465012 - EFFECTS OF SPINAL ANESTHESIA ON RESTING METABOLIC RATE

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Introduction: Previous work by our group has shown that mechanomyography (MMG) can detect neurally-stimulated mechanical activity in resting muscle. As part of a series of experiments to quantify this newly described phenomenon, we are interested in the contribution to total resting metabolic rate (RMR) from resting-muscle mechanical activity. Most human skeletal muscle is found below the waist. We hypothesised that spinal anesthetic, by effectively denervating the muscles below the waist, will result in a lower RMR compared to the pre-spinal resting state.

Methods: With University of Saskatchewan Research Ethics Board approval, 8 consenting adults age 19 to 69 who were planning to have surgery under spinal anesthesia were enrolled. In a quiet room, an hour before surgery, RMR was measured with indirect calorimetry while MMG was obtained from over the right or left mid-sartorius. The process was repeated, after spinal anesthesia was administered, either in the operating room, or in the Post Anesthetic Care Unit (PACU). Intraoperative sedation was given only if requested, and was limited to a propofol infusion that was discontinued prior to transfer to the PACU. No recordings were made during sedation.

Results: See Table. One subject had an intra-operative propofol infusion. The decrease in oxygen consumption (VO_2) with spinal anesthesia was highly significant, as was the mean absolute amplitude of the MMG. The Respiratory Quotient (RQ: the ratio of CO_2 production to O_2 consumption) was <1 and did not change.

Discussion: Spinal anesthesia decreases VO_2 and resting-muscle MMG activity without affecting RQ. This means that the VO_2 decrease was not due to pre-operative anxiety-hyperventilation being ameliorated by completion of the spinal anesthetic. The decrease in VO_2 must then be attributed to either decreased visceral metabolism, for which we have no evidence, or to decreased resting muscle mechanical activity, which is shown by the decrease in resting-muscle MMG. We conclude that resting-muscle mechanical activity probably contributes significantly to RMR. Further studies are planned.

References: Can J Physiol Pharmacol 1998; 76:401-6. Can J Appl Physiol 2004; 29:743-57. Eur J Appl Physiol 2006; 98:566-74. Eur J Appl Physiol 2007; 102(1):107-17.

<u>DEMOGRAPHICS</u>				
Age*	54 ± 9.3			
Sex	female = 4	male = 4		
Height*	169 ± 10			
Weight*	87 ± 17			
<u>RESULTS</u>				
	Pre-spinal*	Post-spinal*	Difference**	P-value
VO₂ (ml.min⁻¹)	232 ± 44	176 ± 55	56[29 to 83]	0.001
RQ	0.86 ± 0.19	0.77 ± 0.15	0.09[-0.07 to 0.25]	0.236
MMG (mm.s⁻²)	10.1 ± 2.5	6.5 ± 2.5	3.6[1.6 to 5.7]	0.005

*mean ± standard deviation **mean[95% confidence intervals]