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CARDIAC CHEMOREFLEX SENSITIVITY IN CRITICAL ILL PATIENTS

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Introduction: The autonomic nerve system enables the organism to adapt to stress and warrant organ perfusion and oxygenation. The sympathetic vagal balance is maintained beyond several peripheral and central mechanisms, e.g., baro- and chemoreflex sensitivity or heart rate variability (HRV). It has been shown in a previous study, that a reduced peripheral chemoreflex sensitivity is a predictor for sudden cardiac death in patients with congestive heart failure, but only few data exist to the meaning of autonomic dysfunction on the pathophysiology and outcome in critical ill patients. **Methods:** Routine clinical monitoring included the use of 3 french artery-catheter (a. radialis) for invasive blood pressure monitoring. Arterial and venous blood samples were analyzed by measuring the partial pressure of oxygen (PaO_2), partial pressure of carbon dioxide (partial CO_2) and PH using standard blood gas electrodes. For the determination of chemoreflex sensitivity, the ratio of the RR-interval shift in the surface ECG and the change of arterial and venous oxygen partial pressure during a 5 min inhalation of oxygen (6 l/min) were measured. **Results**: 19 critical ill patients aged from 29 to 71 years (median 52.6 yr) were referred to the intensive care unit because of sepsis (n=10, 52.6%), cardiogenic shock (n=6 31,6%) or other life threatening diseases (pneumonia, hemolytic uremia syndrome, postoperative). 31 measurements of chemoreflex sensitivity were done in 19 patients. There was a significant negative correlation (r= -052; p= 0.003) between chemoreflex sensitivity and severity of illness described by the SOFA-Score. In 21 of 31 measurements (67,7%) chemoreflex sensitivity was decreased. **Discussion:** Oxygen breathing causes a decrease in heart rate and a comparable rate dependant decrease in cardiac output in healthy volunteers. Further, during oxygen breathing systemic resistance and blood pressure increase. Our data suggests, that this physiological answer to changes in oxygenation is diminished in critical ill patients, who show reduced chemoreflex sensitivity in about 60% of all measurements. This loss of variability might be a consequence of the underlying disease process. On the other hand changes in coupling might be a cause of advancing disease. **Conclusion:** Reduced chemoreflex sensitivity has been

suggested to indicate a poor prognosis. This is in line with the finding of our present study in which we found a significant correlation of the chemoreflex sensitivity and the severity of sepsis.