

it likely that large numbers of patients would have to be studied. It seemed purposeful to confirm the existence of a lowered serum vit. B₁₂ concentration in the pregnant state before more elaborate studies were undertaken.

It is well known that fluid retention and an expansion of plasma volume may occur in the later stages of pregnancy(6). It is possible that this may account for part or all of the decrease in the serum vit. B₁₂ concentration which has been observed. It would seem necessary, however, to test the hypothesis that serum vit. B₁₂ binding capacity might keep pace with hemodilution before concluding that hemodilution is the responsible factor. On the other hand, the increased requirement for many other vitamins of women during pregnancy is well established(7) and repeated pregnancies on a vit. B₁₂ deficient diet have been the most effective way of inducing vit. B₁₂ deficiency in animals(8).

The lowered serum vit. B₁₂ concentrations that have been observed in this group of 502 pregnant women merits further study in order to ascertain the mechanisms involved.

Summary. 1. Serum vit. B₁₂ estimations were made on sera obtained from 502 women after varying durations of pregnancy. 2. This work has confirmed previous suggestions that lower than normal serum vit. B₁₂ concentrations are observed during pregnancy. It has also demonstrated a direct and statis-

tically significant ($P < 0.001$) correlation between serum level of vit. B₁₂ and duration of pregnancy.

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Effect of Local Anesthetics on Motility of Upper Gastrointestinal Tract.* (22412)

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Radiologists have reported that the intra-gastric administration of local anesthetic drugs results in relaxation of the pyloric sphincter. Bayer(1) gave peptic ulcer pa-

tients a 0.25% solution of larocaine orally. This was followed by relaxation of the previously closed pylorus and ready fluoroscopic visualization of the duodenum by contrast material passing from the stomach. Roka and Lajtha(2) used 100 cc of 1% solution of procaine in the same fashion and likewise demonstrated the opening of the pylorus by

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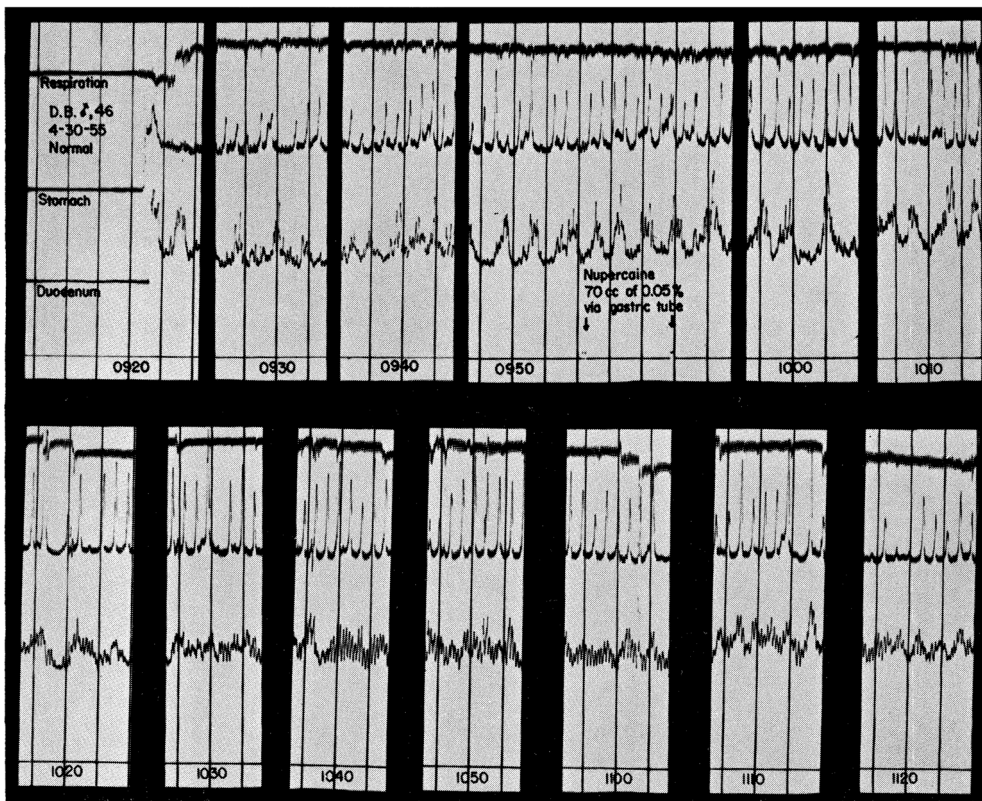


FIG. 1. Effect of locally administered nupercaine on gastric and duodenal motility.

fluoroscopic observations. Crohn, *et al.*(3) made kymographic measurements of gastrointestinal motility in both dogs and humans following administration of local anesthetics. In the dog, gastric motility was unchanged by metycaine or butyn, but small bowel motility was frequently inhibited by metycaine or procaine. In the human subject, they found reduction in gastric or intestinal motility in only a small proportion of their studies. Louckes and Quigley(4) administered procaine by stomach tube to dogs while measuring pyloric sphincter tone and motility. In lower doses (10-25 mg per kg) there was no effect; but larger concentrations often produced an increase in sphincter tone and a decrease in motility.

Method. Studies were performed on 9 human subjects, 7 of whom were entirely free of gastrointestinal disease, while 2 had chronic uncomplicated duodenal ulcer. Either the gastric or duodenal motility or both were recorded in each patient. A double lumen #14

F. rubber tube was passed under fluoroscopic control to the desired position(5); one lumen was used for inflating a balloon for recording motility and the other for the administration of the local anesthetic drug. Local anesthetics used were: 1) nupercaine (2-Butoxy-N-(2-diethylaminoethyl) cinchoninamide hydrochloride), 30 to 100 cc of a 0.05% solution in carmethose;† 2) pontocaine (tetracaine hydrochloride), 15 cc of a 0.5% aqueous solution; 3) elixir probutylin (procaine isobutyrate-Rorer), 10 cc totalling 1,000 mg.§ In 7 patients, the drug was instilled into the stomach and in 2 patients into the duodenum. Motility recordings were made by means of a multichannel recording oscillograph(6).

Results. 1. *Pontocaine:* One patient was given 75 mg (15 cc) of pontocaine intragas-

† Provided through the courtesy of Ciba Pharmaceutical Products, Inc., Summit, N. J.

§ Provided through the courtesy of William H. Rorer, Inc., Philadelphia, Pa.

trically. During the ensuing 100 minutes there was no change in either gastric or duodenal contractions.

2. *Elixir probutylin*: In one patient, 1000 mg (10 cc) of elixir probutylin instilled into the stomach was followed by no change in the gastric motor activity for over 2 hours. In a second patient, the same dose infused into the stomach resulted in a decreased frequency of gastric contractions with no change in amplitude and no effect on duodenal motility.

3. *Nupercaine*: Thirty to 100 cc of 0.05% nupercaine were given to 6 patients. The results were as follows: a) 30 cc instilled into the stomach of one patient with duodenal ulcer produced no change in gastric activity in 90 minutes; b) 50 cc of nupercaine introduced into the duodenum of the second patient with duodenal ulcer was followed by no change in either gastric or duodenal motility during a 50-minute period; c) 70 cc of nupercaine infused into the stomach had no effect on gastric motility but duodenal motility changed from type II to alternating type I and II (Fig. 1); d) 75 cc of nupercaine instilled into the duodenum resulted in no change in duodenal activity for 90 minutes; e) 75 cc of nupercaine dripped into the stomach was followed by no change in gastric contractions until 50 minutes, when the amplitude became moderately reduced; and f) 100 cc of nupercaine instilled into the stomach was followed by no change in gastric motor activity for over 2 hours.

Discussion. Direct administration of local topical anesthetic agents into the stomach and duodenum of 9 human subjects had no discernible effect on the gastric and/or duodenal motility in 6 of them. In 3 patients

there were minor and seemingly inconstant changes in gastric or duodenal activity; in each case the trend was toward a decrease. Tonus and motility of the pyloric sphincter were not measured.

As previously reported(7) topical anesthetic drugs prevent or ameliorate acid-induced peptic ulcer pain. This relief is seemingly not related to a change in motor activity. The pyloric sphincter relaxation reported on the basis of fluoroscopic observation following oral administration of local anesthetics cannot be explained on the basis of the present study since there was no significant change in recorded gastroduodenal motility.

Summary and conclusions. Local topical anesthetics, nupercaine, elixir probutylin, and pontocaine, were administered into the stomach or duodenum of 9 human subjects. Gastric and/or duodenal motility was recorded oscillographically and found to be unchanged in 6 patients; minor and seemingly inconstant changes occurred in 3 of the 9 subjects.

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