6218

Relationship of Pancreatic Digestion to the Emptying of the Gallbladder.

DANIEL N. SILVERMAN. (Introduced by E. C. Faust.)

From the Department of Medicine, School of Medicine, Tulane University.

This communication reports experiments made as a continuation of previous efforts to determine the mechanism of the stimulation of the gallbladder by ingested egg yolk. Boyden[1] first showed that a mixture of egg yolk and cream caused a rapid expulsion of bile from the animal gallbladder, later that in the human subject the administration of egg yolk and cream, but not lean meat or carbohydrate, caused a rapid expulsion of bile.[2] Boyden[3] believed that the gallbladder musculature does not respond to food in the gastrointestinal tract unless digestion and absorption have occurred. The late Professor Denis and the writer showed, by analyzing blood taken at intervals after administration of fats, that emptying of the visualized gallbladder did not depend on the factor of absorption. We then found[4, 5] that the already digested egg yolk (fatty acids and glycerol) did not affect the gallbladders which were emptied by plain egg yolk. This suggested some relationship between gallbladder emptying and the intestinal digestion of fat. With the advice and assistance of Professor A. C. Ivy of Northwestern University, experiments were undertaken to determine the relationship of pancreatic digestion to the evacuation of the gallbladder.

Exp. 1. A male dog was laparotomized, the 2 pancreatic ducts were ligated near their entrance into the duodenum, the contents of the gallbladder were aspirated completely and through the same needle sufficient quantity of brominized oil was injected to distend the gallbladder. The abdomen was closed. The animal was kept in the fasting state and 12 hours later, a radiograph was made. As a control another plate was taken 2 hours later. Then, 4 yolks of raw eggs were ingested by the animal. The emptying of the gallbladder is shown (Fig. 1).

---

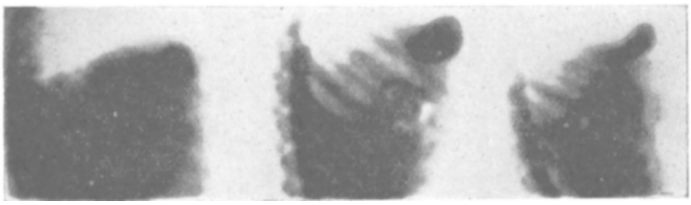
[1] Boyden, E. A., Abstracted in *Anat. Rec.*, 1923, **24**, 388.

[2] Boyden, E. A., *Anat. Rec.*, 1925, **30**, 333.

[3] Boyden, E. A., *Anat. Rec.*, 1926, **33**, 201.

[4] Silverman, Daniel N., Denis, W., On the Relationship of Gallbladder Emptying to Ingested Fats, Radiology.

[5] Silverman, Daniel N., Denis, W., and Weinberger, Herbert L., *Am. J. Med. Sci.*, 1929, **177**, 3.

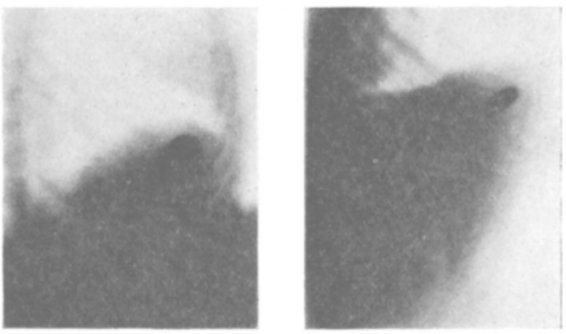


Fasting Controls After Fat

FIG. 1.

Demonstrating Emptying of Gallbladder Following Ingestion of Egg Yolk. (Pancreatic Ducts Ligated.)

Exp. 2. Two weeks later the same dog used in Exp. 1 was given tetraiodophenolphthalein by mouth. After a 16-hour fast with the gallbladder visualized on the radiograph, 4 yolks of raw eggs were administered. A definite emptying of the gallbladder was noted (Fig. 2).



Fasting After Fat

FIG. 2.

Demonstrating Emptying of Gallbladder Following Ingestion of Egg Yolk. (Pancreatic Ducts Ligated.)

Three days following the second experiment the dog was laparotomized by Dr. Bliss and myself and inspection of the pancreatic ducts showed them both to be stenosed.

Summary. The experiments indicate that pancreatic digestion is not essential to the mechanism of gallbladder evacuation following the ingestion of fat.

Appreciation is extended to Drs. Leon Menville and G. N. Ané for the valuable assistance rendered by them in the radiographic work.