HIV testing from both the CDC and USPSTF, and changes in state legal requirements for HIV testing and counseling. An informal baseline survey was conducted among ED physicians to investigate their knowledge regarding HIV and cancer and CDC recommendations, as well as their perceived barriers to performing HIV testing in the ED.

Patient education was provided using brochures designed to highlight the new CDC recommendations for routine opt-out HIV screening, the benefits of early detection and treatment of HIV infection in cancer patients, and the improved outcomes for HIV-positive patients with appropriate treatment. Signage was also created to inform patients of their right to opt out and to remind physicians to order HIV tests.

Algorithms were created to streamline HIV result verification, to ensure reporting of positive cases, and to provide linkage to care through notification of primary oncologists and referral to infectious disease specialists. Changes were made in the laboratory's confirmatory testing process to improve turnaround time of positive tests. Enhancements were made to the ED EHR to facilitate ordering of HIV tests and documentation of patient notification.

Descriptive statistics for the demographic characteristics of tested and HIV positive patients. Outcomes analyzed included prevalence of HIV testing, as well as HIV seropositivity rate and incidence of HIV infection. The rates of HIV testing before and during our initiative were compared using the χ^2 and further described with a statistical process control chart. Statistical analyses were performed using Stata software (Stata 12; StataCorp LP, College Station, TX).

Results

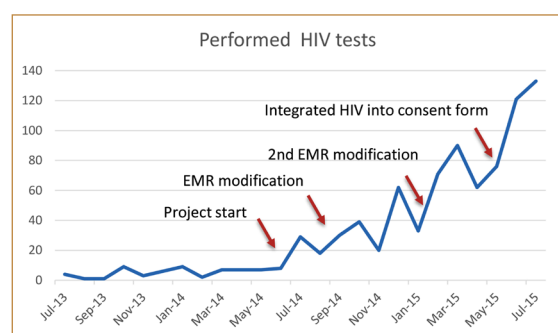
Baseline and intervention period demographic characteristics of tested and HIV positive patients, including previously and newly diagnosed patients, are shown in table 1. Tested patients consisted predominantly of males, with the age distribution between 16-91 years with a median of 55 years. Notably, some services, such as leukemia and stem cell transplant, routinely test their patients regardless of their age, with testing taking place in the ED. HIV testing in the ED increased 10.7-fold in the year during the intervention, starting July 2014. This was a significant increase ($P < 0.001$) compared to the same time interval of the year before (689 tests performed among 12,174 unique ED visits from July 2014, to June 2015, vs. 64 tests performed among 9,588 unique ED visits from July 2013, to June 2014) (Fig.1, 2).

From July 1, 2014 to Aug 31, 2015, there were 15,616 unique visits to the ED and 852 HIV tests performed. HIV seropositivity was 1.4% (12/852), with 0.3% newly diagnosed, which exceeds the CDC's threshold of 0.1% undiagnosed HIV cases for recommending routine HIV screening. Confirmed HIV positive cases were linked to care by notification of their primary oncologists and referral to collaborating infectious disease specialists. Cases were diagnosed from a variety of underlying cancers, not only the classically AIDS-defining cancers (Table 2). One of the eight previously diagnosed patients was not receiving HIV treatment at the time of testing in the ED, so was linked to appropriate care. Of note, an unexpected benefit of testing was that one patient did not reveal known HIV seropositive status, even as being started on chemotherapy. This could have had a significant impact in management of both the patient's HIV and management of the

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Table 1. Demographic Characteristics of Patients Tested For and Diagnosed With HIV Infection

Characteristic	Tested (n=852) n (%)	Previously diagnosed (n=8) n (%)	Newly diagnosed (n=3) n (%)
Sex			
Male	463 (54.3)	5 (62.5)	3 (100.0)
Female	389 (45.7)	3 (37.5)	0 (0.0)
Race			
White	431 (50.6)	2 (25.0)	2 (66.6)
Black	153 (17.9)	3 (37.5)	1 (33.3)
Hispanic	165 (19.4)	3 (37.5)	0 (0.0)
Asian	34 (4.0)	0 (0.0)	0 (0.0)
Other	69 (8.1)	0 (0.0)	0 (0.0)
Age group (years)			
13-25	43 (5.1)	0 (0.0)	0 (0.0)
26-35	86 (10.1)	1 (12.5)	0 (0.0)
36-45	109 (12.8)	2 (25.0)	1 (33.3)
46-55	185 (21.7)	4 (50.0)	2 (66.6)
56-65	227 (26.6)	1 (12.5)	0 (0.0)
>65	202 (23.7)	0 (0.0)	0 (0.0)

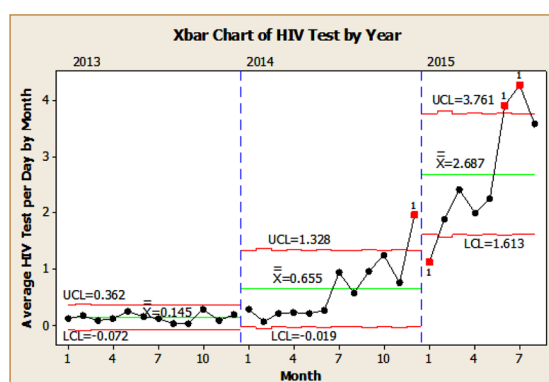

Figure 1. Run Chart of HIV Testing at MD Anderson ED Before and During the QI Project

newly diagnosed cancer, given potential drug-drug interactions as well as impact on immune function.¹⁹

Barriers to HIV testing and Linkage to Care

Implementation of routine opt-out-testing for HIV in our cancer center ED was impeded by multiple factors, including: current EHR, which cannot ascertain test eligibility, the unusual nature of our population with oncologists as “primary” physicians for the patients and high level of acuity resulting in frequent ED visits and high proportion of patients receiving end of life care.

ED physicians were surveyed about perceived barriers to routine HIV testing in the ED. The survey results demonstrated that the primary barrier to testing was the physicians’ difficulty remembering to order the test. Other issues included concerns about handling of the results, patients’ reaction to testing


Figure 2. Control Chart of HIV Testing at MD Anderson ED Before and During the QI Project

and to HIV-related signage, apprehensions about consent documentation requirements, and belief that HIV testing is inappropriate to the population or may offend the oncologist who is recognized as the primary physician of the patient undergoing treatment at our center.

Educational encounters revealed that not only ED physicians, but many oncologists were unaware of the relationship between HIV and cancer, the CDC and USPSTF guidelines, recent elimination of pretest counseling requirements, and state requirements for notification and documentation.

Integration of HIV into the general consent form took three years to achieve and was finalized in June 2015. Since implementation of this new integrated HIV consent, 83% of patients have consented to testing.

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Table 2. Cancer Diagnosis and Linkage to Care of HIV Positive Patients

Patient's #	Cancer Diagnosis	New Patient to MDACC at the Time of HIV testing	Newly Diagnosed with HIV	Known HIV	Patient Revealed HIV Positive Status	Linkage to Care and HIV Treatment
1	Burkitt's Lymphoma	Yes	No	Yes	Yes	Already on treatment
2	Renal Cell Carcinoma	No	Yes	No	N/A	Linked
3	Burkitt's Lymphoma	Yes	Yes	No	N/A	Linked
4	Non-cancer	No	No	Yes	No	Already on treatment
5	Anal Cancer	Yes	No	Yes	Yes	Already on treatment
6	Hepatocellular Carcinoma	Yes	No	Yes	Yes	Already on treatment
7	Ovarian Cancer	No	No	Yes	No	Already on treatment
8	Cervical Cancer	No	No	Yes	Yes	Already on treatment
9	B cell ALL	No	No	Yes	Yes	Already on treatment
10	Kaposi's sarcoma	Yes	Yes	No	N/A	Linked
11	Large B Cell Lymphoma	Yes	No	Yes	Yes	Linked (was not already on treatment)

MDACC: MD Anderson Cancer Center, ALL: Acute Lymphocytic leukemia

Discussion

Our aim was to increase HIV testing in the ED, with a goal of serving as a model for institutional HIV testing in cancer patients, given the clinical and demographic diversity of the ED. The HIV testing rate increased in our cancer center ED during the project period, although the full impact of implementation of routine HIV screening was impeded by our inability to conduct opt-out testing. With the recent modification to the institutional consent for treatment, which now includes HIV testing, ED testing has improved. Ultimately, dissemination of best practices from the ED and other departments (leukemia, lymphoma) will result in improvement in institutional testing rates. For example, in early October 2015, driven by the ED experience and focused educational efforts, the gynecologic oncology group initiated routine HIV testing.

The incidence of 0.3% of HIV positive patients in the ED supports the importance of increased screening in this population. Realizing the burden of HIV infection in cancer patients, we believe that testing our patients for HIV is important not only to identify patients with previously undiagnosed HIV, but improve outcomes of cancer therapy and reduce transmission of a cancer-associated virus.

Improved HIV screening was the primary goal of the project, but linkage to care and ultimately retention in care dramatically reduce incidence and mortality secondary to HIV, from 16.3% and 20.5% with screening alone to 35.5% and 44.6% with linkage and retention in care, respectively²⁰. Therefore, confirming linkage to care of all HIV-positive patients identified through screening was a main goal of our project, with 100% linkage to care (table 2). Prior studies at other institutions have

shown that 24-70% of HIV-screened patients who had positive results upon testing in the ED were already aware of their status; however, from 56-100% of these patients had not previously received medical care for their infection.²¹ A recent study from colleagues in Houston showed improved engagement in treatment, improved retention, and better outcomes in previously diagnosed HIV patients when routine opt-out HIV testing was coupled with linkage to care.²²

In summary, the ED and acute care settings is in a unique position to influence institutional practice because it participates in the care of a cross section of patients with multiple cancer diagnoses. Although the relationship between HIV and cancer is well established, little is known about the incidence of HIV in newly diagnosed cancer patients. There are no formal guidelines from the American Society of Clinical Oncology or other cancer organizations regarding HIV screening. In our ED, in a comprehensive cancer center, we found the rate of HIV infection to be comparable to other settings, and high enough to warrant routine screening by CDC guidelines. More importantly, routine screening in cancer patients is critical to improve cancer outcomes, may reduce recurrence of cancer, and reduces transmission of a cancer associated virus. This quality improvement initiative demonstrated viability of routine testing in a cancer center ED and impacted institution-wide HIV testing.

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Competing interest

none

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