

pletely confirmed. The present authors report two additional cases, proved anatomically, one by autopsy, one by operation. These instances now bring the total to seventy-seven.

(2) One of the cases reported herein is the twentieth diagnosed by X-ray and the eleventh in whom operation later was performed with confirmation.

(3) Symptoms of diverticula of the jejunum may vary from a complete absence of digestive disturbances or abdominal anomaly to those of an acute abdominal lesion. The history of peptic ulceration may be simulated.

(4) The etiology of jejunal diverticula has been discussed and the gross and microscopic anatomy has been described.

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## "Oktrin" As An Adjuvant in the Treatment of Peptic Ulcer\* Observations Upon Twenty-two Patients

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AN ADJUVANT in the medical management of peptic ulcer was added with the introduction of gastric mucin by Fogelson (1). The beneficial action of gastric mucin in ulcer may be due to its viscosity and demulcent properties enabling it to protect the ulcer from chemical and mechanical irritation or to its anti-peptic activity. It is also probable that some individuals with chronic ulcer are deficient in the secretion of mucus, the hypersthenic stomach of Hurst (2). Gastric mucin may supply the mucus needed or it may influence the synthesis of mucus by the mucous membranes because it contains glycuronic acid which would appear to be necessary for the

formation of mucin. Even though in ulcer treatment we may not admit the specificity of mucin, we believe that emollients have a place in our therapeutic armamentarium. Olive oil, cream, and other fats had been used for years before the use of mucin, for a protective action as well as a secretory depressant action. An excess of fat, however, causes nausea and delays the emptying of the stomach. Mucin has been thought by some to be unpleasant, and in some instances to contain "secretagogues", which increase the production of acid gastric juice. Being an animal product, it is subject, of course, to decomposition and putrefaction.

To overcome the objections to mucin we attempted to find a vegetable substance which would

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have a rich yield of mucinaginous material and contain glycuronic acid. Among the plants studied by us the pod of the okra plant (*Abelmoschu esculentus*) seemed most suitable. The mucilaginous material was extracted from the pods, and converted into a fine powder which we called "okrin". The details of the method of extraction and the physical and chemical properties of okrin can be found in our preliminary report (3). Okrin is exceedingly viscous in aqueous solution and has an okra odor and taste. The okrin used was entirely free of secretagogues when tested on a dog with a pouch of the entire stomach.

#### MATERIAL STUDIED

For the past two years we have been using okrin in the treatment of peptic ulcer in twenty-two selected patients. Three other patients, after preliminary treatment, did not return to the Clinic and could not be reached. Patients in the gastro-intestinal clinic having the most difficulty on other managements were chosen for this probatory period. This method of selection of patients attempted to eliminate that large percentage of ulcer patients which has temporary remissions after any type of treatment.

All patients had history, signs, symptoms, laboratory evidence and roentgen manifestations of peptic ulcer. Ewald test meals, fractional and motor test meals and examination of stools for occult blood were performed.

This series includes one patient affected with a prepyloric ulcer. There were eight patients who previously had had gastro-enterostomy performed, with recurrent lesions at the stoma or in duodenal bulb or both. Thirteen patients had duodenal ulcers. Some had the complication of gastric retention and a definite continuous secretion as evidenced by retention and night distress. The chronicity of the ulcer diathesis is indicated by the 4.2 years average duration of periodic pain.

#### METHOD OF TREATMENT

Four to eight grams of okrin were taken in water, milk, canned milk, or milk and cream every hour while the patient was awake. Most patients were allowed three smooth, bland, low secretagogue-yielding meals daily, with adequate vitamins and minerals, but if there was marked retention or vomiting, feedings were begun gradually. All patients were treated while ambulatory.

#### RESULTS OF TREATMENT

In seventeen of the twenty-two patients remission occurred in from one to ten days. There

was an absence of pain during the day, a cessation of vomiting and pyrosis, and diminution of night distress within the first two or three days. During the next two weeks there was a disappearance of the night distress, of epigastric tenderness and of blood from the feces. Re-examination gave roentgenographic evidence of decreased pylorospasm and decreased emptying time. It was not possible to give a definite opinion of anatomical changes in the lesions except in those prepyloric ulcers with niche formation which roentgen anomaly disappeared after treatment. Three patients with duodenal ulcer and two with jejunal ulcers failed to obtain relief. Some of the failures in this "intractable" group might have had complicated ulcers with accompanying perigastritis or periduodenitis and peritoneal adhesions causing pain. Surgical intervention may be necessary to relieve them. There is also the possibility of cicatrised ulcer being the cause of continuous discomfort along with gradually increasing stenosis due to cicatricial contraction and fibrous connective tissue thickening at the border of the ulcer. Ten patients after preliminary treatment did not take okrin for periods of from one to six months. Three of these had recrudescences which again were relieved by okrin.

#### COMMENT

In April, 1933, a preliminary report (3) was made of the use of okrin for peptic ulcer. At that time the supply of okrin was extremely limited, so that its use was confined to three patients. The results were sufficiently favorable to warrant additional investigation. Meyer, Seidmon, and Necheles (4) confirmed our original report.

Further study indicates that okrin relieves pain in patients with peptic ulcer and apparently produces a remission in a large percentage of ulcer-bearing individuals. We cannot prove that the ulcer has been healed, but the rapid relief of pain may indicate a subsidence of accompanying gastritis and duodenitis.

A direct comparison of the benefit of okrin with gastric mucin cannot be made in a disease whose natural history is so variable. It was our impression that patients taking okrin did not gain in weight so rapidly as those taking mucin.

Okrin is pleasant to take and produces no untoward symptoms. It does not deteriorate or putrefy. Okrin, apparently, has a palliative, demulcent, protective action. It should be considered as an adjuvant to other previously proved methods of treating the peptic ulcer patients' general condition.

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