Effects of xenon on mesenteric blood flow.

Abstract:
BACKGROUND AND OBJECTIVE: The effects of xenon on mesenteric vascular resistance have not been investigated. Because human beings anaesthetized with xenon show good cardiovascular stability, we believed that the agent would have little or no effect on vascular resistance in the splanchnic bed. We determined the effects of different inhaled xenon concentrations on mesenteric blood flow and mesenteric oxygen consumption in pigs sedated with intravenous propofol. METHODS: Twenty-three minipigs were instrumented with transit time flow probes around the pulmonary and superior mesenteric arteries as well as with pulmonary artery and portal venous catheters. A 14 h recovery was allowed followed by recordings of baseline values. Xenon was then randomly administered in 0.30, 0.50, and 0.70 end-tidal fractions. RESULTS: The administration of xenon resulted in an 8% (not dose dependent) decrease in mean arterial pressure (from 99 +/- 15 to 91 +/- 19 mmHg; P< 0.05), a 20% decrease in calculated systemic oxygen consumption (from 0.23 +/- 0.07 to 0.19 +/- 0.04L min(-1); P< 0.01), a 20% reduction in mesenteric oxygen delivery (from 41 +/- 12 to 33 +/- 11 mL min; P< 0.001), a 37% reduction in mesenteric metabolic rate of oxygen (from 11.3 +/- 3.6 to 7.1 +/- 3.2 mL min(-1); P< 0.01) and an 8% decrease in mesenteric artery blood flow (0.22 +/- 0.07 to 0.20 +/- 0.07 L min(-1); P< 0.05) in a dose-dependent fashion. Heart rate, cardiac output, systemic
vascular resistance, mesenteric vascular resistance, mesenteric oxygen extraction fraction and portal lactate concentration were not significantly altered by xenon. CONCLUSIONS: Xenon inhalation in the propofol-sedated pig had no measurable effects on mesenteric vascular resistance. This finding may partly explain the well-known cardiovascular stability observed in patients anaesthetized with xenon. Although mesenteric artery blood flow and mesenteric oxygen delivery decreased during xenon administration, unchanged mesenteric oxygen extraction fraction and portal lactate suggest that metabolic regulation of the splanchnic circulation remained unaltered.