Capillary, Venous Lactate Agreement

Julia Grahamslaw
Senior Research Nurse
CLVA Study Co-ordinator
Royal Infirmary of Edinburgh
Emergency Department
HIGHER LACTATE IS ASSOCIATED WITH MORTALITY

Kaplan-Meier survival curve of all patients attending the ED stratified by lactate group

Lactate <2
Lactate 2-<4
Lactate >4

HIGHER LACTATE = HIGHER MORTALITY
BLOOD LACTATE

Biochemical marker of tissue hypoxia

Helps identify patients in need of resuscitation and higher level of clinical care

Best practice in sepsis management
We need a method of lactate measurement that is:

- Quick
- Causes minimal discomfort
- Easily repeatable (serial measurements)
- Minimises workload on clinical staff
Blood lactate

Peripheral venous lactate

Capillary lactate measures could be even more efficient…

…but there is a need to demonstrate how closely they agree with other measures

ILLNESS SEVERITY

CVLA

EVIDENCE NEEDED
The best test of capillary lactate (CAP-LACT) would be a comparison against arterial lactate.

Arterial lactate less commonly used on patients

Difficult to ethically justify extensive use of arterial lactate tests

Clinical shift to Peripheral venous lactate

Many patients available for testing

Is there an agreement between capillary and venous lactate values?
STATSTRIP LACTATE MONITORS

Hand-held point-of-care lactate analyser using StatStrips (like a BM machine)

Rapid results (15 seconds)

Small amount of blood needed (0.7 micro-litres)

Versatile – little staff training required

Ideal for remote locations

Resource-efficient

Two units supplied to ED by Nova Biomedical
CVLA – AN OBSERVATIONAL PILOT STUDY

To determine feasibility of larger-scale study of agreement between capillary lactate (CAP-LACT) and peripheral venous lactate (PV-LACT)

To establish necessary sample size for full study
INCLUSION CRITERIA

Aged 16 or over

Recruited within 4 hours of presentation

Judged by attending clinician to require peripheral venous lactate (PV-LACT)
CONSENT

..Challenges in the ED

NHS Lothian

EMERGE
METHODS

Emergency Department, Royal Infirmary of Edinburgh
101 patients, October – December 2014

PV-LACT taken and tested using GEM 4000 blood gas analyser

CAP-LACT taken within 15 minutes using Nova StatStrip meter
LIMITATIONS

Ethical approval for ABG

Machine technicalities

Study suspended for 2 weeks
RESULTS

Bland-Altman plots used to visualise level of agreement between two measures

Each point represents a patient

Consider Patient B…

**CAP** lactate = 13.5

**Venous** lactate = 11.5

**AVERAGE** = 12.5

Difference (CAP minus venous) = (13.5 - 11.5) = 2

Patients with generally LOW lactate

Patients with generally HIGH lactate
RESULTS

Bland-Altman plots used to visualise level of agreement between two measures

Patients with generally LOW lactate

Patients with generally HIGH lactate

Above 0: CAP-LACT values higher than PV-LACT values

Below 0: PV-LACT values higher than CAP-LACT values

If there is good agreement, the points will all be compressed horizontally

NHS Lothian

EMERGE
RESULTS

CAP-LACT measures, on average, 0.43 mmol/L higher than PV-LACT measures on average.

Agreement is good at LOW lactate levels.

Agreement is worse at HIGH lactate levels, but...

...few samples at high lactate levels – need more data!

NHS Lothian

EMERGE
CONCLUSIONS

Study shows good potential for the use of capillary lactate in addition to our standard measures.

Wide limits of agreement, and small sample size at high lactate levels, means further study is needed.

CAP-LACT could potentially revolutionise triage.
EMERGE

Powered by Curiosity

Website coming soon

Julia.Grahamslaw@nhslothian.scot.nhs.uk

@emerge_research
ACKNOWLEDGEMENTS

Study meters and consumables supplied by Nova Biomedical

Financial support for conference attendance supplied by

Elsie Inglis Education Trust

and

MEDIC ONE