

[3845.517] NIRS Technology Detects an Increase in the [Arterial-Muscle] Oxygen Saturation Gradient Associated with a Decrease in Cardiac Output

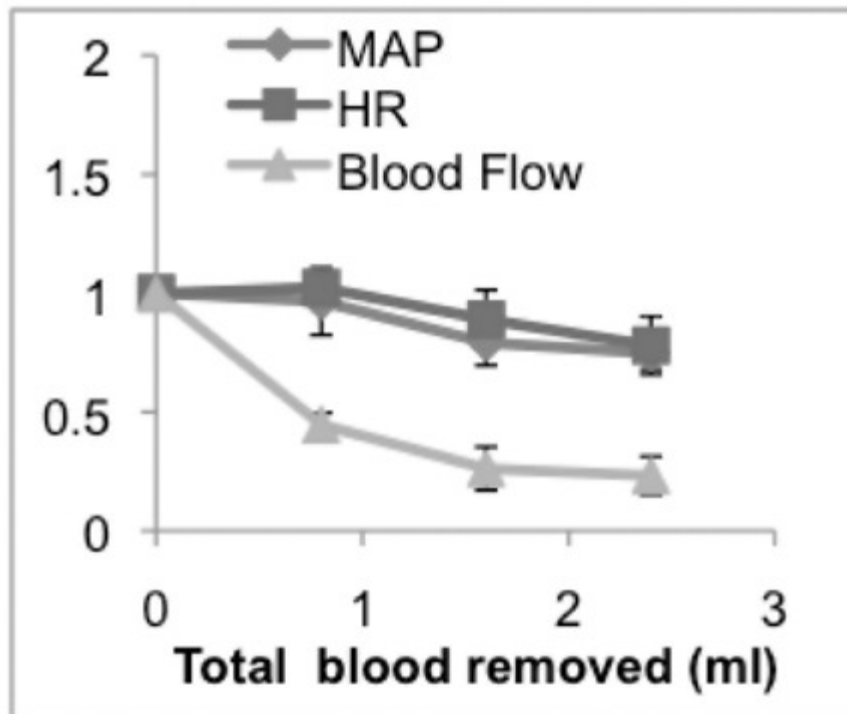
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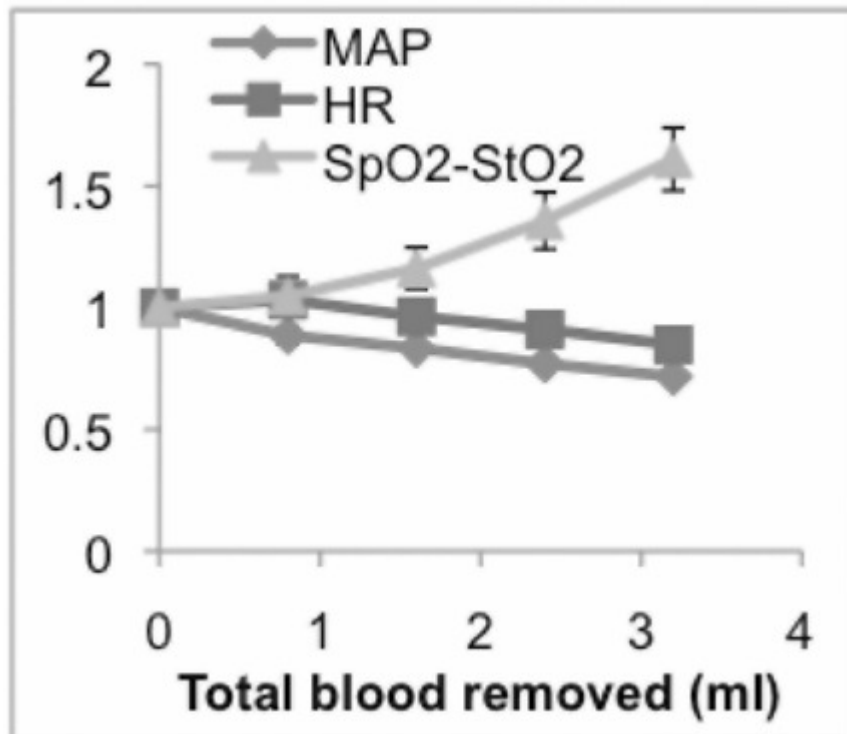
BACKGROUND: A non-invasive method for monitoring changes in cardiac output might improve care for neonates. Heart rate (HR) and mean arterial blood pressure (MAP) are maintained under decreased cardiac output conditions by decreasing peripheral organ blood flow (BF). Since the arterial-venous O₂ sat gradient is inversely proportional to BF, we hypothesize that a decrease in BF will cause an increase in [pulse oximetry arterial sat (SpO₂) - NIRS tissue O₂ sat (StO₂)] while HR and MAP are maintained.

OBJECTIVE: To determine the effect of hypovolemia (HV) on Inferior Vena Cava (IVC) BF, SpO₂, muscle StO₂, HR and MAP

DESIGN/METHODS: Two aortic and one IVC catheters were placed in rats. HR and MAP were monitored using the aortic catheter. IVC BF was measured by the dye dilution method. The effect of HV (removal of 0.8 ml of blood every 7 minutes) on BF, HR and MAP were monitored. In a second study, the effect of HV on SpO₂ (right paw), StO₂ (right thigh), HR and MAP were monitored.

RESULTS: Each parameter was normalized to baseline, mean(SEM) N=5.





BF decreased by 77% after blood removal, while HR and MAP decreased by 22% and 25%. The $[SpO_2-StO_2]$ increased to 61% after blood removal. HR and MAP decreased by 15% and 28%.

CONCLUSIONS: Increasing hypovolemic conditions caused a decrease in HR, MAP and IVC BF and an increase in the $[SpO_2-StO_2]$. The effect of hypovolemia on the $[SpO_2-StO_2]$ and IVC BF was 2-4 fold greater than changes in HR and MAP, suggesting that changes in $[SpO_2-StO_2]$ may detect changes in cardiac output earlier than changes in HR and MAP.

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Session: Poster Session: Critical Care (4:15 PM - 7:30 PM)

Date/Time: Monday, April 30, 2012 - 4:15 PM

Room: Exhibit Halls A/B - Hynes Convention Center

Board: 517

Course Code: 3845

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