

tion of this parasite in blood from normal and kala-azar hamsters.

A minute piece of spleen from a hamster heavily infected with kala-azar was ground up in a mortar with 1.2 cc. of heart blood from the same animal. From this 4 hanging drop preparations were made with aseptic technique and sealed airtight with sterile vaseline. Two of these preparations were kept at a temperature between 20° C. and 22° C. These showed a large number of *Leishmania* flagellates when examined on the 6th day. The remaining 2 preparations kept at 37° C. showed no flagellates on repeated examination at different intervals up to the end of 3 weeks. Similar experiments repeated with normal hamster's blood yielded the same results, namely, the development of flagellates in such hanging drop preparations when kept at room temperature (20° C.-22° C.) but none in the preparations kept at 37° C.

The range of temperature in which flagellation may occur may be quite large, for Christophers, Shortt, and Barraud¹ obtained positive cultures of *Leishmania donovani* in temperatures between 16° C. and 34° C. The fact that *Leishmania donovani* from the spleen of a kala-azar hamster develop into flagellates in the blood from the same animal at room temperature points to the possibility that the parasite may even flagellate in the mammalian host under favorable conditions.

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Relationship of Peptic Ulceration to Gastric Chemism.

ALTON OCHSNER, MIMS GAGE, AND KIYOSHI HOSOI.

From the Department of Surgery, Tulane University School of Medicine, New Orleans, La.

The relationship of gastric acidity to peptic ulceration has been debated for years. The present investigation was undertaken in an attempt to evaluate the etiologic importance of gastric acidity. A total of 125 dogs was used, but of this number 68 died at various intervals after the operation, leaving 57 animals on which our results are based. Each animal was kept in separate clean quarters with a constant supply of fresh drip water. They were allowed to play on the roof on sunshiny days. All the lesions described were sub-

¹ Christophers, S. R., Shortt, H. E., and Barraud, P. J., *Ind. Med. Res. Memoirs*, 1924-1927, 1-5, 55.

mitted to microscopic study. Gastric analysis was done about 6 times before operation and then once a week postoperatively after a standard test meal of cracker dust. The following series of dogs were used as controls or received thrice daily every other day either 1% HCl feeding or 1/25 to 8/10 mg. histamine injections subcutaneously: I. No operative procedures were done to get the gastric reaction to the HCl feeding or histamine injections. II. Extirpation of (a) greater curvature; (b) lesser curvature. III. Formation of a gastric pouch from (a) greater curvature of Heidenhain type, or (b) lesser curvature (Pavlov type) plus anastomosis of the proximal jejunum to the pouch. IV. Same as series III plus anastomosis of fundus of gall bladder to the pouch.

Repeated HCl feeding produced multiple acute lesions—petechiae, erosions and shallow ulcers of the stomach and duodenum, which were observed as early as 5 days after starting the feedings. In the longer experiments (2 months), there was associated a mild to marked gastritis and duodenitis with increased mucus production. In general there was a tendency toward temporary achlorhydria with a return to normal values of free HCl after a month or so of experimentation. Histamine injections also gave similar results. Histamine was found to produce multiple acute ulcers but did not stop them from healing. In one animal, which had received injections over a period of 134 days, there were 22 ulcers of various sizes and depths, some showing microscopic evidence of healing. Ulcers were most frequently or most abundantly found along the lesser curvature. The acidity values obtained were usually within the range of variations normal for dogs, although sometimes the acidity values after histamine stimulation were frequently double that of the pre-operative values without histamine stimulation. The incidence of acute ulcers in series I was 27%.

Extirpation of the greater or lesser curvature of the stomach in dogs did not significantly change the acidity values of the gastric contents of the main stomach when compared with the pre-operative values. HCl or histamine injections produced findings similar to those in series I. The incidence of acute ulcer in series II was also 27%.

In series III, subacute or chronic jejunal ulcers were obtained in 100% of the greater curvature pouch experiments and in 71% of the lesser curvature pouch dogs, or an average of 85%. As regards the location of these anastomotic ulcers, 71% of these were in the efferent loop, 14% opposite the gastro-jejuno-stomy stoma, and 14% marginal. The proximal or afferent loop was always normal in appearance, whereas the distal or efferent loop showed the effects

of the irritating acid gastric pouch secretion passing through it. It was edematous, congested, with numerous variously sized petechiae and hemorrhages and even erosions. Histamine injections produced 100% of anastomotic ulcers in this series of either the greater or lesser curvature experiments. Sixty-six per cent of the animals in this series died from perforation peritonitis.

In series IV, bile appeared to be a good neutralizing agent, since it reduced the incidence of post-operative anastomotic ulcers from 100% to 43% in the greater curvature pouch dogs and from 71% to 50% in the lesser curvature pouch animals, giving an average of 39% ulcer incidence for this series. Eighty per cent of these ulcers perforated. As regards the lesions of the stomach or duodenum itself, deviation of the bile toward the pouch in 13 dogs produced hemorrhages and erosions in the main stomach in only one animal and a chronic duodenal ulcer in another, both without histamine, and a small pyloric mucosal hemorrhage in one with histamine stimulation. The experiments of series III and IV indicate that while acidity of the gastric secretion may not be the sole predisposing factor, it is nevertheless a major exciting factor whenever condition favorable for ulceration prevails, such as allowing acid secretions of the gastric pouch to flow into the jejunum which is not accustomed to such acid environment.

TABLE I.
Incidence of Ulcers in Our Experiments.

Group I. Control group, no operative procedures.		1% HCl 8 dogs	Histamine 7 dogs	Controls
	Ulcers	1	3	—
	Erosions	4	1	
Group II. Extirpation of greater or lesser curvatures.		3 dogs	4 dogs	4 dogs
Greater curvature	Ulcers	0	2	2
	Erosions	2	1	0
Lesser curvature	Ulcers	—	1 dog	3 dogs
	Erosions	—	0	0
Group III. Gastric pouch plus jejunal anastomosis.			3 dogs	3 dogs
Greater curvature	Ulcers		3	3
			3 dogs	4 dogs
Lesser curvature	''		3	2
Group IV. Gastric pouch plus jejunal anastomosis plus gall bladder.			4 dogs	3 dogs
Greater curvature	Ulcers		2	0
			3 dogs	3 dogs
Lesser curvature	''		0	3