

POSTER PRESENTATION

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# 0633. Time-resolved spectroscopy using non-invasive monitoring may detect hepatic ischemia

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## Introduction

The aim of the present study was to investigate whether the changes in hepatic oxygenation can be detected by time-resolved spectroscopy (TRS) placed on the skin surface above the liver.

## Methods

With approval of the local Hospital Ethics Committee and informed consent, 6 healthy volunteers aged 28.8 years (25-36 years), and 5 patients with chronic renal failure aged 70.6 years (58-81 years) were studied. In 6 healthy volunteers, following the echography, TRS (TRS-10, Hamamatsu Photonics K.K., Hamamatsu, Japan) probe consisting of a near-infrared light (at 760 nm, 800 nm, 835 nm) emitter and a receiver optode, was placed 4 cm apart on the abdominal skin surface above the liver or apart from the liver at least 10 cm. In 5 patients with chronic renal failure, following the echography, TRS probes were placed 4 cm apart on the skin surface above the liver during hemodialysis (HD).

## Results

In 6 healthy volunteers, the values of abdominal total hemoglobin concentration (tHb) was significantly higher in the liver area than in the other area ( $80.6 \pm 26.81 \text{ mM}$  vs  $44.6 \pm 23.1 \text{ mM}$ ,  $P=0.0017$ ), while the value of abdominal  $\text{SO}_2$  in the liver area was nearly the same as that in the other area ( $71.5 \pm 3.6\%$  vs  $73.6 \pm 4.6\%$ ,  $P=0.19$ ). The values of mean optical path length and scattering coefficient ( $\mu's$ ) at 800 nm in the liver area were significantly different from those in the other area ( $21.3 \pm 4.9 \text{ cm}$  vs  $29.2 \pm 5 \text{ cm}$ ,  $p=0.0004$ , and  $7.97 \pm 1.14 \text{ cm}^{-1}$  vs  $9.02 \pm 0.51 \text{ cm}^{-1}$ ,  $P=0.015$ ). One of 5 patients with chronic renal failure complained of the severe abdominal pain during HD, and the abdominal  $\text{SO}_2$  was decreasing from 53% to 22%, but the pain relief

occurred following cessation of HD, and  $\text{SO}_2$  recovered to the baseline.

## Conclusions

Our data suggest that the optical properties of the liver may be measured by the TRS placed on the skin surface, and the hepatic oxygenation may act as a non-invasive monitoring for early detection of intestinal ischemia.

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