SHORT COMMUNICATION

EFFECT OF BILE SALTS AND BILIARY OBSTRUCTION ON PANCREATIC SECRETION

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Summary : In healthy stray dogs pancreatic juice was collected through a chronically implanted cannula in the pancreatic duct and was analysed for pH, bicarbonates and amylase activity under different conditions. Both intra-peritonial administration of bile salts and biliary obstruction produced an increase in the volume and the bicarbonate content. Amylase activity increased after billiary obstruction.

Key Words : pancreatic secretion bile duct obstruction bile salts administration

INTRODUCTION

An increase in pancreatic secretion of dogs after intra-peritoneal administration of bile salts has been reported by Ivy et al (1). Kuroyanagi et al (3) reported the stimulating effect of bile salts on secretin stimulated pancreatic secretion. This action was greatly diminished when both substances were mixed and administered simultaneously. They also reported about the difference between the effects of different brands of sodium de-hydrocholate on the stimulated secretion of the dog's pancreas.

In this study the effects of intra-peritoneal administration of bile salts and of biliary obstruction on pancreatic secretion in dogs are being reported.

METERIALS AND METHODS

In healthy stray dogs of both sexes anaesthetized with chloralose (80 mg/kg) pancreatic fistula was made by implanting a stainless steel cannula (1-1.5 mm bore) in the prominent pancreatic duct opening. The cannula was fixed with silk sutures, and exteriorized so as to collect the pancreatic juice. The pancreatic juice was collected for one hour in a polythene bottle attached to the cannula underneath a special framework. The biliary obstruction was produced by ligating the common bile duct near the hepatic hilum with catgut suture. Bile salt was administered intra-peritoneally. Lean sheep heart, sodium chloride and water at libitum was given to each dog 1/2 hr before the experiments. In each case control readings were taken for one week. In the second week, bile salt was administered or biliary obstruction was produced, and observations were continued over the next two weeks. All estimations were carried out by the techniques described by King et al (2).

Table I : Effect of bile salts on pancreatic secretion

	pH		*Volume (ml)*		*Bicarbonate (meq/litre)*		*Amylase activity (unit/ml)*	
	mean	range	mean	range	mean	range	mean	range
Control	7.3	(7.4—8.0)	22.94	(19.6—29.2	131.37	(109.8—157.6)	407.45	(378.45—472.5)
After bile salts								
First week	7.42	(7.2—7.8)	28.9	(23.6—33.2)**	180.88	(168.6—198.6)**	417.90	(382.2—468.2)
Second week	7.37	(7.2—7.6)	26.71	(24.2—30.2)*	124.97	(98.4—148.6)	409	(368.9—477.5)
Third week	7.21	(7.0—7.4)	24.14	(22.0—24.2)	116.20	(94.2—139.2)	312.20	(302.4—370.2)

Data obtained from 3 dogs; * significant $P<0.05$, ** highly significant $p<0.01$

TABLE II: Effect of ligating the common bile duct on pancreatic secretion

	pH		*Volume (ml)*		*Bicarbonates (meq/litre)*		*Amylase activity (units/ml)*	
	mean	range	mean	range	mean	range	mean	range
Control	7.42	(7.0—7.8)	26.37	(23.4—31.6)	124.14	(106.4—143.4)	294.97	(272.6—318.5)
After bile duct ligation								
First week	7.37	(7.2—7.6)	32.46	(23.0—37.4)	153.21	(109.2—192.6)*	339.10	(306.4—357.2)
Second week	7.24	(7.1—7.5)	34.74	(27.0—43.2) **	147.74	(138.5—163.2)**	399.78	(378.4—427.5) **
Third week	7.26	(7.0—7.4)	31.01	(22.0—34.0)	151.61	(138.6—157.8)	439.65	(373.5—488.7)

RESULTS

Perusal of Table I, shows a significant increase in the volume and bicarbonate contents after intra-peritoneal bile salt injection. No appreciable change was observed in pH value and amylase activity. As a result of biliary obstruction, an increase in pancreatic secretory volume, bicarbonate content and amylase activity was found beginning 4 to 8 hrs after obstruction. No change in pH was observed (Table II).

DISCUSSION

Intra-peritoneal administration of bile salt showed a significant increase in the pancreatic secretory volume, bicarbonate content and amylase activity, whereas it did not affect pH value (Table I). Biliary obstruction is known to produce a rise in blood concentration of bile salts. Intra-peritoneal injection of bile salts would also produce a similar rise. Both the procedures in the present study have resulted in an increase in volume and alkali of the pancreatic secretion. Bile salts seem to be responsible for such an action (3, 4). Increase in amylase activity in pancreatic juice as a result of biliary obstruction is an action of some other product of bile that is absorbed as a result of biliary obstruction.

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