Long-term cerebrovascular reactivity mediated by ozone autohemotherapy: a NIRS study

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INTRODUCTION

Recent studies demonstrated the ozone capability of boosting the overall metabolism and particularly of enhancing peripheral tissue oxygenation. Particular attention has been given to the possibility of utilizing ozone in neurology in order to enhance brain oxygenation. However, a uniformed and standardized evaluation protocol of ozone mediated vascular effects on cerebral tissue is still missing.

We used Near Infrared Spectroscopy (NIRS) to monitor the long-term effects of ozone autohemotherapy. Changes in oxygenated (O₂Hb) and reduced (HHb) haemoglobin were investigated by means of a time and time-frequency coupled analysis.

METHODS

8 patients (6 neurological and 2 controls) were continuously monitored by NIRS 300 (Hamamatsu Photonics, Japan) while undergoing ozone therapy (experimental set-up in fig. 1). 240 g of blood were drawn from the subjects’ antecubital vein and then 240 ml of O₂/O₃ mixture were added. This mixture was composed by O₂ at 50%, with an O₃ concentration equal to 50 μg/ml (M95, Multioxygen, Gorle (BG), Italy). The ozonized blood was then slowly reinjected and NIRS monitoring lasted for about 2 hours since the end of reinjection.

RESULTS AND DISCUSSION

An overt oxygen concentration increase in the brain tissue has been observed for all the subjects about 1 hour after reinjection of ozonized blood. Being the increase far from the reinjection, it is not caused by a volumetric effect (fig.3). A marked vascular reactivity that follows the ozone injection is documented by the increased power in the LF band, which is observable in the spectra of both O₂Hb and HHb. Results revealed that ozone triggers a vascular response that increases the metabolic exchange between blood and brain tissue. Even though this study is still preliminary, we believe that this assessment protocol could find its utility in clinical studies on large populations of neurological patients.