

Effects of selective vagal stimulation on the gallbladder and sphincter of Oddi and peripheral vagal routes mediating bile evacuative responses induced by hypothalamic stimulation

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Abstract

Peripheral routes of the vagus nerves to the biliary system were studied in anesthetized dogs using various selective vagal stimulation. Efferent stimulation of the gastric, hepatic, or celiac vagal branch as well as the cervical or thoracic vagal trunk induced gallbladder and Oddi's sphincter contractions, but those induced by hepatic vagal stimulation were rather small. The contraction responses in the gallbladder and sphincter of Oddi induced by thoracic vagal stimulation were greatly reduced after an external ligation around the pyloric sphincter. After administration of sympathetic blockers and atropine, vagally-induced gallbladder contractions were completely abolished and slight relaxation was seen in some animals. On the other hand, relaxation or transient relaxation followed by enhanced contractions was elicited in the sphincter of Oddi by vagal stimulation after atropine and sympathetic blockers. The relaxation response in the gallbladder after atropine and sympathetic blockers was abolished and that in the sphincter of Oddi was greatly reduced after the ligation around the pyloric sphincter. Stimulation of a ventral part of the anterior hypothalamic area induced gallbladder contraction and simultaneous relaxation of the sphincter of Oddi. These responses were completely abolished by the ligation around the pyloric sphincter in six dogs, while a slight relaxation response in the sphincter of Oddi remained in two dogs. These results suggest that the vagal fibers

passing across the pyloric sphincter region are important for regulation of canine biliary motility and that extragastric vagal routes play a minor role in the nervous control of canine bile evacuation.