Peptic Ulcer Therapy

By

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In previous work on gastric digestion (1), reference was made by the author to a method of treating peptic ulcers, based on experimental findings in which potential or active alkalalis were employed just before as well as after feedings. It was pointed out that complete neutralization of gastric digestion depended on the presence of potential or active alkalalis for immediate neutralization of the pepsin-HCl or pepsin-HCl pancreas-bile combination. In such alkalized mixtures digestion of muscle fibers was completely absent. When an interval of 15 minutes or longer was allowed before such neutralization was carried out, complete inhibition of peptic digestion of the meat fibers did not occur.

The usual methods of peptic ulcer treatment, as given by von Leube (2), Lenhartz (3), or Sippy (4), advocate at least a half hour interval between the time of feeding and the administration of neutralizing substances, when these are employed. Such treatment does not prevent digestion of the gastric or duodenal content, and probably interferes with healing of the ulcer to some extent. When alkalals are administered before as well as after feedings, to the point that digestion of meat fibers, as demonstrated by our method of stool examination (1), is decreased to 10 to 30 per cent, rapid relief of symptoms (within 72 hours after proper dosage) and apparent healing of the peptic ulcers has been noted. Sufficient time has not elapsed to determine the permanency of these results, since these patients have all been treated within the past five years.

In this group of cases, ambulatory treatment has been employed except where active hemorrhage has necessitated two to three week periods in bed. Since continuous gastric analysis could not be maintained for the demonstration of complete inhibition of gastric digestion by titration methods, recourse was had to frequent stool examinations.

Simultaneous experiments on gastric digestion in vitro revealed that the majority of acids tested activated pepsin to varying degrees in its digestion of muscle fiber. Neither nitric nor sulfuric acid, in concentrations producing the same pH as hydrochloric acid, were as effective in promoting digestion with pepsin alone or with the combination of pepsin pancreas-bile, as was the latter acid. Phosphoric, lactic, acetic, boric, salicylic, benzoic, oxalic, tannic, tartaric, citric, and the other acids tested all activated pepsin digestion to some degree, and were active also in combination with the pepsin pancreas-bile mixture. Salicylic acid was markedly more active in vitro in the pepsin pancreas-bile combination than anticipated from the hydrogen ion concentration. This finding should be kept in mind as a possible explanation of the starting point of some peptic ulcers in humans.

With these findings as a basis, the diet was so arranged that during the first three to eight weeks all foods containing appreciable acid, such as tomatoes, fruits and buttermilk, were eliminated. Other cooked and raw vegetables were permitted. Meats, eggs, fish, fowl, crustaceans, bi-valves, curd or cottage cheese and milk, American or Swiss cheese, were permitted in normal quantities. Bread, tea, coffee and milk in normal quantities were also allowed. Cereals or pureed foods were reduced to a low level in order, so far as possible, to prevent intestinal fermentation.

After the three to eight weeks period, tomatoes, raw or cooked, were permitted along with adsorbent ant-acid powder (to take care of the additional acid) in quantity sufficient to keep muscle fiber digestion down to or below 30% as estimated by stool examination. Gradually, fruits were added to the diet, and in the milder cases, after twelve weeks, the adsorbent ant-acid powder was reduced ½ dram weekly. The 30% level of digestion was maintained during this period. When necessary to achieve this level, the patient was kept on the adsorbent powder for a longer period before the next reduction was made.

Fresh tincture of stramonium was employed before meals and maintained just below the dryness or blurred vision stage during the entire period. Usually the stramonium was administered 10 drops t.i.d. A.C., the object being to have three normal sized meals with no feedings between, an increase of one drop at each meal until the pharmacological effects were obtained. The use of stramonium for this purpose, as compared with belladonna, has been found more successful in the author's experience, possibly because of the greater hyoscyamine content and consequent anti-spasmodic effect. It was not necessary to carry stramonium medication to the stage of complete dryness to obtain this result, as is required with belladonna. This has been fluoroscopically confirmed on several occasions.

In the severe ulcers of long-standing, it was felt advisable, while employing the ambulant treatment, to continue the therapy outlined for a period of four to six months. The results thus far obtained have justified this prolongation of the period of treatment (Table I).

During the past year one adsorbent ant-acid powder has been employed to the exclusion of all others because of its greater effectiveness without such untoward effects as a tendency to alkalosis or hyper-sensitivity to bismuth salts. During the previous three years, when the dosage of other powders was increased to the required degree, there was a tendency in some patients to alkalosis. This was counteracted by the administration of aromatic spirits of ammonia in the ante meal medication (the ammonia was converted by the hydrochloric acid of the stomach to ammonium chloride). The preparation described contains the more stable type of ammonium salt, di-ammo-
nium-hydrogen phosphate, \((\text{NH}_4)_2 \text{HPO}_4 \cdot 2\text{H}_2\text{O})\), in sufficient quantity for the same purpose. None of the patients taking this powder have required additional ammonium salts for the prevention of alkalosis.

The various adsorbents available for internal administration have been employed in an attempt to reduce the alkali or potential alkali requirements. Among these were kaolin, bismuth salts, magnesium hydroxide and oxide, aluminum hydroxide, aluminum silicate and various pharmaceutical and other combinations of the usual ant-acid chemicals used for such purposes. It has been found that a synthetic hydrated magnesium trisilicate is the most effective adsorbent for the purpose of this treatment.

Synthetic hydrated magnesium trisilicate is a light, fine powder, insoluble in water. However, distilled

**TABLE I**

*Peptic ulcer cases*

<table>
<thead>
<tr>
<th>Initials</th>
<th>Sex</th>
<th>Age</th>
<th>Diagnosis</th>
<th>Acute</th>
<th>Chronic</th>
<th>Hemorrhage</th>
<th>Confirmation by</th>
<th>X-Ray</th>
<th>Operation</th>
<th>Previous Treatment (Dict., Larostidin, etc.)</th>
<th>Maximum Quantity Powder in Treatment, Before and After Meals*</th>
<th>Results</th>
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</thead>
<tbody>
<tr>
<td>F.G.A, Jr.</td>
<td>M</td>
<td>48</td>
<td>D. U.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<td>Yes</td>
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<td>No</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>Sippy twice</td>
<td>4</td>
<td>2</td>
<td>&quot;</td>
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<td>Twice</td>
<td>&quot;</td>
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<td>Sippy twice</td>
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<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
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<td>3</td>
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<td>&quot;</td>
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<td>No</td>
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<td>&quot;</td>
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<td>&quot;</td>
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<td>No</td>
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<td>2</td>
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<td>&quot;</td>
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<td>1</td>
<td>2</td>
<td>&quot;</td>
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<td>&quot;</td>
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<td>&quot;</td>
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<td>4</td>
<td>2</td>
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<td>H.S.</td>
<td>F</td>
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<td>D. U.</td>
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<td>No</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
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<tr>
<td>J.S.</td>
<td>M</td>
<td>45</td>
<td>D. U. and gall stones</td>
<td>&quot;</td>
<td>&quot;</td>
<td>Yes before and after confirmed healing and gall stones</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>4</td>
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<td>&quot;</td>
<td>Yes</td>
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<td>3</td>
<td>2</td>
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<tr>
<td>W.W.</td>
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<td>54</td>
<td>Gastric and D. U.</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
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<td>1½</td>
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<td>N.W.</td>
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<td>38</td>
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<td>No</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>2</td>
<td>2</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

*In a variable proportion of ulcers presenting hypersecretion between meals it may be necessary for a time to give half the "meal time" dose of powder between meals and at bed time. The extra dosage can usually be terminated in 3 to 6 weeks even in severe ulcers, when the hypersecretion is controlled by before and after meal doses of powder.