Titel: **Continuous Monitoring of Total Body Oxygen Consumption during Liver Transplantation in Adult Patients**

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Introduction: In the basal state about 20% of the total oxygen requirements of the body are consumed by the liver. This leads to significant decrease in total body oxygen consumption (VO_2) during the anhepatic phase of the orthotopic liver transplantation (OLT) procedure as calculated using the Fick equation. After revasularisation of the transplanted liver a sudden increase in VO_2 can be seen following directely to reperfusion (Fick equation). This increase was only missing in patients with primary graft failure (PGF). Aim of the presented study was to assess the performance of a continuous noninvasive device of monitoring total body oxygen consumption related to the initial organ function of the transplanted liver.

Patients and Methods: We evaluated a number of 14 patients within the last year who underwent OLT with an FIO_2 of 0.5±0.05 constantely throughout the whole procedure. From the very beginning on a Deltatrac® Metabolic Monitor (Datex Instrumentarium Corp., Helsinki, Finland) was connected to the ventilator in the OR (Siemens Servo®-Ventilator 900 C). This is an open system indirect calorimetry device designed for measurement of VO_2 and VCO_2 (CO_2-production). Energy expenditure is calculated from the measured rates of VO_2 and VCO_2. During respiratory measurments the RQ is calculated with the Haldane transformation from the gas fraction. The device restrict from use of Nitrous-Oxide and any volatile anesthetic.

Results: Two out of the 14 patients suffered from PGF. The first one showed really no increase in VO_2 after reperfusion, the second one only a slow increase with a maximum of less than 25% of the value at the time of reperfusion. The PGF by this means postulated in the OR was verified on the ICU. Re-OLT on the fourth and third day respectively succeeded well, an adequate increase in VO_2 was measured after reperfusion. Both patients could be discharged in good condition.

The other 12 patients showed an increase in VO_2 as presented in Tab.1:

5min before reperfusion	126±28
time of reperfusion	120±32
5min after reperfusion	165±58
10min after reperfusion	161±39
15min after reperfusion	160±37
30min after reperfusion	180±48
45min after reperfusion	169±46
60min after reperfusion	186±44
75min after reperfusion	188±44
90min after reperfusion	194±45

Table 1: VO_2 (ml/min), mean±sd, n=12

Discussion: In all those cases where the increase of VO_2 was greater than 40% within 1 hour after reperfusion no problems occured with the liver function. A poor or missing increase of VO_2 after reperfusion on the other hand confirmed in 100% the diagnosis of PGF. This might be of great advantage for the patient, because the indication for Re-OTL can be given very early.

Conclusion: The continuous online monitoring of VO_2 during OTL is of great predictive value concerning the primary organ function.

TITLE: COMPARISON OF DIRECT ARTERIAL AND FINAPRESS BLOOD PRESSURE

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Measuring the arterial blood pressure noninvasively and continuously with the FINAPRESS is an attractive new possibility. We evaluated the reliability of this device during one (OLV) and two (TLV) lung ventilation and in patients with severe vascular disease.

METHODS. Seven patients (age range: 53 - 69) undergoing a carotid endarterectomy (N=6) or an AAA resection (N=1) and 10 patients (age range: 52-73) undergoing a pulmonary resection (lobectomy N=8, pneumectomy N=2) were studied. The cuff of the FINAPRESS 2300 (Ohmeda, Boulder, Col) was placed on the middle finger or the thumb, ipsilateraly to the radial arterial line connected to a Siemens Sirecust 400 monitoring system. The FINAPRESS and the arterial line waveforms were recorded using a strip chart recorder. The SBP and DBP recorded every 20 seconds were measured on the paper trace. Precision and bias (1) were calculated for SBP and DBP for each patient, with the invasive blood pressure being considered as the 'golden standard', using the following formulas:

Prediction error (PE) = finapress - invasive pressure

Precision = sum of squared PE / number of points

Bias (systematic error component) = mean PE

RESULTS

	SYSTOLIC BLOOD PRESSURE		DIASTOLIC BLOOD PRESSURE	
	Vascular patients			
	Precision	Bias	Precision	Bias
Mean±SD	27.01±13.4**	-8.45±25.77	14.91±11.07	5.26±15.49
Range	11.67/46.07	-44.47/+41.29	5.68/37.19	-10.64/+37.19
	Two lung ventiation			
	Precision	Bias	Precision	Bias
Mean±SD	12.29±5.14	-3.4±9.45*	8.52±3.78	1.87±7.23
Range	5.36/18.78	-16.93/+15.38	3.16/14.93	-10.48/+8.89
	One lung ventiation			
	Precision	Bias	Precision	Bias
Mean±SD	13.57±6.3	1.2±10.22	9.47±3.7	2.17±7.22
Range	5.36/22.79	-13.24/+13.17	4.19/15.27	-10.34/10.52

* = p<0.05 TLV vs OLV ** = p<0.05 Vascular vs TLV

DISCUSSION. The FINAPRESS underestimated SBP and overestimated DBP in the vascular patients. The precision of the measurements was very poor. In the other patients precision was much better and the biases very small. However the FINAPRESS underestimated SBP during TLV and overestimated SBP during OLV. In all groups there were enormous individual variations.

1.J Pharmacokin Biopharmaceut 9:503-512,1981