



# Critical incident report from the IAKH-Fehlerregister

in cooperation with the DIVI and the CIRSmedical Anästhesiologie of BDA/DGAI and ÄZQ

Report via



IAKH Fehlerregister



CIRSmedical AINS

of BDA/DGAI and ÄZQ

<b>Topic/Title</b>	<b>Erronous hemoglobin content in blood gas sample</b>
<b>Case -ID</b>	<b>CM4829/2010</b>
<b>Case report (approx. as entered)</b>	Elderly patient for brain tumor resection/debulking had received blood tranfusion during the long procedure already previously following measuring hemoglobin content in the blood gas analysis. Now, for the redo measure of hemoglobin content, anesthesia nurse takes sample and sends it via pneumatic delivery to ICU where the blood gas analyser is located, then goes to phone and informs the staff on ICU. However, calibration process is running and analysis delayed. After 25 min, the analysis ask fort he result and ICU is called- sample is still not analysed- had been forgotten. After finished analysis, result was sent in OR- very low hemoglobin- indicating transfusion. Anestheseologist requires a redo- new analysis has a much higher hemoglobin content.
<b>Problems (here: questions that arise the possibility of problems- there had been no possibility for follow up queeries)</b>	<ul style="list-style-type: none"> <li>• Calibration process of the single blood gas analyser delays the immediate injection by the ICU nurse. Since the sample is deposited and apparently not gently remixed prior to injection, the measured hemoglobin content is false too low. If the mixing process is not done correctly for the measurement of the hemoglobin content, a false to high or to low content can be measured depending which part of the sample is analysed. Whereas hemoglobin analysis only requires exact mixing after longer storage to be accurate, for the gas analysis itself a longer storage time also is changing the results of pO<sub>2</sub> and pCO<sub>2</sub>.</li> <li>• There is no blood gas analyser in the OR despite greater neurosurgery cases are done. The staff on ICU is frequently busy with other cases and forgets tasks that are not connected to their patients. The pneumatic delivery to ICU is producing an interface problem as is here demonstrated.</li> <li>• Remember that volume loss is not reflected by the hemoglobin content. Even if the patient exsanguinates, the hemoglobin content does not</li> </ul>

	change much without volume substitution.
Process Step concerned **	Laboratory- sample analysis
Circumstances	Routine hours, ASA 3, experienced staff
Good elements (“as reported” or criticism of the CIRS Board)	3/5
*Risk of reoccurrence/Likleyhood	3/5
*Potential risk for patient damage	•
Board recommendation (Suggestion of a change of process and/or structural quality by introduction /installation/reeducation of the following measures) SOP= Standard operating procedure	<p><b>Process quality:</b></p> <ul style="list-style-type: none"> <li>• SOP at the analyser and for its users: for handling and analysis of blood samples for the gas analysis – if an immediate analysis is not possible- take a clock with you that reminds you later, mix gently but thoroughly before starting the analysis</li> <li>• SOP in the OR- use alternative POC method at the bedside for double check and in case of delayed results: Haemocue, noninvasive longitudinal HB-oximetry(Massimo Radical 7), IStat, etc.</li> <li>• Long surgery and invisible blood loss: monitoring not solely by blood gas analysis but also diagnosis of volume deficits by noninvasive cardia output monitor and stroke variation index or pH, BE, laktate etc..</li> <li>• BGA-withdrwal and analysis should be done by one person only- if possible</li> </ul> <p><b>Structure quality:</b></p> <ul style="list-style-type: none"> <li>• Provision of a second back up blood gas analyzer in OR! Also important for CO<sub>2</sub> and pH status, elektrolytes, glucose and lactate!</li> <li>• Consideration of alternative techniques and machines (Haemocue, Massimo Radical 7, IStAT, etc.) for double checks of inplausible results</li> </ul> <p>Equipe and supervise staffwith and in noninvasive measurements of volume status: CO-Monitor (i.e. Edwards Vigileo)</p>

**\*Risk Grades:**

<b><u>Frequency, Risk of reoccurrence</u></b>		<b><u>Potential risk for patient damage</u></b>	
<b>1/5</b>	<b>very rare max 1/100 000</b>	<b>1/5</b>	<b>very little acute injury/no permanent damage</b>
<b>2/5</b>	<b>rare max. 1/10 000</b>	<b>2/5</b>	<b>minor acute injury/slight permanent damage</b>
<b>3/5</b>	<b>medium max. 1/1000</b>	<b>3/5</b>	<b>considerable acute injury/ minor permanent damage</b>
<b>4/5</b>	<b>frequent, min. 1/100 damage</b>	<b>4/5</b>	<b>profound acute injury / considerable permanent damage</b>
<b>5/5</b>	<b>usual/common, min. 1/10</b>	<b>5/5</b>	<b>death/severe permanent damage</b>

**\*\*Allocation of errors/near misses in the process of administration of blood or coagulation products**

1. -blood sample withdrawal
2. -blood order
3. -laboratory
4. -handling or storage
5. -blood product release, transportation, or administration
6. -sample/product/patient identification