

OP 47. Blood bank automation - The Western Province Blood Transfusion Service experience

Karen Dramat¹

¹ - WPBTS

Introduction

Conventional tube technology (CTT) has been the gold standard at Western Province Blood Transfusion Service (WPBTS) for many years. Since 2002, the Blood Banks in the Western Cape were challenged by a fluctuating staff complement and a steadily increasing workload, requiring the investigation of more efficient automated systems. Automation had been introduced in the developed countries as early as the 1960's. ⁽¹⁾ In 2005, there were few totally automated instruments available in South Africa.

Nature of the challenge

In the 4 years prior to automation a 35% increase in samples numbers with a concomitant increase in workload was observed. From 2005 till 2015, there was a 56% increase in sample registrations at the 4 Blood Banks in the Cape Town metropole.

Processes undertaken

In July 2005, Tygerberg Hospital Blood Bank commenced the evaluation and validation of the Ortho AutoVue (A/V) Innova analyser. The Red Cross Children's Hospital Blood Bank investigated the Erythrocyte-Magnetized Technique (EMR). ⁽¹⁾

Erythrocyte Magnetised Technology vs CTT:

40 samples were tested using EMR.

A decision was taken not to continue EMR investigation as the technology had not been widely used other than in France and was not a walk-away system.

On the AutoVue a wide variety of samples were tested. This included Group and Screens, crossmatches, samples with irregular/ auto antibodies, neonatal samples, group and Rh queries and diluted commercial antisera.

Results

The results obtained on the AutoVue which incorporates Column Agglutination Technology (CAT) were compared with those of CTT. In general, test results obtained by CAT, was graded higher than the same test performed by CTT.

Positive results obtained by CAT in the anti-A and anti-B test, were mostly 4+, while the strength ranged from 1+ to 4+ with CTT.

Anti- D showed a similar pattern with positive results in CTT ranging from 1-4+, while the same test in CAT was always graded 4+.

Reverse group test grading was higher with CAT than CTT. This was clearly demonstrated in Neonatal samples when reverse matched forward grouping.

It was demonstrated that CAT was more sensitive in detecting anti-A1.

The validation clearly showed the high incidence of positive DAT obtained by CAT while the test result is negative by CTT. This phenomenon ultimately led to the elimination of these tests from routine pre-transfusion testing.

Antibody detection tests showed a higher strength in the test grading as well as the ability to detect antibodies at a far lower titre than is possible by CTT.

The benefits of automation in the Blood Banks are that test results are standardised, reproducible and visually documented. Samples can be batch tested or randomly accessed. There was also a decrease in technical errors. ⁽²⁾

Some disadvantages of automation are that analysers, reagents and consumables are costly. Furthermore, the increased sensitivity resulted in many nonspecific incompatible crossmatches.

Closing

Since 2006, 937 570 samples have successfully been processed through the AutoVue and BioVue analysers. Adoption of automation has increased the Blood Banks' efficiencies and optimised the balance between workload and staff numbers.