GESELLSCHAFT FÜR TAUCH- UND ÜBERDRUCKMEDIZIN e.V.

CAISSON

29. Jg. September 2014 Nr. 3 Begründet von Oskar F. Ehm - Mitteilungen der GTÜM e.V.

BOOK OF ABSTRACTS inside

EUBS European Underwater and Baromedical Society

40th Annual Scientific Meeting of the European Underwater and Baromedical Society (EUBS)

GTÜM-Kongress 2014
Wiesbaden, Germany
24. – 27. September 2014

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36 The effects of HBO-Therapy on blood viscosity and erythrocyte aggregation in diabetic patients

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There are only a few studies about hyperbaric oxygen's effect on hemorheological parameters and their results show an increase in blood viscosity and RBC aggregation both in vivo and in vitro. This would suggest more complications about blood after HBO therapy however; reality is not consistent with study results. Therefore, in this study, the effects of HBO-Therapy on blood viscosity and erythrocyte aggregation have been investigated. Since they make up an important part of HBO patients, diabetics were chosen as subject at first. 11 diabetic ulcer patients aged between 42 and 82 were included to the study, after their consent. 100% oxygen was applied at 2.4 ATA for 2 h in three cycles of 25 min of oxygen-5 min air break. Treatments were carried on every weekday usually for six weeks. Blood that was collected before the initial HBO therapy was accepted to be control. Samples were also collected after the initial therapy and twentieth one to be evaluated. Corrected whole blood viscosity was measured using a cone/plate viscometer with a hematocrit of 45%. RBC aggregation was measured using a Myrenne aggregometer in both autologous plasma and dextran70 solution.

Our results showed that there were no significant changes in corrected blood viscosity between the samples collected before and after the first and twentieth HBO treatments. Also RBC aggregation in both autologous plasma and dextran70 solution after the first and twentieth HBO treatments were not significantly different than the control samples.

These results were in contrast with the previous experimental studies. The reason of these contradictory results may be caused by experimental method and HBO application differences and/or different reactions of humans and animals. Still, this topic needs further studies to clear such an important effect.

37 Dietary nitrate reduces oxygen cost for dynamic apnea

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Introduction: Dietary nitrate has been shown to reduce oxygen cost in a variety of situations, although in sports involving apnea results have been conflicting. Nitrate supplementation was found to increase saturation after static apnea (Engan et al 2012) – but was reported to have the contrary effect by Schiffer et al (2012), while they reported no effect on simulated dynamic apnea (DYN).

Methods: We studied the effect of dietary nitrate on post-dive arterial oxygen saturation (SaO_2) after DYN. Fourteen experienced male apneic divers with mean(SD) age 33(11) years volunteered. They performed 2 x 75 m DYN in a pool with 4.5 min recovery between dives, one day after ingesting 70 ml of organic beetroot juice (nitrate content 5.000 mmol), another day after ingesting placebo juice with the nitrate removed (nitrate content 0.003 mmol). Juices were ingested 2.5 h before the tests at a randomized, blinded order. SaO_2 was measured via finger pulse oximetry. For 11 subjects, mean values from their two dives in each condition were used, and in three subjects with incomplete data in some dives, data from the completed dive and the corresponding dive from the other condition was used.

Results: Nitrate ingestion resulted in higher SaO_2 at 20 s after the dives (86.3+10.6%) compared to placebo (79.4+10.2; $P<0.01$). Nadir values were 83.1(11.1) after beetroot ingestion and 77.4 (11.1) for the placebo trial ($P<0.05$).

Discussion: Our result suggests an oxygen conserving effect of nitrate, which is contrary to the "no effect" reported by Schiffer (2012), but in line with the effect on static apnea found by Engan (2012). The data by Schiffer reveals a tendency for an effect, not reaching statistical significance in their small sample (n=10). An oxygen conserving effect by dietary nitrate, as suggested by our study, could have important applications in competition apnea and other diving.

38 Blood glucose real time monitoring and recording during SCUBA Diving: case report

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Introduction: Type-1-Diabetes Mellitus (DM) was traditionally considered a contraindication to SCUBA diving for the risk of complications such as sudden hypoglycaemia.

Even if this is currently being reconsidered, there are still many doubts about diving and diabetes mainly because of the impossibility to check Blood Glucose values during diving.

To prevent worsening of hypoglycaemia and to correctly interpret hypoglycaemia-like symptoms whilst diving, diabetic divers could benefit from real-time Blood Glucose (BG) monitoring during their dives.

The scope of this work is developing a continuous BG monitoring system using a real time monitor during diving.

Materials & Methods: A female diver, N.B. (Female, 29 y, weight 53 Kg, height 1.57 m) was monitored every 5 min on every dive, by a dedicated subcutaneous glucose monitor (Dexcom G4) hosted in a waterproof case (Dive system Furyo diving computer) and the BG level was shown on the Furyo's display, allowing the diver to continuously check her BG. Data were recorded every 5 min during dives and also during 1 h before and 1 h after the dive.

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