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Letters to the Editor

An urgent need for introduction of fourth-generation Ag–Ab based EIA for detection of HIV infection

Dear Editor,

Detection of antibodies against HIV is the cornerstone of HIV screening assays. The major drawback of antibody based assay is that they turn reactive only on seroconversion following the initial viremia. Fourth-generation enzyme immunoassays (EIA) has the ability to simultaneously detect the p24 antigen and conventional HIV antibodies¹ and thereby reduce the window period and the risk of transmission of infection.

Between Jan 1997 and Aug 1999 (32 months), we screened 10,204 units of blood by third-generation (MICROLISA HIV1/2, J. Mitra) as well as fourth-generation Ag–Ab assays (Gen-screens Ultra HIV Ag–Ab, Biorad) at a large blood bank in a tertiary care hospital in Central India on an unlinked anonymous basis. All units were also assayed for other transfusion transmitted infections (TTI). 27 units tested positive for HIV infection by the fourth-generation assay whereas 25 units tested positive by antibody based third-generation assays. Thus, we were able to detect two additional HIV positive units by fourth-generation assays that would otherwise have been missed by third-generation assays. HIV infections in these two cases were further confirmed by HIV RNA load by real time PCR.

National guidelines on HIV testing permit the use of simple and rapid antibody detection kits depending on the specific strategy employed for HIV diagnosis namely blood banking, surveillance, voluntary testing or PMTCT etc. The main reasons for not insisting on EIA based assays routinely are equipment costs, technical difficulties and absence of electricity in remote locations.

Marks *et al* suggest that in USA approximately 21% of individuals with HIV infection are unaware of their status, and may account for more than 50% of new transmissions of the disease.² With early identification of HIV disease there are potential reductions in disease transmission and improvement in assay sensitivity. The current third-generation assays, antibodies can be detected in most individuals within 4–6 weeks of viral transmission. However, the p24 antigen is detectable before an antibody response during the initial burst of viral replication (Fig. 1). The risk of infection

from persons with acute early infection is reported to be greater due of the elevated viral load.

India has seen a definite decadal trend in HIV infection and it is now imperative to ensure that not even a single HIV infection occurs either vertically or during transfusion simply because the existing antibody based assays failed to detect an early HIV infection.

Many countries of the European Union like France and Germany have already introduced fourth-generation assays as the initial point of care. Most of the states in USA too have followed suit. Since most of the blood banks and laboratories of larger hospitals in India have facilities for carrying out EIA, its appropriate time for initial introduction of fourth-generation HIV assays in blood banks and PMTCT programs nationally. Subsequently, the same should be extended for all the HIV testing strategies (I, IIa, IIb and III, NACO, India).³

It is also reiterated that the cost per test of fourth-generation assays are comparable to the third-generation and cheaper to some rapid kits (Table 1).

Fig. 1 – Figure depicting the serological response and the time frame for detection by different assay methods to HIV infection.

Table 1 – Cost per test for different assays for detection of HIV infection.

Test principle	Detected parameter	Cost per test (in Rs) ^a
1. Dot immunoassay/ lateral flow assay	Antibody	33.00
2. Immunofiltration/ flowthrough assay	Antibody	71.00
3. EIA	Antibody	18.00
4. EIA	Antigen + Antibody	38.00

^a Costs are approximate.

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Letter to the Editor

Dear Editor,

We have read the article entitled, “A study to determine factors influencing outcomes of pediatric cochlear implants” by Swami et al published in MJAFI 2013; 69:366–368 with great interest. Cochlear implantation is indeed a powerful tool for helping children with severe to profound hearing loss to gain the ability to hear, and to achieve age appropriate communication skills. Despite the impressive skills achieved by many children with CIs, variability in progress remains a significant concern. This study strongly correlates the duration of preimplant auditory deprivation, parental education and cochlear morphology with the outcome. However, we would like to highlight another very important aspect, preservation of residual hearing during cochlear implant surgery, which significantly influences the outcomes of pediatric cochlear implants.

Hearing preservation is becoming increasingly important in cochlear implantation as there is growing evidence that preserving the residual hearing, especially in the low frequencies in combination with the electric stimulation can significantly improve hearing and speech outcomes. It increases hearing performance in difficult or noisy listening environments, improves music perception and appreciation, and gives sound and voices a more natural quality. Preserved residual hearing may lead to the application of “electro-acoustic” stimulation (EAS), where the lower pitches are aided through acoustic amplification and the mid/high pitches are aided through the cochlear implant within the same ear.^{1,2}

Possible causes of residual hearing loss after cochlear implantation include trauma, which can be acoustic trauma while drilling a cochleostomy or mechanical trauma due to electrode insertion resulting in fractures of the osseous spiral

lamina, perforations or disruption of the basilar membrane, or tearing of the endosteum of the scala tympani. The implant insertion can disturb cochlear fluid homeostasis and can introduce bacterial infection. Cochlear fibrosis or osteoneogenesis may result from a foreign body reaction to electrode components, bone dust, or blood.

To preserve residual hearing the following basic strategies have been adapted:

1. Technical alterations in the operative technique of cochlear implantation
2. Use of perioperative steroids
3. Modification in electrode design

Technical alterations in the operative technique of cochlear implantation designed to preserve hearing include: (a) avoidance of acoustic trauma using low speed drills, (b) careful placement of the cochleostomy anterior and inferior to the round window membrane to avoid damage to the basilar membrane and osseous spiral lamina, (c) round window membrane insertion, (d) a small cochleostomy to prevent buckling of the electrode and escape of perilymph, (e) changes in the angle and depth of electrode insertion, (f) slow insertion of electrode.^{3,4}

Steroids are used in conjunction with atraumatic implant surgical techniques because of their hair cell protecting properties in order to reduce the acute insertion trauma as well as the postimplantation inflammation.⁵ However the type, dosage, mode of delivery and the timing of steroid application remains a matter of debate. They can be given preoperative, intraoperative and postoperative, through various routes,