

Name of research institute or organization:

Pneumologie, Medizinische Fakultät der Ludwigs-Maximilians-Universität München

Title of project:

Correlation of blood gas analysis at 3454 m with symptoms of acute mountain sickness

Project leader and team:

Prof. Dr. med. Rainald Fischer, project leader

Project description:

According to current knowledge, acute mountain sickness is induced by hypobaric hypoxia. In a number of studies, there is a correlation of oxygen saturation and acute mountain sickness, while in other studies the correlation is not convincing. As new small portable blood gas monitors are now available, not only oxygen saturation, but arterial blood gas samples can now be easily drawn, even during the ascent to maybe remote areas.

We therefore aim to find out whether we can detect correlations between parameters of arterialized blood gas samples and symptoms of acute mountain sickness during acute exposure to an altitude of 3454 m for at least 24 h.

Methods: The ongoing study will sample blood gases from healthy young students with or without previous altitude exposure. The blood gas samples are drawn from the arterialized ear lobe and are measured with a portable point of care blood gas analyser (EPOC, Alere Inc., Ontario, Canada). The blood gas samples are taken at least three times during the stay at altitude: after 3 – 4 h (T1), 12 – 15 h (T2) and 22 – 25 h (T3) after arrival at 3454 m. In parallel, symptoms of acute mountain sickness were monitored with the Lake Louise Acute Mountain Sickness Score (AMSS).

Results: Until now, 24 subjects have been studied (10 female, 14 males, mean age 24 years). The highest values of AMSS were recorded T2, with a mean of 3,09 (ordinal scale, minimum 0 – maximum 18). The overall mean AMSS was 2.44 AMS – values of 3 or higher (defining acute mountain sickness) were found in 18/24 subjects. However, if the cut-off point is set at 4 or higher, only 8/24 subjects experienced acute mountain sickness. The highest score with 18 was found in a child after the first night at altitude. However, no rescue medication had to be given, although two subjects received oxygen for a few hours to reduce symptoms.

Mean PaO₂ was 52.8 – 54.9 mmHg, mean PaCO₂ was 32.1 – 33.4 mmHg, mean SaO₂ was between 87 and 84 percent, depending on the time of measurement.

With the current measurement, we found no significant correlation of AMS-score and oxygenation, neither measured with PaO₂ or with SaO₂.

Conclusion: The current sample size is not sufficient to detect a significant correlation of AMS and oxygenation at an altitude of 3454 m. This may be due to relative low severity of AMS at the high altitude research station Jungfraujoch, but we expect that increasing the samples sizes will help us to find out if arterialized blood gas sampling is superior to the measurement of SaO₂ for predicting acute mountain sickness.

Key words:

Acute mountain sickness, oxygenation, blood gas sampling

Scientific publications and public outreach 2014:

As the study is ongoing, no publications have been written in 2014

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