Point-of-Care Blood Gas Analysis on a Johannesburg Based Jet Air Ambulance Service

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Overview

- Background
- Equipment
- Study outline
- Findings
- Discussion
- Summary
To Start

Disclosures

• Data from part of data collected for MSc MED Emer Med research report

We do not endorse any particular product
Background

Point-of-care blood gas analysis is considered a standard of care in modern Air Ambulance clinical assessment and monitoring of patients by many professional organisations.

Studied, compared and Validated in ICU & Air Ambulance settings.

Background

Instances where point-of-care blood gas analysis have identified clinically significant abnormalities which then led to clinical intervention are well documented in the Air Ambulance environment.

Blood gas analysis useful for diagnostic and monitoring purposes, it is however not inexpensive.

Results obtained from point-of-care blood gas analysis are not always required for patient care, nor do they always result in any clinical action on the part of the medical team.

Background

In one study reviewing six years of medical transportation cases, treatment decisions that were quantifiably directly linked to point-of-care testing results occurred in 30% of cases where point-of-care testing was employed.

Our question therefore centred around the figures for our Johannesburg based Jet Air Ambulance service.

Equipment
Equipment
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>37.3°C</td>
</tr>
<tr>
<td>pH</td>
<td>7.493</td>
</tr>
<tr>
<td>PCO2</td>
<td>35.2 mmHg</td>
</tr>
<tr>
<td>PO2</td>
<td>59 mmHg</td>
</tr>
<tr>
<td>Na</td>
<td>137 mmol/L</td>
</tr>
<tr>
<td>K</td>
<td>3.8 mmol/L</td>
</tr>
<tr>
<td>Cl</td>
<td>122 mmol/L</td>
</tr>
<tr>
<td>iCa</td>
<td>1.14 mmol/L</td>
</tr>
<tr>
<td>TCO2</td>
<td>28 mmol/L</td>
</tr>
<tr>
<td>Glu</td>
<td>7.0 mmol/L</td>
</tr>
<tr>
<td>Urea</td>
<td>1.9 mmol/L</td>
</tr>
<tr>
<td>Crea</td>
<td>71 umol/L</td>
</tr>
<tr>
<td>Hct</td>
<td>44 %PCV</td>
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<tr>
<td>Hb*</td>
<td>15.0 g/dL</td>
</tr>
<tr>
<td>AnGap</td>
<td>12 mmol/L</td>
</tr>
</tbody>
</table>

**Operator ID:** 22874112950176
**Physician:**

**Serial:** 326070
**Version:** JAMS131C
**CLEW:** A23
**Custom:** 00000000
Study objectives

- To determine how often point-of-care blood gas analysis is undertaken on air ambulance missions
- To determine how often point-of-care blood gas analysis reveals abnormal findings
- To determine how often findings result in a clinical intervention
- To evaluate cost-effectiveness
Study methods

- Retrospectively reviewed patient care records
- Number of missions/occasions where blood gas sampling undertaken
- Number of samples revealing abnormal findings
  - Predetermined parameters
- Number of abnormal findings followed up with an intervention
Findings

Total Patients

- 80% BGA undertaken
- 20% BGA not undertaken
Findings

Blood Gases Done

- 40% Normal Findings
- 60% Abnormal Findings
Findings

Abnormal Finding & Potential for Corrective Action

- 31% Possible
- 69% Not Possible
Findings

Abnormal Finding Potentially Correctable & Corrective Action

- 87% Evidenced
- 13% Not Evidenced
Findings

Abnormal Findings

- Hb: 15%
- PaCO2: 14%
- PaO2: 15%
- pH: 10%
- BE: 4%
- Bicarb: 13%
- K: 14%
- Na: 14%
- Lactate: 1%
Findings

Corrective Actions

- Blood: 4%
- Medications: 22%
- Fluids: 25%
- Oxygen: 21%
- Ventilatory: 15%
- General Supportive: 13%
Discussion

- POC BGA undertaken – 80%
- Abnormalities noted – 60%
- Abnormalities within total patient population – 48%
- Clinical action related to POC BGA within total patient population – 29%
Discussion

- Patients where BGA undertaken = 80%
- BGA performed with Abnormal findings = 60%
  - 1.7
  - Cost = ZAR 175.00
- BGA performed resulting in action = 38%
  - 2.6
  - Cost = ZAR 272.00
- There are other costs to consider…
- Comparative – Multifunction Chest Pads…
“While it may be desirable to obtain rapid laboratory results, there is little published data that point-of-care laboratory testing improves outcomes.”
Discussion

- Point-of-care testing has wider operational, economic and patient care value.
- Furthermore, where no laboratory facilities exist in a given environment, point-of-care testing becomes the only option – such as in the out-of-hospital Air Ambulance environment.

Summary

- Our findings similar to other studies
- Would be potentially dangerous to remove this modality as standard
- Only option in the Air Ambulance
- However, always needs to be contextualized
- Is it really that expensive?
- Towards a more cost-efficient future option?
Thank You