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EFFECTS OF ANAESTHESIA INDUCTION ON MICROVASCULAR REACTIVITY

MONITORED BY NEAR-INFRARED SPECTROSCOPY: IS THERE A DIFFERENCE

BETWEEN SMOKERS AND NON-SMOKERS?

Background:

Recent research has indicated that induction of anaesthesia impairs microvascular reactivity. Also smoking is known to affect microcirculation. The impairment of microvascular reactivity during induction of anaesthesia can lead to cellular hypoxia and organ dysfunction even when macrocirculatory parameters show adequate oxygen delivery.

Aim:

The aim of the present study is to evaluate if the effect of anaesthesia on microvascular reactivity is more pronounced in smokers than in non-smokers.

Material and Methods:

- Adult patients scheduled for elective CABG.
- Twelve currently smoking patients and 12 case-control matched non-smoking patients.
- Matched variables were gender, age, weight, haemoglobin and PaO₂.
- Assessment of the microvascular reactivity by the postocclusive reactive hyperaemia (PORH) response before and 30 minutes after anaesthesia induction.
- Measurement of PORH response with near-infrared spectroscopy (NIRO-200NX).
- Oxygen consumption (VO₂), recovery times (time from release of cuff to the initial (tR) and to the maximum value (tM)) and rate of recovery (recS_iO₂) were determined.
- Comparison of data using the Wilcoxon and Mann Whitney U test for within and between group differences, respectively.

PORH values of oxygenated haemoglobin before and after induction in smokers and non-smokers.				
		Before induction	After induction	P-value within group
VO ₂ nad (%/min)	Non-smokers	201.5 (55.6, 1055.6)	48.2 (15.2, 750.0)	0.008
	Smokers	373 (45.1, 594.0)	94.1 (41.3, 390.5)	0.028
P-value between groups		0.6	0.02	

tR (sec)	Non-smokers	9.0 (4.0, 13.0)	11.0 (8.0, 23.0)	0.021
	Smokers	11.0 (7.0, 30.0)	19.0 (15.0, 96.0)	0.047
P-value between groups		0.04	0.01	

tM (sec)	Non-smokers	20.0 (15.0, 66.0)	32.0 (24.0, 57.0)	0.026
	Smokers	27.0 (18.0, 44.0)	44.0 (17.0, 97.0)	0.04
P-value between groups		0.41	0.05	

recS _i O ₂ (%/min)	Non-smokers	459.0 (91.0, 1369.0)	452.0 (158.0, 840.0)	0.86
	Smokers	384.5 (206.3, 1649.0)	322.0 (134.9, 433.5)	0.041
P-value between groups		0.82	0.12	

Results and discussion:

- Data are presented in the table as median (min,max).
- Before induction of anaesthesia, only tR was significantly different between smokers and non-smokers.
- After induction of anaesthesia VO₂ was significantly lower and recovery times were significantly longer in both groups. In addition, VO₂ was significantly higher and recovery times were significantly longer for smokers compared to non-smokers.
- Since alterations in microvascular perfusion are known to be associated with impaired tissue oxygenation and organ dysfunction, this finding may have important implications for the anaesthesia management in smoking patients.

Conclusion:

Given the higher VO₂, the longer recovery times and the shortening of the recovery slope in the smoking group after induction of anaesthesia, we demonstrated that the effect of anaesthesia on microvascular reactivity is more pronounced in smokers than in non-smokers.

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