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OPPORTUNITIES FOR EARLIER HIV DIAGNOSIS IN A PEDIATRIC EMERGENCY DEPARTMENT

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Abstract

Objectives—Emergency department HIV screening is recommended, but challenging to implement and of uncertain effectiveness in pediatric EDs (PEDs). We sought to determine whether there were opportunities for earlier HIV diagnosis in the PED for a cohort of young adults diagnosed with HIV.

Methods—This retrospective cohort study reviewed PED records of a group of young adults receiving HIV care in an urban hospital setting. PED visits were selected for review if they took place after the patient's estimated time of HIV acquisition and before their eventual diagnosis. Charts were reviewed to determine whether HIV infection was suspected and whether testing was offered.

Results—Among a cohort of HIV-positive young adults, only 3 of 84 (3.6%; CI_{95} 0.9 – 10.8) were seen in the PED during the time they were undiagnosed but likely to be infected with HIV. Among these subjects, there was no documentation that HIV testing was offered or refused, nor was there documented suspicion of HIV.

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Study concept and design: Lyons, Namde, Holland, Lindsell, Reed.

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Conclusions—There are opportunities for earlier diagnosis of HIV in PEDs, affirming the importance of HIV screening implementation in these settings. However, PED's are unlikely to have the same frequency of contact with undiagnosed individuals as do adult EDs. Alternative methods of accessing at-risk adolescent populations must be identified.

Keywords

HIV; Mass Screening; Emergency Medicine; Epidemiology; Adolescent

INTRODUCTION

Early HIV diagnosis leads to improved health outcomes for infected individuals and reduced transmission (1, 2). Emergency departments (EDs) in particular have been called to expand HIV screening (3–6). Although progress has been made, implementation of HIV screening recommendations remains suboptimal (7–10).

Adolescents are frequently infected and infrequently tested. They account for nearly 60% of all undiagnosed HIV infections in the US (11). Pediatricians in outpatient settings are less likely to recommend HIV testing as compared to other STI testing even for those who are at high risk (9, 12). While improvements are needed in that setting, extrapolation from adult studies suggests that pediatric emergency departments (PED) may also be an ideal venue to access high risk populations. However, HIV screening in PEDs has not been widely studied or broadly implemented. The few experiences that have been reported demonstrate acceptance of testing by adolescents but few new diagnoses (13–16).

Demonstration of unrecognized opportunities for HIV diagnosis has motivated screening implementation in adult EDs (17–20). Herein, we explore the extent to which there are opportunities for HIV diagnosis in a PED.

METHODS

This retrospective cohort study reviewed PED records for adolescents after their estimated time of HIV acquisition and before their eventual diagnosis. The study was approved by the university and the pediatric hospital IRBs.

Setting

This study was conducted at an urban, Midwest, academic health center in a region of lower HIV prevalence (21). This health center is characterized by: i) an affiliated pediatric hospital that provides the majority of regional pediatric (ages 0–21) emergency care, with an annual ED volume of approximately 90,000 visits, ii) an adult hospital whose ED features a publicly funded HIV counseling and testing program (22, 23) an infectious disease treatment center that provides the majority of regional HIV care.

Patient Selection

Adults who were newly diagnosed with HIV infection and had a CD4 count measured at the time of diagnosis were identified from two existing data sources: i) a retrospective chart

review of patients receiving care at the HIV treatment center from 1999 to 2003, and ii) records from the ED HIV testing program. Methods for selecting this cohort have been described previously (18).

From this group, we included patients who were ≤ 25 years of age when diagnosed. For each subject, we then conservatively estimated the duration of time during which infection was likely but undiagnosed by calculating the difference between the lower limit of normal CD4 count (500/μL) and the CD4 count at diagnosis, divided by the lower limit of the average decrease in CD4 per year of infection (60/μL) (24–26). If initial CD4 was greater than 500/μL then we presumed infection had been present for one year. Any subject whose infection was not estimated to have been present prior to the age of 21 was then excluded.

Data Collection

PED records for visits occurring during the estimated time period during which infection was likely but undiagnosed were independently reviewed and abstracted by two PED physicians. Data was entered into a standardized study form. Agreement between abstractors was verified by a third reviewer, and no significant discrepancies were identified.

Analysis

Analysis was descriptive, and limited by the number of individuals ultimately found to have opportunities to have been diagnosed in the PED. The primary outcome was the number and proportion of eligible patients with opportunities for diagnosis in the PED. Secondary outcomes included whether or not the opportunity was missed (i.e. infected but not tested) and potential indications for HIV testing during PED encounters, including (1) clinician suspicion of HIV infection, (2) symptoms potentially indicative of HIV illness (3) risk factors, and (4) diagnoses potentially related to HIV.

RESULTS

There were 84 subjects included. Mean age at diagnosis was 22 years (SD 2.3 years, range 17 – 25) with a mean CD4 of 448 (SD 251; range 1 – 1,305). Of these, 25 had prior visits to the PED. Twenty-one were excluded from further analysis as their PED encounters were prior to the estimated time at which they became infected with HIV. In three cases, subjects missed inclusion narrowly. The time between HIV diagnosis and most recent PED encounter was 14, 16, and 25 months and initial CD4 counts were 499, 807, 1030 cells/mm^3 respectively.

There were 4 remaining subjects who were presumptively infected during visits to the PED. One had been diagnosed by the pediatric hospital two years prior to the repeat diagnosis as an adult, but the PED providers did not document awareness of that history. The remaining 3 (3.6%; CI_{95} 0.9 – 10.8) subjects and their PED visits are described in Table 1. Among these subjects, there was no documentation that HIV testing was offered or refused, nor was there documented suspicion of HIV. None of the ED encounters resulted in subsequent hospitalization.

DISCUSSION

Expanded HIV screening for adolescents is a critical health goal, but the best ways to reach at-risk populations in this age group are unknown. PEDs are a promising possible venue, but evidence of this is lacking. Thus far, screening in PEDs has resulted in new diagnoses in 0 – 0.6% of tests (15, 16, 27, 28). This is generally above the recommended threshold for non-targeted screening (1/1000 tests positive) (29), but insufficient to emphasize PEDs as unusually effective venues for HIV screening. We sought to clarify the potential role of PEDs in HIV screening by determining whether individuals diagnosed with HIV are frequently encountered by PEDs prior to diagnosis. The number of individuals with opportunities for diagnosis in the PED was far less than we expected, suggesting that methods other than PED screening are required to reach at-risk adolescents. Nonetheless, our study affirms the importance of PED screening by demonstrating that there are some opportunities for earlier HIV diagnosis even in a region of lower HIV prevalence.

This preliminary study has several notable strengths. Use of a reasonably large cohort of HIV positive young adults in a setting where almost all pediatric emergency care is delivered by a single center, allowed us to explore the fundamental health services question of whether adolescents with undiagnosed HIV seek care in PEDs. Reasons why most subjects in this study did not utilize the PED for healthcare are unknown, but given patterns of health care utilization in our region, we do not expect that these patients received care in other EDs. One reason may be that adolescents are relatively unlikely to seek healthcare given their generally good health. Alternatively, our estimates for duration of infection prior to diagnosis may have been overly conservative, thus limiting the chances that a PED visit would have occurred. (30–32) However, even if we included the additional three cases that missed inclusion only narrowly, it would not substantially alter the magnitude and direction of our results. It is also possible that some patients using the PED for safety net care were not included in our study; our methods selectively included individuals who were ultimately able and willing to be linked to HIV care.

Although data in this study are not recent, we assert their utility for this study question, for three reasons. First, past or current screening practices are tangential to our primary finding. Regardless of whether the PED conducts screening to capitalize on those opportunities that do exist, we found that most young adults with undiagnosed HIV did not have prior visits to the PED. Second, we are unaware of any change in HIV epidemiology or the overall health care system that would have substantially changed the relationship between adolescents and how they access healthcare. Nonetheless, we acknowledge that this study does not address current screening practices, how to identify at risk adolescents in the PED setting, or estimation of the absolute number of opportunities for diagnosis within the ED population.

Even if the frequency of opportunities in the PED is low, the presence of undiagnosed HIV among adolescents and young adults suggests the urgent need for two parallel lines of investigation. First, there is a need for efficient methods to selectively identify the undiagnosed patients that do visit the PED. Second, further research is needed to identify methods, other than PEDs, to efficiently access at-risk adolescent populations.

CONCLUSIONS

There are opportunities for earlier diagnosis of HIV in PEDs, affirming the importance of HIV screening implementation in these settings. However, PED's are unlikely to have the same frequency of contact with undiagnosed individuals as do adult EDs. Alternative methods of accessing at-risk adolescent populations must be identified.

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Abbreviations

HIV human immunodeficiency virus

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Table 1

Patient Characteristics and Summary of ED Encounter History for Subjects with Missed Opportunities for Earlier HIV Diagnosis in the Pediatric ED

Subject	Age at Diagnosis	CD4 at Diagnosis	Age of Infection*	Years from 1st ED Missed Opportunity to Diagnosis*	Number of Visits Between Infection and Diagnosis	ED Encounters	
						Patient Factors and Characteristics Noted at Visits	Discharge Diagnoses for Visits
Black; Male	19	246	15	3.8	8	**1** discharge, multiple sex partners **2** Rash **3** Rash **4** Rash **5** Abscess **6** Rash **7** STD exposure **8** Urethral discharge, multiple sex partners	**1** STD/Gonorrhe a **2** Shingles **3** Insect bites **4** Insect bites **5** Abscess **6** Urticaria **7** STD exposure **8** Urethral discharge
Black; Male	18	479	18	0.6	1	**1** Details unavailable	**1** Details unavailable
Black Male	19	217	14	1.5	4	**1** Details unavailable **2** Fever, myalgias, lost appetite, cough **3** Scrotal pain; past STD **4** Sore throat	**1** Details unavailable **2** Viral syndrome **3** Epididymitis **4** Allergic rhinitis

* Conservatively estimated based on initial CD4 at diagnosis and typical rate of CD4 decline after infection