

Nucleic Amplification Testing: Individual Verses Minipool, What to choose?

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Dear Sir,

The commonly used NAT testing technologies include Polymerase Chain reaction (PCR) and transcription mediated amplification^[1]. TMA is a transcription-amplification process, using two enzymes- Reverse transcriptase & RNA polymerase to produce millions of copy of targeted RNA sequences. It comprises of three steps- target capture, amplification & detection. TMA allows for simultaneous testing of multiple viruses in a single test tube.^[2] Today there are two NAT tests available- COBAS Ampliscreen HBV test/ COBAS Taq screen MPX- a multiplex assay for HBV, HCV & HIV- both of these are manufactured by Roche Molecular system Inc and Procleix Ultrio assay a multiplex assay for HBV, HCV & HIV manufactured by Gen Probe Inc. (Novartis) (Chiron in US)^[3]

The sero prevalence of anti HIV-1, anti HCV and HBsAg in Indian blood donors is 0.5%, 0.4% and 1.4% respectively ^[4] compared to 0.0097%, 0.3% & 0.07% in blood donors in USA.⁵ The NAT yield NAT+/Ab- in USA was 230 for HCV, 18 for HIV and 5 for HBV¹. If we extrapolate Indian prevalence to expected NAT yield in our country as the technology is the same as followed in US, we get stunning figures for HIV- 5154, HCV-133 and HBV -2000, this emphasizes the importance of NAT in India with high prevalence of viremia. Japan was the first country to implement routine HBV NAT in addition to HCV & HIV-1 NAT ⁶. UK, USA, Australia, Japan, Austria, Belgium, Canada, Finland, France, Germany, Italy, Poland, Netherland, New Zealand, Singapore, Poland, Portugal , Norway, Slovenia & Hong kong are countries where there is 100% NAT testing of donor blood. The developing nations like India, China, Brazil, Thailand, Spain, Korea, Greece and others have a portion of their blood supply which is

NAT tested^[7]. The decision to perform NAT in mini pool or Individual format is largely based on the balance between cost quality & resources available with blood centers.

The implementation of NAT using minipools was a necessary compromise in light of the cost and complexity of NAT technologies and the massive scope of blood screening. There are studies from India by Makroo et al^[8] & Chatterjee et al^[9] suggesting that use of ID NAT in blood banks in India would ensure safer blood transfusion. On the other hand, another recent case report^[10] from Australian Red cross Blood service where 11, 13, 288 donations were screened as pools of 24 and an additional 32,003 donations were screened in Individual NAT format and further 294474 donations exclusively on Individual format showed minor differences in Individual & minipool strategies with excellent specificities however when Individual NAT was performed at Minipool site, a potential for contamination limiting optimal processing of Individual NAT was observed.

In a country with limited resources and where cost economics playing vital role we have to delicately strike a balance between cost, quality , manpower & infrastructural constraints as well as opening for new testing technologies prevalent in the world. In order to keep pace with the growth and safety for blood receipts we need to gear up for acceptance and incorporation latest testing facilities for our blood banks. The policy makers need to self retrospect. Recently, a study by Australian Red cross^[10] emphasized on trained, skilled manpower requirement for such a technically demanding procedure.

The most prudent approach in today's scenario is not debating the issue of Minipool NAT - versus Individual NAT rather it should be to fill the gap between those who

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can afford everything and those who can afford nothing. At the drop of a hat, we need to think seriously on how to make available NAT testing facilities for our blood recipients that is not taxing on the patients, keeping high quality affordable at reasonable cost else we will be in a jaywalk situation.

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Competing Interests

None Declared

Reference

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