TABLE I

RESULTS			
	No. of Patients	Gastric Transit Time	Small Intestine Transit Time
Control	10	36 min. to over 8 hr. (mean 3 hr. 12 min.)	1½ hr. to over 16 hr. (mean 4 hr. 38 min.)
Crohn's disease	6	40 min. to 13 hr. (mean 3 hr. 43 min.)	2½ hr. to over 16 hr. (mean 6 hr. 37 min.)
Ulcerative colitis	8	2 hr. to over 10 hr. (mean 6 hr. 13 min.)	3½ hr. to over 24 hr. (mean 10 hr. 35 min.)

TABLE II

GASTRIC TRANSIT TIMES

Percentage of Patients with Gastric Transit Times of Four Hours

Control	Crohn's Disease	Ulcerative Colitis
20	16.5	75

COMMENT

As can be seen from Table II, emptying of the stomach in ulcerative colitis may be delayed. Although some patients were investigated in the active phase of their illness by no means all were toxic and in the main they were longstanding cases. In addition small intestine transit time is slow, but since in only five of eight of this group was it possible to complete the investigation due to the prolonged delay in the stomach of three, further studies of small intestinal transit are needed for confirmation. Should this distinction between the two disorders be substantiated by further study, the alimentary transit time might provide a clinical means of differentiating between Crohn's disease and ulcerative colitis.

SUMMARY

A simple, safe, inexpensive method of determining intestinal transit time (both as a whole and in components) is described. Some preliminary results of an unexpected nature are reported.

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An improved technique of perfusion of the stomach for the study of gastric secretion in the rat

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One of the methods widely used at the present time for the study of gastric secretion in the rat is that described by Ghosh and Schild (1958) or its modification by Lai (1964). It is based on the perfusion of the stomach of anaesthetized rats with saline and the measurement of the acidity of the perfusate. It is a useful method for continuous recording of the acid secreted by the stomach under various conditions during an acute experiment. It has the advantage of being technically easy, requiring relatively simple apparatus, and the interference with the physiological processes is minimal. However, it has the disadvantage that the gastric washings may be incomplete and consequently there are fluctuations in the acid content of the perfusate. The fluctuations are apparent in the basal acid tracing and during the response to various gastric stimuli. These changes may be considerable, with a coefficient of variation usually over 20%, and occur quite suddenly without obvious cause thus rendering the interpretation of the results difficult. This is especially important when assaying very small doses of gastric stimulants, where the changes in the acid output are of the order of 10 to 20%. Similar difficulties are encountered when studying inhibitory factors in gastric secretion where the changes are usually around 50%.

With our preparation we have tried to eliminate the two factors responsible for these fluctuations in the level of acidity, namely, the inadequate perfusion of the stomach by the inlet catheter and the irregular evacuation due to the large size of the gastric rumen.

TECHNIQUE

The anaesthetized rat, fed on dextrose and water ad libitum for 48 hours before the experiment, is placed on the operating table, and the stomach is exposed by a vertical mid-line incision. The duodenum is identified and its first part is brought gently into the wound. A small transverse incision is made in the duodenum a few millimetres distal to the pylorus and through it a small polythene catheter is passed into the stomach. The catheter is fixed by a silk ligature tied around the pylorus close to the wall so as to avoid injury to the small blood vessels. The rumen is then identified and through a small incision made in the dome, the tip of the malleable tube of a Mackintosh's cocaine spray is introduced into the stomach. This is tied in position by a silk ligature placed near the junction of the rumen with the body of the stomach so as to exclude as much of the rumen as possible (Fig. 1). Both the inlet and the outlet tubes are brought out through counter incisions in the left and right flanks of the

FIG. 1. An experiment in progress.

animal respectively, in order to avoid traction on the vascular and nervous pedicle of the stomach.

During this procedure it is possible and indeed advisable to avoid touching the glandular portion of the stomach. The anterior abdominal incision is closed with a continuous suture.

One end of the metallic T tube of the Mackintosh's spray is connected to a reservoir containing saline, kept at a temperature of 35°C. in a water bath; the other end is attached to an air pump. The pressure of the air pump is regulated so that a fine spray of saline is produced by the tip of the tube.

In order to obtain a satisfactory spray by this apparatus 3 ml. of the liquid should be delivered per minute. The stomach is washed by allowing the perfusing fluid to flow freely through it for 10 to 20 minutes before starting the collection in graduated test tubes. Ten-minute samples, 30 ml. each, are titrated against N/1000 NaOH using phenolphthalein as an indicator in a Conway biuret. These modifications in the technique have succeeded in reducing the fluctuations in acidity so that the coefficient of variation of the different samples is almost always under 20% (Fig. 2).

FIG. 2. Coefficients of variation obtained by the original and the modified techniques.

This undoubtedly provides a more stable preparation for the study of acid secretion in the rat, and may improve the accuracy of bioassay procedures.

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