Perspectives on POCT Neonatal Testing: Impact on Clinical Practice

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Sweden
≈ 115 000 births/year

Stockholm
≈ 29 000 births/year

Neonatal Care
≈ 10% of newborns
Neonatal Intensive Care Units (NICU)

Karolinska Univ Hosp
Huddinge

Karolinska Univ Hosp
Danderyd

Karolinska Univ Hosp
Solna

Stockholm South General Hospital

Maternity Ward

Neonatal Home Care

NICU
100 hospital beds

Center of Fetal Medicine

ECMO

Neonatal Intensive Care Transport

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Why POCT in neonatal care?

Availability

Mobility

Response time

Small sample volume
What’s so special about neonates?

- Low albumin concentration
- Physiological hemolysis
- High (or low) hematocrit
- Extreme vulnerability
Pitfalls in the choice of method…

Accuracy

Measuring range

Precision

Interferences
…that leads to

- Uncertainty in decision making
- Unnecessary admissions
- Extensive testing
The benefit of dialogue between clinical practitioners and lab specialty

- Knowledge of strengths and weaknesses of different methods
- Specify the needs and limits in practical use
- First testing of new methods in laboratory setting
- One method when possible
- Minimize number of instruments
- Minimize analytical error
- Minimize pre-analytical error
Measurement of high level total bilirubin: Effect of physiological hemolysis
Accuracy

Bilirubin $\mu$mol/L

Whole Blood

Plasma

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Precision

Bilirubin $\mu$mol/L

Whole Blood

Plasma

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Measuring range

Bilirubin μmol/L

Whole Blood

Plasma
Studies on the Interference by Haemoglobin in the Determination of Bilirubin


The graph illustrates the relationship between total bilirubin fraction found and haemoglobin concentration. Each line represents a different condition or method, labeled from (1) to (7), showing how the bilirubin fraction changes as the haemoglobin concentration increases.
Measurement of sodium at low plasma albumin: Differences between direct and indirect methods
Measured difference between diluted and undiluted samples

- Low albumin
- Pseudohyponatremia

- High albumin
- Pseudohypernatremia

In the diluted sample

Normal protein level

Differences, mmol/L

Protein level, %
Measurement of low level glucose concentration: Accuracy and hematocrit
Deviation from reference method

Hematocrite

POCT/ref
The choice of method is not always obvious

When possible stick to one!