EFFECTS OF DIGITAL BLOCK ON PULSE OXIMETRY IN SHOCK SIMULATION

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INTRODUCTION: Pulse oximetry is impaired by hypotension and peripheral vasoconstriction (1). Digital block may cause increase in tissue perfusion and hence improving the parameters of pulse oximetry (2). The purpose of this study was to investigate the effect of digital block on SpaO_2 , lag time and height of plethysmographic wave (PW) of pulse oximeter, in presence of shock simulation in upper extremity.

METHODS: After approval of the proposal by institutional ethics committee and obtaining the informed consent, 34 patients under general anesthesia and elective surgery were selected. In each patient, one hand randomly underwent simulated shock by cooling ($<35^\circ\text{C}$), elevation of hand (40cm) and inflation of arm cuff (30mmHg). As the kinetic energy in artery is dissipated in climbing a vertical hydrostatic gradient, the absolute pressure in artery decreasing by 0.75mmHg per centimeter vertical distance up to the heart. Depending on the level of elevation of trial hand (40cm) and inflation of arm cuff (30mmHg), the hydrostatic pressure in distal port of this hand decreases approximately 60 mmHg.

Lag time, height of PW (in millimeter) and SpaO_2 were measured in middle and small fingers of this hand and compared to that of middle finger of another hand. Shocked middle finger was blocked by lidocaine 2% and above parameters were measured in 15th and 20th minutes after digital block and compared to small shocked finger and middle finger of non-shocked hand. Statistical analysis was performed with ANOVA.

RESULTS: Mean height of PW in shocked and blocked, shocked non- blocked and control fingers are shown in table (Mean $\pm$ SD). There were no significant differences between three fingers in lag time and SpaO_2 .

Finger	Height of PW (mm)		
	Before block	15th min	20th min
Shocked & blocked	11.5 $\pm$ 4.2	16.2 $\pm$ 6 ^{?*}	21 $\pm$ 5.9 ^{?*}
Shocked & non-blocked	10.8 $\pm$ 4.3	11.4 $\pm$ 4.3	11.8 $\pm$ 4.3
Control	11.3 $\pm$ 4.4	10.7 $\pm$ 4.3	11.2 $\pm$ 3.9

? P<0.05 vs shocked and non- blocked finger

* P<0.05 vs control finger

DISCUSSION: This study showed that digital block may improve height of plethysmographic wave in shocked condition and better pulse oximetric signal detection.

REFERENCES:

- 1) *Indian J. Anaesth.* 46: 261-268
- 2) *Anesth Analg.* 73: 815-817