Effects of short-term endotoxemia and dopamine on mucosal oxygenation in porcine jejunum.


Department of Anesthesia, University of Innsbruck, Austria.

Effects of Escherichia coli lipopolysaccharide (2 micrograms.kg-1.20 min-1; LPS), given systemically (S) or via superior mesenteric artery (M), and consecutive dopamine infusion (16 micrograms.kg-1.20 min-1) on jejunal mucosal tissue O2 tension (PO2muc) and serosal tissue O2 tension (PO2ser; Clark-type surface electrodes) and jejunal mucosal microvascular hemoglobin O2 saturation (HbO2muc; tissue reflectance spectrophotometry) were investigated in a hemodynamically stable pig model. Twenty-one pigs were anesthetized, paralyzed, and mechanically ventilated. After laparotomy, a mesenteric venous catheter was inserted and a jejunal antimesenteric enterotomy performed. LPS-infused animals developed similar degrees of pulmonary hypertension. No differences in cardiac output and mean arterial blood pressure between groups were found. PO2muc and HbO2muc were significantly lower in M animals compared with control (C) [210 min; PO2muc: 7.12 +/- 1.81 (M), 19.01 +/- 3.12 mmHg (C); HbO2muc: 28.78 +/- 3.36 (M), 49.09 +/- 3.84% (C)], whereas S animals ranged in between (PO2muc: 13.36 +/- 2.2 mmHg; HbO2muc: 40.68 +/- 4.43%). Of measured PO2muc values, 12.6 (C), 20.6 (S), and 46.3% (M) ranged from 0 to 5 mmHg. PO2ser was lower in LPS animals compared with control [59.43 +/- 5.4 (C), 45.00 +/- 6.12 (S), 47.33 +/- 4.34 (M) mmHg]. Dopamine increased PO2muc and HbO2muc to similar absolute values and significantly decreased frequency of PO2muc (0-5 mmHg) in M animals. We conclude that LPS impairs mucosal tissue oxygenation independently of systemic hemodynamics. Mucosal microvascular dysfunction depends on regional LPS concentrations. Under conditions of compromised tissue oxygenation, dopamine significantly improves PO2muc and HbO2muc.

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