

A study on time gap analysis between early infant diagnosis (EID) and initiation of antiretroviral treatment (ART) among HIV-exposed infants from Ahmedabad, Gujarat, India

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Abstract

Background: Effective pediatric HIV management requires early diagnosis and prompt initiation of antiretroviral treatment (ART) to ensure optimum quality care. ART initiation in the first 3 months of life can reduce mortality by 76%. Delay at any step from the collection of blood sample to the ART registration will lead to a delayed initiation of ART.

Objective: To analyze the time gap in each step of HIV testing and ART initiation and analyze the median age of ART initiation among the HIV-exposed infants.

Materials and Methods: This retrospective, cohort study was conducted from the record of Ahmedabad Municipal Corporation AIDS Control Society (AMCACS). A total 488 infants born to HIV-positive mothers were registered since 2010 in AMC ACS till June 2014. Time gap analysis for each process starting from HIV testing to ART initiation was carried out using Microsoft Excel.

Result: Among all the infants (465) tested by either method, 32 (6.8%) of those who were reactive were followed up subsequently. Of them, three died and three were nonreactive by whole blood specimen (WBS) test, while another three cases were lost to follow-up. The median age for carrying out dry blood spot (DBS) test in this study was 8 weeks. The median time for DBS and WBS testing was 3 weeks and 1 week, respectively, whereas the median time from DBS to initiation of ART was 10 weeks. The median time from birth to ART initiation was 37 weeks.

Conclusion: Time lag was present at all the stages from the commencement of DBS examination to ART initiation.

KEY WORDS: Early infant diagnosis, antiretroviral treatment (ART) initiation, time lag

Introduction

The WHO in 2010 released the revised recommendations about the diagnosis of HIV infection in infants and children

as a feedback to the emerging data exhibiting dramatic survival benefits of early antiretroviral treatment (ART) initiation among HIV-infected infants and children.^[1] The key elements included in the guidelines were: (1) HIV virological testing should be used to diagnose HIV infection in infants and children below 18 months of age and (2) all HIV-exposed infants should undergo HIV virological testing at 4–6 weeks of age or at the earliest opportunity thereafter. The success in treating the infants with HIV involves factors such as early diagnosis, speedy initiation of ART, and persistent monitoring to ensure retention and quality care. ART initiation in the first 3 months of life can reduce mortality by 76%.^[2] Studies have shown that infants and children subjected to ART when they were already severely immune deficient never regained normal levels of

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immune functioning even after 5 years on treatment.^[3] Another study^[4] showed that such infants and children are more likely to die than those children who received treatment at an earlier stage. At present, ART is initiated after the confirmation of the second specimen among infants showing initial positive virological test as per guideline.^[5] This study was conducted among all HIV-exposed infants detected within Ahmedabad city by various integrated counseling and testing centers (ICTCs) functioning under Ahmedabad Municipal Corporation (AMC)-run AIDS Control Society (AMC ACS) under the National AIDS Control Organization (NACO) with the objectives to (1) analyze the time gap in each step of HIV testing and ART initiation and (2) the median age of ART initiation among them.

Figure 1 shows the process of testing and ART initiation followed in this study.

Materials and Methods

Early infant diagnosis program was implemented in Gujarat state since 2010. This retrospective, cohort study was conducted from the records obtained from AMC ACS. A total of 488 infants born to HIV-positive mothers were registered since 2010 in AMC ACS till June 2014. This study has included all the HIV-exposed infants registered in this duration. Time gap analysis for each process (from HIV testing to ART initiation) was carried out using Microsoft Excel.

Result

A total of 488 infants born to HIV-positive mothers were registered since 2010 in AMC ACS till 2014. Among them, 385 infants were tested for HIV by dry blood spot (DBS) test

Table 1: Age of conducting DBS examination among exposed infants

Age (months) of conducting DBS examination	No.	%
<2	155	40.3
2–6	110	28.6
>6	120	31.1
Total	385	100
Mean age (weeks)	13.6 ± 9	
Median age (weeks)	8	

method. The remaining 103 were tested by rapid testing. Among the 385 infants, the results of 23 infants were pending. Among all the infants tested by either method, 6.8% (32/465) infants were reactive. The cohort of 32 HIV-reactive neonates was followed up. Among them, three cases died and three were nonreactive by whole blood specimen (WBS) testing, while three cases were lost to follow-up. The mean age for carrying out DBS was 13.6 ± 9 weeks. All DBS were taken at the age between 6 and 68 weeks. The median age of conducting DBS was 8 weeks. In 40.3% cases, DBS was conducted within 2 months of age [Table 1 Figure 2]. The mean time required for DBS testing and the receipt of result was 4.6 weeks with a standard deviation of 4.2 weeks. The mean time required for WBS testing and the receipt of result was 1.6 weeks with a standard deviation of 1.4 weeks. The mean duration required for initiating ART in the preregistered infants was 3 weeks with a standard deviation of 3.9 weeks. The total time elapsed between DBS testing and ART initiation was 15.1 weeks with a standard deviation of 9 weeks [Figure 3]. It was found that, in 52.2% cases, it took 6–12 weeks for initiating ART after DBS testing. Only 4.3% cases ART could start in time (i.e., within 6 weeks), whereas in 21.7% cases, it took more than 24 weeks [Figure 4].

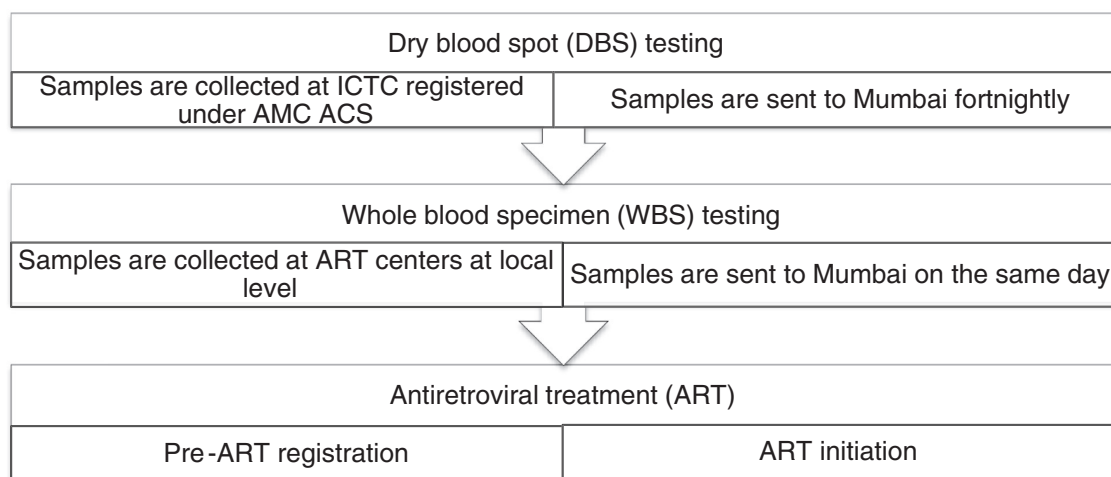


Figure 1: Process of testing and ART initiation followed in this study.

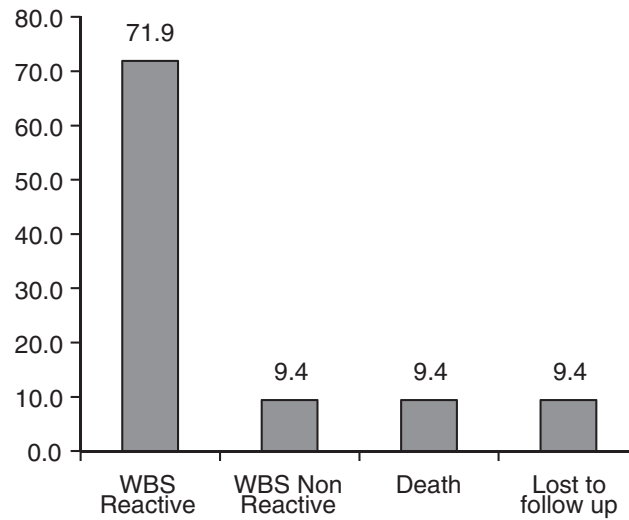


Figure 2: Follow-up of DBS-reactive infants ($n = 32$).

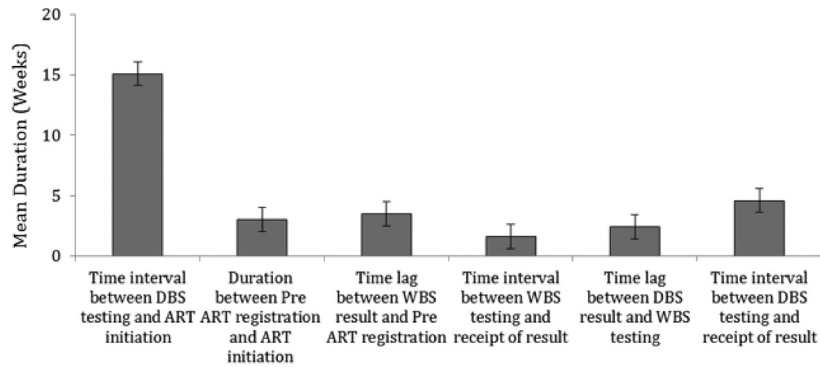


Figure 3: Mean duration in weeks for HIV testing and ART initiation.

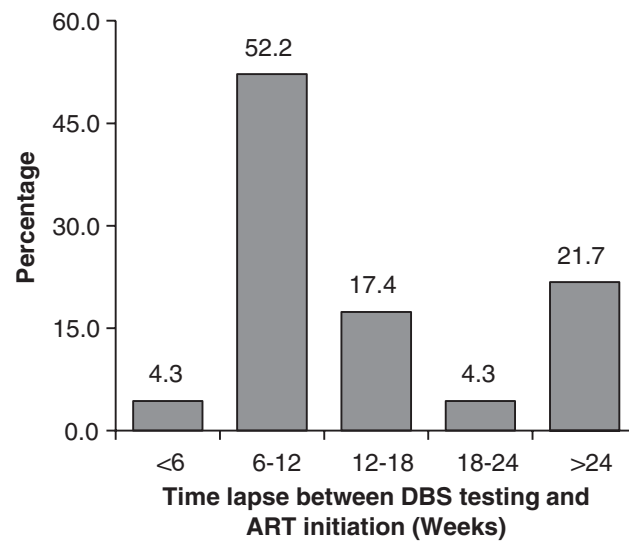


Figure 4: Time elapsed between DBS testing and ART initiation.

Discussion

Early detection of HIV at or after 6 weeks of age for all the HIV-exposed infants will help in an early initiation of ART that will improve the chances of survival. This study was conducted with the aim of quantifying the time needed in every stage of detection from testing to initiation of ART. In 40.3% of cases, DBS testing was done in their first 2 months. The WHO recommends that all infants born from mothers who tested positive during pregnancy should have a blood sample collected for early infant diagnosis (EID) testing at 4–6 weeks of age.^[1] Study from four countries—Cambodia, Namibia, Senegal, and Uganda—stated that, among all infants receiving EID, the proportion of tests that were done in their first 2 months was less than 50% in all the four countries.^[6]

In this study, of the 32 HIV-reactive infants, three (9.4%) infants died, three (9.4%) were nonreactive by WBS, while another three (9.4%) were lost to follow-up. Adherence to treatment was relatively good when compared with findings from other study.^[6] In a study conducted at Botswana (2005–2012), of 202 infants diagnosed with HIV, 82 (41%) children were alive, and on ART, 79 (39%) died, and 41 (20%) were lost to follow-up, transferred, or their mothers declined ART.^[7] The median age for carrying out DBS in this study was 8 weeks. The median time for DBS and WBS testing to their result was 3 weeks and 1 week, respectively, whereas the median time from DBS to initiation of ART was 10 weeks. Median time from birth to ART initiation was 37 weeks. In the study conducted at Botswana,^[7] the median time from birth to EID testing was 9 weeks, and the median time from birth to ART initiation was 23 weeks. Findings of this study was comparable with study of Botswana as far as EID testing is concerned, but median time for initiation of ART was more when compared with their finding.

As sample size of the study is not adequate, similar studies can be taken up at national level, the findings of which might be useful in revising the guideline for betterment of HIV-positive children.

Conclusion

From the findings of this study, it can be concluded that the median age of DBS testing among exposed infants was 8 weeks, not fulfilling the guideline of National AIDS Control Program, which has stated that the ideal age of conducting DBS should be 6 weeks. The median time required to get the DBS result was 3 weeks in this study. The median time required for WBS result to ART initiation was 4 weeks. The median time from birth to ART initiation in this study was 37 weeks. Ideally, the ART should be started within 12 weeks of life so as to get the highest benefit of it.

Recommendations

To reduce time lag in ART initiation:-

1. Delay in receiving result of DBS can be reduced if the samples are sent as and when they are collected rather than sending them fortnightly.
2. Infants with an initial positive virological test result should be given ART without delay, and, at the same time, a second specimen should be collected to confirm the initial positive virological test result.

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