

## **Acute coronary syndrome and Hyperbaric Oxygen Therapy**

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### **Background :**

Cardiovascular disease (CVD) is the leading cause of death in the world, accounting for 30% of all deaths, of which 42% are due to coronary heart disease (CHD) (WHO 2013)

Acute Coronary Syndrome (ACS), with or without extra-ST segment is a frequent common condition that can be fatal. Its management is well codified and HBO is excluded:

### **Rationale for HBO use**

Hyperbaric oxygen (HBO) therapy could improve the oxygen supply to heart water in a region is ischemic and could reduce heart muscle area destroyed. The addition of HBOT to the standard treatment rots reduce the mortality rate and improve the management

### **Evidence – Based review of HBO use**

Since 2011 no new study to assess the evidence of the effects of HBOT as adjuvant in the treatment of ACS have been published. Six trials with 665 participants contributed to this review. These trials were small and subject to certain biases numbers. Patients with ACS awarded OHB were associated with a reduced risk of death by 42% (RR 0.58 (95% CI 0.36 to 0.92), 5 trials, 614 participants; evidence low quality) .In general, HBOT was well tolerated. No patients had neurological oxygen toxicity and one patient was reported for a significant barotrauma.

### **References**

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## **Conclusion : Recommendation**

There is some evidence from this review that HBOT following an episode of ACS reduces the risk of death, re-infarction, significant dysrhythmias and MACE, as well as limiting the peak levels of CPK and improving left ventricular ejection fraction. HBOT may also reduce the time required to achieve relief from cardiac ischaemic pain in these patients. The small number of studies, the modest numbers of patients, and the methodological and reporting inadequacies of the primary studies included in this review demand a cautious interpretation.

The routine use of HBOT can not be justified under the care of a ACS : Type 1 recommendation; Level B evidence



| Study (authors, year)   | Type   | Nb patients        | Aim(s) / Evaluation criteria  | Inclusion / Exclusion criteria | HBO protocol (pressure, time, nb of session) | Results  | Conclusion / comment   |
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| <p>Am Heart J. 2004 Oct;148(4):E14. Adjunctive effect of hyperbaric oxygen treatment after thrombolysis on left ventricular function in patients with acute myocardial infarction. Dekleva M1, Neskovic A, Vlahovic A, Putnikovic B, Beleslin B, Ostojic M.</p> | <p>This randomized study was conducted to further assess the benefit of hyperbaric oxygen treatment after thrombolysis on left ventricular function and remodeling in patients with acute myocardial infarction.</p> | <p>74 patients</p> | <p>patients with first acute myocardial infarction were randomly assigned to treatment with hyperbaric oxygen treatment combined with streptokinase (HBO+) or streptokinase alone (HBO-).</p> |                                |  | <p>There was a significant decrease of end-systolic volume index from the first day to the third week in HBO+ patients compared with HBO- patients (from 30.40 to 28.18 vs from 30.89 to 36.68 mL/m<sup>2</sup>, P &lt;.05) accompanied with no changes of end-diastolic volume index in HBO+ compared with increased values in HBO- (from 55.68 to 55.10 vs from 55.87 to 63.82 mL/m<sup>2</sup>, P &lt;.05). Ejection fraction significantly improved in the HBO+ group and decreased in the HBO- group of patients after 3 weeks of acute myocardial infarction (from 46.27% to 50.81% vs from 45.54% to 44.05 %, P &lt;.05).</p> | <p>Adjunctive hyperbaric oxygen therapy after thrombolysis in acute myocardial infarction has a favorable effect on left ventricular systolic function and the remodeling process.</p> |

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| <p>Kardiologiia. 2007;47(12):53-6.</p> <p>[Long-term results of the use of hyperbaric oxygenation in patients with acute myocardial infarction].</p> <p>[Article in Russian]</p> <p>Dotsenko EA, Salivonchik DP, Kozyro VI.</p> | <p>Effect of hyperbaric oxygenation (HBO) on mortality and rate of development of reinfarctions during 24 month follow-up</p> | <p>129 patients</p> | <p>study in 129 otherwise conventionally treated patients with acute myocardial infarction (AMI).</p>   | <p>These patients were randomly divided into control (n=65) and intervention (n=64) groups</p> | <p>6 HBO sessions in a single-place chamber (isopression for 40 min at working pressure 0.03 MPa o.d.) starting from day 4 - 6 of the disease.</p> | <p>The use of HBO in combination with traditional course of drug treatment significantly reduced rate of reinfarctions (control group - 19%, intervention group - 5.3%, <math>p &lt; 0.05</math>) and increased survival (control group 86.2%, intervention group 94.7%) during 2 years after hospital discharge. Maximal effect on survival was seen during first 0.5 years (91.4 and 100% in control and intervention groups, respectively, <math>p=0.05</math>).</p> | <p>The use of HBO in combination with the traditional course of treatment will burn significantly the reinfarction rate</p>  |
| <p>Inhibition of restenosis by hyperbaric oxygen: a novel indication for an old modality. Cardiovascular Sharifi M, Fares W, Abdel-Karim I, Petrea D, Koch JM, Adler D, et al. Radiation Medicine 2002;3:124-6</p>              | <p>to investigate the effect of HOT on restenosis</p>   | <p>51 patients</p>  | <p>Of the initialenrolled, 24 were randomized to the HOT arm of the study and 27 to the control group. The patients underwent PCI for unstable angina or acute myocardial infarction (AMI). All patients in the HOT arm underwent two hyperbaric dives using the Sechrist 2500B Monoplace Hyperbaric System</p> |  | <p>3 dives: Each dive consisted of 100% oxygen at 2 bars for 90 min with a total chamber dwell time of 120 min</p>                                 | <p>Angiographic restenosis of the target lesion was found in all five patients of the control and zero of the HOT arm (<math>P=.026</math>). Similarly, recurrence of late chronic angina (after 8 months) developed in six patients of the control and zero of the group (<math>P=.014</math>).</p>  | <p>The results indicate that HOT is safe and feasible in PCI and is associated with a significant reduction in the restenosis rate and in the development of late anginal symptoms</p> |

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|  |  |  | (Sechrist Inds.,<br>Anaheim, CA):<br>one dive 2 h<br>before or<br>immediately after<br>PCI and the other<br>within 18 h after<br>the first dive |  |  |  |  |
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