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Title: Patients with tissue hypoxia with unknown origin

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Body: [Backgrounds] Dyspnoea is common complication in respiratory disease and is mainly caused by hypoxemia due to lung diseases, cardiac diseases or neurologic diseases. Patients with dyspnoea without hypoxemia, hypercapnia and clear abnormal findings considered to have psychological problems. We have found a group of some patients who complain dyspnoea without hypoxemia (normal SpO₂ and PaO₂) have high venous oxygen level (P_vO₂). The aim of this study was to investigate the clinical characteristics of patients who have high P_vO₂ and normal SpO₂. [Method] Eight patients have dyspnoea with high P_vO₂ with normal SpO₂ were enrolled in this study. Patients with any other lung diseases or systemic diseases, abnormal chest X-ray finding or elevation of inflammatory markers were also excluded. Arterial and venous blood gas analysis was performed after 10 minutes bed rest. Tissue oxygen levels (PtO₂) was calculated using following equation; PtO₂=PaO₂-PvO₂. Serum lactate and pyruvate level were measured by enzyme assay. [Results] PvO₂ in patients enrolled (67.3±12.4 mmHg) was higher than normal range (26-40 mmHg) and PtO₂ in patients enrolled was lower (22.0±17.3 mmHg, normal range: 40-70 mmHg) than normal range. Serum lactate(21.6±7.9 mg/dl) and pyruvate(2.1±0.9 mg/dl) were also elevated compared to normal range. [Discussion and Conclusion] The group of patients seem to have dyspnoea due to tissue hypoxia. The tissue hypoxia probably raises pyruvate and lactate levels due to activation of anabolic glycolysis. PvO₂ measurement and assessment of tissue hypoxia is need for the patients with dyspnoea without hypoxemia. It would be also necessary to explore the cause of tissue hypoxia in the patients.