Process improvement of Neonatal Bilirubin Testing within NICU with the use of 2 existing Radiometer ABL 90

Singapore Healthcare Management 2023

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Background

In KKH Neonatal Intensive Care Unit (NICU), neonates require blood gas analysis and bilirubin testing frequently. Blood gas is analysed using the Radiometer ABL 90 in NICU and bilirubin testing is sent to the Clinical Chemistry Laboratory. Often, the patient will have blood drawn at separate times of the day for the two tests.

	Issues
1.	Blood for bilirubin testing is taken at 5am and sent to the lab so that the results will be ready during the doctors' rounds at 8am.
2.	Other neonatal wards have the same practice and the influx of specimens for bilirubin testing in the laboratory leads to a longer turnaround time for each patient.
3.	Longer turnaround time for bilirubin testing may cause a delay in management of severe hyperbilirubinaemia.

Objectives

1. Streamline workflow in NICU for blood gas analysis and bilirubin testing.
2. Reduce turnaround time for bilirubin testing.
3. Reduce amount of blood taken and cost of tests.

Method

Radiometer ABL 90 is a blood gas analyzer that can analyse 17 parameters including bilirubin using as little as 65µL of blood. NICU has two Radiometer ABL 90 analyzers for point-of-care-testing. Therefore, we looked into the possibility of analyzing both blood gas and bilirubin simultaneously.

A new workflow was developed and implemented for bilirubin monitoring and reporting in NICU (Figure B).

Before

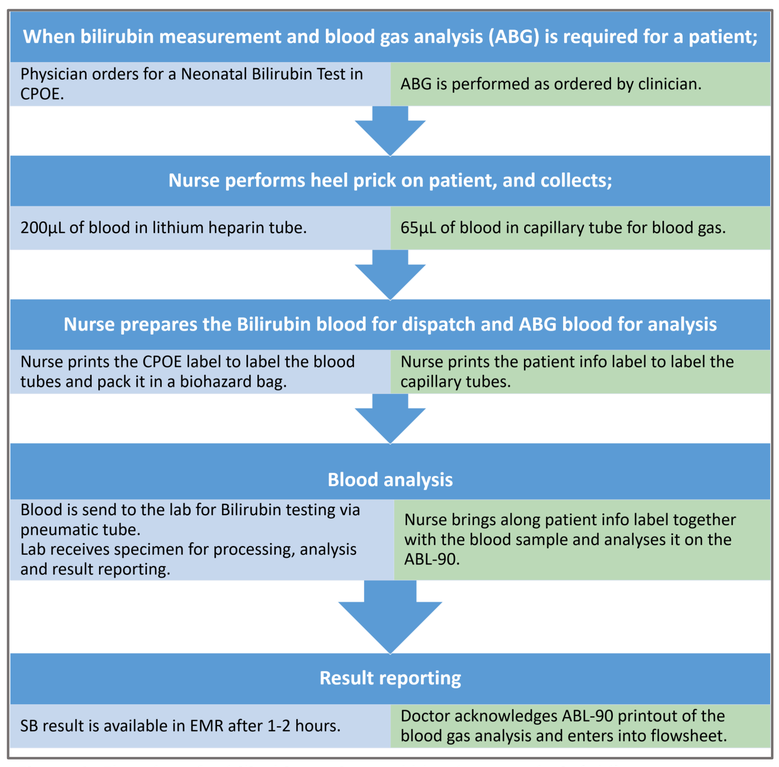

Figure A: Flowchart for bilirubin testing and blood gas analysis (old)

After

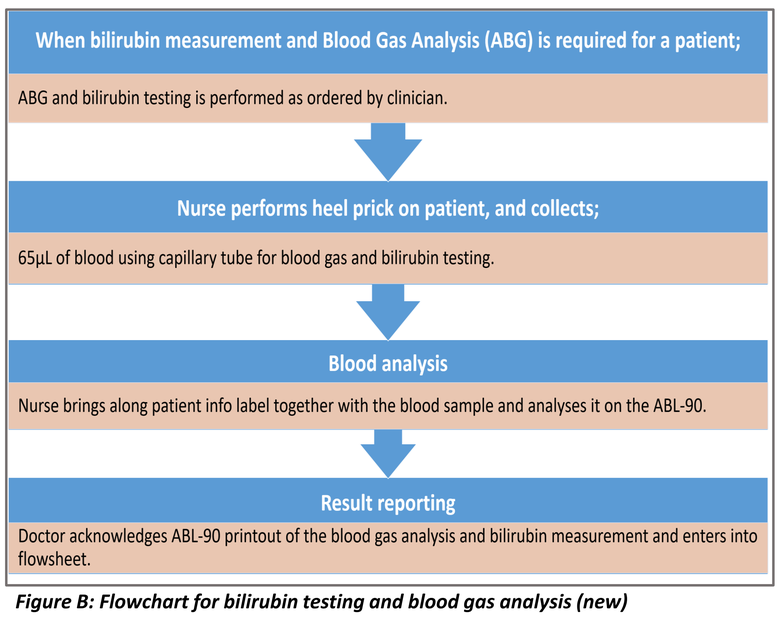

Figure B: Flowchart for bilirubin testing and blood gas analysis (new)

Results

After implementation of bilirubin testing as a Point-of-Care-Test (POCT) in NICU, the following were achieved:

1. Reduction in turnaround time for Bilirubin Testing (Figure C).

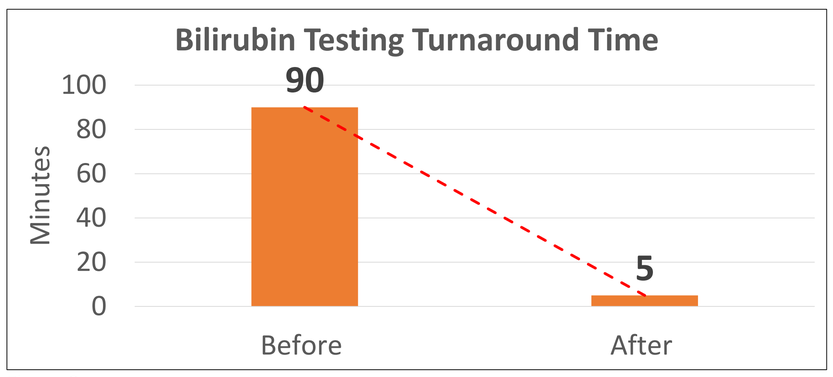

Figure C

2. Reduced amount of blood taken from patient.

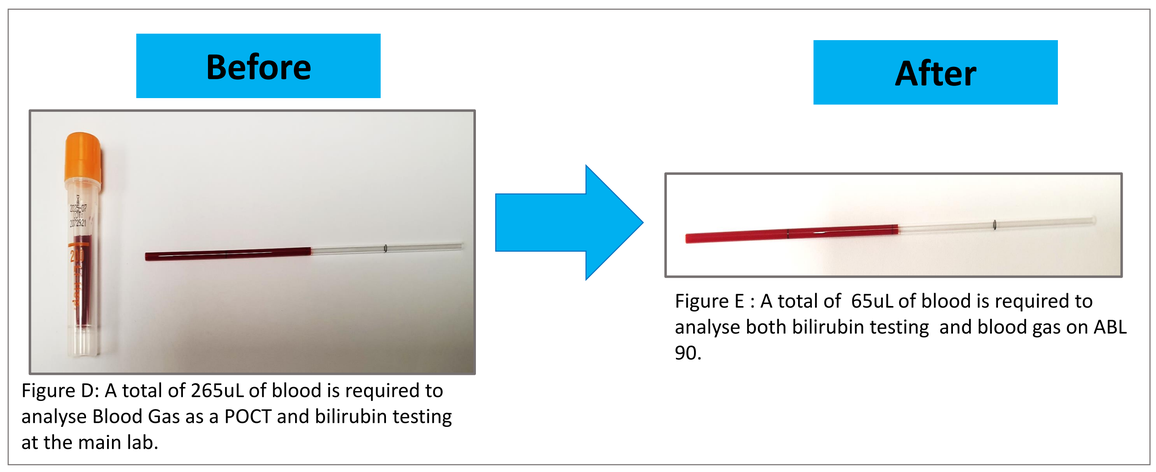

Figure D: A total of 265uL of blood is required to analyse Blood Gas as a POCT and bilirubin testing at the main lab.

Figure E : A total of 65uL of blood is required to analyse both bilirubin testing and blood gas on ABL 90.

3. Cost reduction for patient by 31.5% (Figure F).

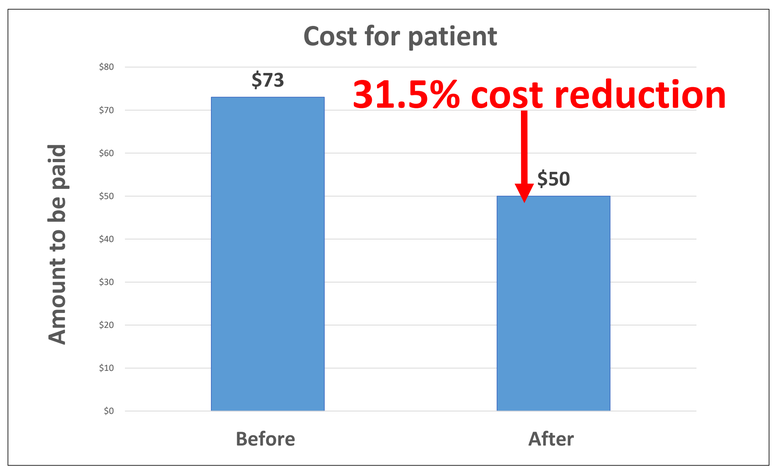

Figure F

Spreading

After receiving positive feedback from the NICU team, this solution will be implemented in Special Care Nursery in the latter half of 2023 as they have the same device and similar patient demographics.

Sustainability

In the future, results will be automatically transmitted from ABL 90 to electronic medical records (emr), hence results do not need to be manually transcribed. This will further reduce the time needed and workload involved in blood gas and bilirubin charting and reporting.

Conclusion

Implementation of bilirubin testing using ABL 90 in NICU has streamlined work processes resulting in faster turnaround time for bilirubin testing, reduced amount of blood sampling and costs of running the tests.