JEJUNAL AND GASTROJEJUNAL ULCER 
AND THEIR ASSOCIATED ROENTGENOLOGIC SIGNS 
WITH ESPECIAL REFERENCE TO THE NICHE*

JOHN D. CAMP, M.D. 
BOSTON 

The uncertainty attending the clinical diagnosis of 
jejunal ulcer and gastrojejunal ulcer has often been a 
handicap to the early and proper treatment of these 
postoperative conditions and their serious complications. 
The incidence of these lesions following gastro-
enterostomy has been variously quoted. According to 
Balfour, 1 2 per cent of patients will develop them. 
Loewy 2 states that the number of cases of jejunal ulcer 
recorded up to 1921 approximated 400; in 19 per cent of 
these (seventy-six cases), or about one in five, the 
patients had been observed to develop a gastrojejuno-
colic fistula. At the Mayo Clinic, according to 
Verbrugge, 4 this complication was noted in 11 per cent of 
such cases. Because of the risk attending the operation 
for gastrocolic fistula, the early recognition of the 
causative lesion is of considerable import. 

According to Moynihan, 5 disappointments after 
gastro-enterostomy are caused in nine out of ten cases 
because the operation is performed on a normal stom-
ach. Eusterman 6 also maintains that two thirds of the 
surgical failures occur in the absence of a lesion intrinsic 
to the stomach or the duodenum. In the face of these 
facts, the demonstration by the roentgenologist of a 
normal stomach or duodenum is quite as important as the 
diagnosis of postoperative disease.

Unfortunately, the roentgenologist is handicapped at 
the start in these conditions by many circumstances over 
which he has no control. In many instances the patient 
does not know definitely whether a gastro-enterostomy 
was done previously or not. Because the examination 
involves structures changed by surgical intervention, 
atypical operations or defects in surgical technic may 
complicate the usual appearance and suggest a lesion 
when none is present. As a positive diagnosis is depend-
don evidence of malfunction and the demonstration 

Fig. 1.—Jejunal ulcer showing a well defined niche in the efferent loop. The deformity in the jejunal proximal to the ulcer is obscured by the 
overhanging stomach. The duodenum is deformed by a duodenal ulcer.

Fig. 2.—Jejunal ulcer with niche deformity in the efferent loop. Note 
the characteristic puckering up of the gastric contour at the site of the 
gastro-enterostomy.
5. Gastric peristalsis is not overactive. 6. The contour in the vicinity of the stoma is not deformed. 7. The efferent limb of the jejunum is neither narrowed nor markedly irregular. 8. The stomach is moderately mobile. 9. The stomach is not deformed, and it does not show a tendency to spasticity or to hour glass formation.

The roentgenologic signs of gastrojejunal ulcer have been placed in two groups, the direct and the indirect. The former indicate the lesion itself and permit a positive diagnosis of disease; they include the presence of an ulcer niche or crater, deformity about the stoma, partial or complete occlusion of the stoma, irregularity of the jejunum, and the presence of a gastrocolic fistula. The indirect signs include gastric retention, hyperperistalsis, dilatation of the stomach, spasticity of the stomach, dilatation of the duodenum and spasticity of the jejunum. These are not positive indications of a lesion, but collectively or in combination they may suggest disease.

The importance of the niche or crater shadow in gastric ulcer and duodenal ulcer is accepted by all. The existence of a niche, and its reliability as a diagnostic point in jejunal and gastrojejunal ulcer, have been doubted. With the exception of one case, Carman failed to note any roentgenologic evidence of a cavity resembling a niche or accessory pocket. He believed that the nature of the ulcer rather precluded any probability of visualizing its crater as a niche, for the reason that the ulcer is most often characterized by surface area rather than by depth. This statement is not in accord with some of the more recent observations. It is interesting that several illustrations (320, 330, 331, 336, 337) in Carman's book show a deformity of the jejunum or stoma that resembles a niche. These are identical with deformities proved to be niches by myself and others.


Strom reported four cases showing a niche, and emphasized this as a diagnostic point. Palugay in 1925 reported seven jejunal ulcers, five of which showed as a niche. These observations have been doubted by some, who would call such deformities barium flecks retained by rugae of the stomach or folds of the jejunum. Experience has taught me that the niche is the most important sign in the diagnosis of these conditions, and it may be present when other signs fail.

In support of this view I have recorded ten consecutive positive cases in which a niche or crater was disclosed in eight instances. Seven of these were in the jejunum and one was in the stoma. Five of the patients showing a niche were operated on, and a corresponding ulcer was found in each. Because the majority of niche shadows are located in the jejunum and the average roentgenologist heretofore has confined his attentions chiefly to the gastro-enterostomy stoma, it is not surprising that in the past many such shadows were overlooked.

An accurate diagnosis of these conditions presupposes careful palpation under the fluoroscope with the patient in the upright position. It is useless to expect satisfactory results otherwise. The stomach should be empty and the anastomosis and contiguous areas explored first with only a swallow or two of barium sulphate in the stomach. By approximating the gastric walls with the gloved hand, the roentgenologist permits the barium to descend slowly across the rugae to the gastro-enterostomy opening. Gentle pressure at this point will demonstrate the site of the anastomosis, and as the release of the hand pressure permits the barium to enter the jejunum, the direction of the loop can be ascertained. If the entire meal is given at once, the rapid egress through the stoma and the overlying loops of jejunum will hopelessly obscure the field. Stomal and jejunal craters invariably fill with the first swallow

of barium and the niche is best seen at this time. It will stand out as a remaining shadow of increased density in the stoma, or as a projection about 1 cm. in diameter, from the contour of the jejunum (fig. 1). In the latter case it is usually in the efferent loop and rarely more than 5 cm. from the anastomosis. The shadow must be differentiated from barium flecks retained by gastric rugae or jejunal folds. These can

be effaced or changed by pressure or manipulation. Niche shadows will remain the same, and they frequently become more pronounced when pressure is applied. Should they empty, they will reappear at the same point. Any questionable shadows should be confirmed by a second examination. It is my custom to examine the patient fluoroscopically as thoroughly as possible with not more than two swallows of barium. Films are then made in the upright position under fluoroscopic control. The rest of the meal is then given, the fluoroscopy continued and more films made if desired.

Deformity about the stoma when persistent is indicative of disease at or near the anastomosis. Rarely will the changes resulting from poor surgical technic simulate it. The usual deformity consists in a puckering up of the gastric contour and rugae at the site of the stoma (fig. 2). This may be the result of spasm or, more often, the result of the marked inflammatory process accompanying most lesions. Such deformities will persist and resist the action of antispasmodic drugs. Occasionally, and especially if an anterior gastro-enterostomy has been done, an inflammatory mass may be palpated.

Demonstration of complete occlusion of a previously functioning gastro-enterostomy, in the absence of malignant disease, is prima facie evidence of disease. In patients who do not know whether or not a gastro-enterostomy has been done, an occluded stoma may be overlooked. Partial occlusion and delay at the stoma may or may not be present. If they persist and are unchanged by antispasmodics, disease is inferred.

Irregularity of the jejunum is one of the most common observations. The narrowing or deformity usually starts at the stoma and may extend an inch or more beyond it, in the efferent loop (figs. 3 and 4). Should the ulceration be jejunal and well below the stoma, that portion contiguous to the anastomosis may appear normal, while the area involved will show narrowing and absence of the usual jejunal folds. When a niche is present it is usually in the center of the deformity and an incisura-like formation is sometimes suggested.

In the absence of a malignant condition, the demonstration of a gastrocolic fistula (fig. 6) is evidence of a preceding jejunal or gastrojejunal ulceration. Occasionally after the perforation has occurred and the fistula is established the ulcer may heal. As it has been reported that 19 per cent of jejunal ulcers have formed fistulas, a barium enema should be given to every patient when the diagnosis of a gastrojejunal ulcer has been made. If this procedure is carried out, a fistula will be demonstrated frequently when it is not suspected clinically.

Of the indirect signs, dilatation of the stomach suggesting inadequate drainage seems to be common. It was present in half of this series of cases, and according to Moore and Marquis it is the most important one. This sign must be considered cautiously, however, for a stomach dilated previously to the establishment of a gastro-enterostomy may not regain normal tone afterward.

Gastric retention does not seem to be common in these conditions and was present in only two of my cases. A misplaced stoma which affords inadequate drainage is the most frequent cause.

Hyperperistalsis is frequently a manifestation of abnormal stomal function. It can be caused by so many other things that it cannot be relied on alone as a diagnostic sign.

Spasticity of the stomach or the jejunum when present may suggest disease. It is well to check its presence by a second examination and with antispasmodics. When its presence seems significant, one of the direct signs can usually be demonstrated as well.
Tenderness over the stoma was present in all of the cases. It, too, can be caused by so many other conditions that it must not be considered seriously in the absence of other reliable signs.

Duodenal dilatation may be present, but such a condition may easily be caused by adhesions. If the pylorus is obstructed or partially obstructed, the duodenum may not be visualized. Frequently the barium leaves through the stoma so quickly that a sufficient amount cannot be expressed into the duodenum to determine whether it is dilated or not.

Although the indirect signs are frequent accompaniments of jejunal or gastrojejunal ulceration, yet, like the indirect signs of gastric and duodenal lesions, they are not to be relied on. Notwithstanding the reliability of the direct signs, the roentgenologic diagnosis of gastrojejunal ulcer is no doubt one of the most perplexing that the radiologist is called on to make, and in many instances a positive opinion is given with a certain amount of fear and trepidation. I am convinced that the value of the niche as a diagnostic point has been underestimated and that the deformity is probably present more often than has been noted. Since its presence is irrefragable evidence of disease, careful attempts to demonstrate it should be made.

SUMMARY

The importance and apparent frequency of the niche or crater deformity in the jejunum or stoma as a positive sign of jejunal or gastro-jejunal ulceration has not been emphasized in the past except by a few observers. Others have doubted its frequent existence in these lesions. In this series a niche was definitely demonstrated by the examiner in eight of ten consecutive cases diagnosed as positive by the roentgenologist. In seven instances the niche was located in the jejunum and in one it was found in the stoma. Five patients were operated on and an ulcer corresponding to the niche shadow in the jejunum was found in each. The results of these observations suggest that the niche deformity is frequently present. As it represents irrefragable evidence of disease, its presence should be sought for in all cases.

475 Commonwealth Avenue.

ABSTRACT OF DISCUSSION

Dr. A. B. Moore, Rochester, Minn.: I wish to add a fervent amen to what Dr. Camp has said in regard to jejunal and gastrojejunal ulcers. As to the difficulty of diagnosis, I think it is without doubt the most difficult that the roentgenologist is called on to make. The percentage of error in our hands is high; too high, if the figures are taken as they have been compiled only in cases of gastrojejunal ulcer. If the cases of gastro-enterostomy in which there has been exploration are taken as a basis, the percentage is fairly creditable. The diagnosis can be made 90 per cent accurate on that basis. The percentage of error in our hands has been, I think, larger on the positive than on the negative side. We have said that patients had gastrojejunal ulcer, but when an exploratory operation was done the anastomosis appeared normal. I think that a definite part of that group is made up of the cases which I once attempted to describe as marginitis in which the folds of the stomach and jejunum adjacent to the anastomosis are infiltrated and yet have no ulcer; they produce the same spasmodic tie-ups and retractions that are produced by a gastrojejunal ulcer. In regard to the crater, our figures substantiate those of Dr. Camp. We are finding a great many niches in cases of gastrojejunal ulcer, and, as he said, it is the most valuable single sign we have. The fact that one is examining a stomach that has been operated on makes the examination difficult to start with, and we are now seeing a group of cases which are still more difficult; namely, those in which a partial gastric resection has been performed. We have now twelve such cases in which we have been able to demonstrate a gastrojejunal ulcer. I think it is within the realm of probability that we are going to see a greater number of these after more time has elapsed following gastric resection for peptic ulcer. In regard to the tender point, our figures seem to substantiate the contention that its presence or absence means very little. The average patient after operation is tender, and in my experience there is not a localized point of tenderness.

VALUE OF BRONCHOSCOPY IN DIAGNOSIS OF MALIGNANT CONDITIONS OF THE LUNGS

PORTER P. VINSON, M.D.
HERMAN J. MOERSCH, M.D.
AND
B. R. KIRKLIN, M.D.
ROCHESTER, MINN.

The first comprehensive report of primary carcinoma of the bronchus was presented by Adler 1 in 1912. Since that time interest in the disease has increased and many cases have been reported. 2 The majority of the reports, however, have been on postmortem observations and have seemed to lack an appreciation of the value of bronchoscopic examination in making a positive antemortem diagnosis.

The disease is evidently increasing, and if palliative or curative measures are to be employed the diagnosis must be made as early as possible. In most cases a diagnosis probably can be made several months earlier if the increasing frequency of the disease is realized, and if it becomes known that a positive diagnosis can be made by the examination of tissue removed from the lumen of the bronchus through the bronchoscope.

Since May, 1925, we have made a diagnosis of primary carcinoma of the lung in seventy-seven cases. Eleven of these diagnoses have been proved at postmortem examination, thirty-seven were based on the classic observations of bloody pleural effusion, metastasis to the cervical lymph nodes, or other presumptive evidence, and twenty-eight were made on tissue removed from the bronchus by bronchoscopy. In one case the patient coughed up a piece of tissue before a bronchoscopic examination was made.

We shall discuss here only the twenty-nine cases in which a positive diagnosis was made during life by examination of tissue removed from the bronchus.

GENERAL EXAMINATION

There was nothing in the history of any of the cases to suggest a definite cause of the lesion, although in five evidence of prolonged suppuration of the lung

1 From the Division of Medicine and the Section on Roentgenology, Mayo Clinic.
2 Read before the Section on Laryngology, Rhinology and Otology at the Seventy-Ninth Annual Session of the American Medical Association, Minneapolis, June 15, 1928.