SHORT COMMUNICATION

Clinicoepidemiological Scoring System for Early Diagnosis of Pediatric HIV

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This pilot study was aimed at testing the feasibility of using a standardized questionnaire as a screening tool for detection of pediatric HIV at first contact. A prospective study was carried out on a cohort of 400 new patients attending the pediatric outdoor patient department in Medical College, Kolkata. After examining, the attending physician noted his clinical impression, filled the standardized questionnaire and scored each patient. ELISA test was performed. The results of the diagnostic tests were correlated with the clinical impression and the score. Taking a score of 9 as the cut-off, the sensitivity and specificity of the scoring system was 95.7% and 98.6%, respectively. We conclude that this clinicoepidemiological scoring system may be used to screen children for HIV in resource-limited settings.

Keywords: *Diagnosis, Pediatric HIV, Scoring system.*

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In children, HIV presents with a spectrum of manifestations, ranging from simple diarrhea to a complicated case of failure to thrive. Therefore, the need arises for a uniform, standardized protocol which would enable not only the clinicians, but also the paramedics as well as other health workers to identify the population to be screened for HIV. A clinicoepidemiological scoring system was devised by the Apex clinic, Medical College, Kolkata as a screening tool to identify children with HIV(1). The aim of this pilot study was to establish whether this scoring system could be used in day-to-day practice in the out patient department for early diagnosis of pediatric HIV.

METHODS

Ethical clearance was obtained from the institutional ethical committee. The study population included 400 consecutive children (18 mo-14 yrs) attending the pediatric outdoor patient department at Medical College, Kolkata between 1st February to 30th April, 2006 for the first time. Known HIV positive patients and those patients whose guardians could not furnish the desired information were excluded.

These children were examined by the attending physician and the clinical impression was noted. Consent for inclusion in the study was sought in all cases from parents and legal guardians, and assent from children over the age of 7 years. At the end of the examination, a questionnaire based on the scoring system, was filled up by the attending physician for each of the subjects, on the basis of the information given by the guardians and the clinical parameters present in the child. The points allocated to each of the parameters are tabulated in ***Table* I**. A score was given. ELISA test was performed in all the subjects as a screening measure. Those found positive were confirmed by repeat ELISA and Western blot. The results of the diagnostic tests were compared with the clinical impression of the physician and the scoring obtained. The sensitivity and specificity of the scoring system to diagnose

TABLE I SCORING SYSTEM FOR DIAGNOSIS OF HIV IN CHILDREN

Parameters	Point allocated
Father is a truck-driver/migrant labourer/transport worker	3
Father's place of work is in Mumbai/ Chennai/ Hyderabad/ Bangalore	3
Father's place of work is away from home, but not in Mumbai/ Chennai/Hyderabad/Bangalore	2
Father suffers from all or any 2 of the following: wasting/ chronic diarrhea/TB	3
Father suffers from only 1 of the following, but not 2/3 of the following: wasting/chronic diarrhea/TB	2
History of sudden death of either parent without any definite cause	3
History of blood transfusion in the child	2
Recurrent/chronic diarrhea >1 month	3
Recurrent pneumonia/TB	3
Persisting oropharyngeal candidiasis >2 months	3
Persisting fever >1 month	3
Bilateral non-tender parotitis	2
Failure to thrive	2
Extensive seborrheic dermatitis	2
Extensive molluscum contagiosum	2
Hepatomegaly	1
Generalised lymphadenopathy	1

Maximum score: 38

HIV was calculated using cut-off value of 9, 14 and 19. The diagnostic odds ratio was computed for both the methods and compared. A receiver operating characteristics (ROC) curve was plotted to define the cut-off points for the scoring system and analyzed.

RESULTS

Of the 378 patients (M=201, F=177, mean age=7.1±4.2 years), 92 were found to be HIV positive; 22 patients refused to be screened by ELISA.

Of the 286 patients, scoring between 0-9, 99% were HIV negative. All the 51 patients who scored above 19, were confirmed to be HIV positive. Only 12 HIV positive patients were suspected correctly at the out patient department. Eighty patients were missed by clinical suspicion alone. Of them, 76 patients were correctly identified by the scoring system. The optimized cut-off for sensitivity (95.7%) and specificity (98.6%) was calculated at 9, implicating that a score >9 suggests a high possibility of HIV, while those scoring ≤9 in the questionnaire were at less risk of being HIV positive. Comparing the diagnostic odds ratio in ***Table* II**, the scoring system is 1374 times more likely to diagnose a HIV positive pediatric patient as compared to 42 times by clinical suspicion only.

DISCUSSION

Although universal screening programs may be more meticulous than voluntary screening, it increases expenses. Selective screening of patients based on history and clinical examination may provide a solution. The 2005 revised WHO clinical staging for infants and children, mentions >40 clinical conditions for staging the child. For field purposes or in the out patient department with a heavy patient load, such an exhaustive clinical search would be difficult to perform. Further, Indian studies on clinical profile of pediatric HIV(2-9) show that not all those clinical conditions are observed in our country. Several Indian studies(10,11) have established the utility of a clinically directed

WHAT THIS STUDY ADDS?

- A scoring system based on the clinical and epidemiological variations of a region maybe used as a screening tool for diagnosing pediatric HIV.

selective screening for pediatric HIV, but they did not have an epidemiological component.

This scoring system was devised keeping in mind the common clinical presentations and local epidemiological pattern. The weightage given to each parameter was based on the degree of importance and specificity that each of the parameter had in relation to HIV infection.

Thirteen children diagnosed on the ground of clinical suspicion alone were mostly those who remained undiagnosed after a thorough complete investigative work up. If such patients are seen in the out-door patient department, it would not be possible to suspect them as HIV positive in the first visit. However, if we use the scoring system, such patients will be identified as high risk in the very first visit. In our study, we have not quantified the clinical impression of the physician. However, this scoring system gives uniform results irrespective of the expertise of the physician.

In the study, four HIV positive patients scored in the 0-9 range. All of them were asymptomatic thalassemic patients, thus limiting the role of the scoring system in their diagnosis. One of the main issues in the diagnosis of HIV infection in children is non-accessibility of facilities for the diagnosis of HIV infection in children <18 months. This study does not address it either, making it a limitation.

This study was conducted based on information specific to this region and current epidemiology. Such a screening tool maybe modified according to the epidemiology of different regions. This is a pilot study to serve as a prototype in devising local screening tools to detect HIV positive patients.

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TABLE II COMPARISON OF CLINICAL SUSPICION AND SCORING SYSTEM FOR DIAGNOSING HIV POSITIVE PEDIATRIC PATIENTS

	Clinical suspicion	Scoring system
HIV positive patients detected	12/92 (13%)	88/92 (95.7%)
Correct diagnosis	297/378 (78.6%)	370/378 (97.9%)
Sensitivity (95% CI)	13.0% (6.9% to 21.7%)	95.7% (89.2% to 98.8%)
Specificity (95% CI)	99.7% (98.1% to 99.9%)	98.6% (96.5% to 99.6%)
Positive predictive value (95% CI)	92.3% (64% to 99.8%), {change = 68%}	95.7% (89.2% to 98.8%), {change = 72%}
Negative predictive value (95% CI)	78.1% (73.5% to 82.2%), {change = 2%}	98.6% (96.5% to 99.6%), {change = 23%}
Positive likelihood ratio (95% CI)	37.3 (6.3 to 221.8)	68.4 (27 to 177)
Negative likelihood ratio (95% CI)	0.87 (0.79 to 0.93)	0.04 (0.02 to 0.11)
Diagnostic odds ratio	42.3 (6.1 to 1833.5)	1373.6 (333.2 to 8127.9)

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