lish aeration and not to remove diseased tissue. Some will recover under local treatment. In others a semi-radical sphenoid operation is advocated.

Complications: No fatalities. Three post-operative hemorrhages. In one, middle ear infection followed the post-nasal packing.

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PERFORATED GASTRO-DUODENAL ULCERS. SOME NOTES AS TO THEIR TREATMENT.

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PERHAPS the most serious and terrifying surgical emergency which can occur in the abdomen is the acute perforation of a gastric or duodenal ulcer. It is a condition which must be recognized and treated promptly, otherwise the result is most apt to be a fatality. It is not the type of accident in which "observation" is allowable, for every hour after perforation increases the mortality with great rapidity.

So much concerning this condition has appeared in the literature during the past decade, that it would seem as though the symptomatology of it would be a matter of common knowledge, and that great accuracy would be attained in its diagnosis. Yet, reports from various clinics throughout this country show that the diagnosis is made in only from 28 per cent. to 60 per cent. of cases. Furthermore, one case in our own series, and which we shall report later, was admitted as cholelithiasis and was in the hospital six hours, until the increasing gravity of the symptoms demanded that some one be called to see him. The diagnosis in this case was perforated duodenal ulcer and was proved at operation. These facts furnish an excuse for briefly reviewing the symptoms.

The most important single item is the history and it is so characteristic that the diagnosis should be made from it alone. There are no

premonitory symptoms. The victim is stricken suddenly during his ordinary occupation. He may be at work or at play, when suddenly he is seized with an atrocious pain in the epigastrium. He may be thrown to the ground by the severity of the attack. Soon he is writhing in agony. He passes almost instantly from a condition of relative well-being to one in which his very life is in jeopardy, and he knows it. He is conscious that he is desperately sick, and demands relief. This story is almost unvaried and should be sufficient to establish the diagnosis, for surely no other condition simulates it.

Quickly the signs of peritoneal insult supervene: nausea, vomiting, abdominal rigidity and shock. On physical examination, we find the patient with a pinched, anxious face, breathing with obvious difficulty. The abdomen is held rigidly, and respiration is almost entirely thoracic in type. The abdomen is tender and rigid, "board-like," with tenderness and spasm most marked in the epigastrium. The pulse is accelerated; the temperature may or may not be increased. Later, with increasing leakage of air from the perforation, the normal liver dullness is obliterated. This is a very valuable sign and is almost always present. And this sign is especially valuable for this reason: Very often, in such a cosmopolitan clinic as that at the Boston City Hospital, we are obliged to operate on foreigners who cannot speak our tongue, where no interpreter is available, and who cannot furnish a shred of history. The most valuable diagnostic landmark is lacking. In such a case, the only physical sign of any value whatever is the absence of the normal liver dullness and its replacement by tympany. If this sign is missing, no diagnosis can be made except acute surgical lesion in the upper abdomen.

Treatment. Until comparatively recent years, the treatment has always been suture of the ulcer, and drainage, and the results, with very few exceptions, have certainly been nothing to brag about. Scully reported 49 cases treated at the Cook County Hospital, Chicago, with 28 deaths; a mortality of 57 per cent. Hertz reported 53 patients operated at the Copenhagen Hospital, with 27 deaths; a mortality of 50 per cent. plus.

During the years 1915 to 1920, 119 cases have been operated at the Boston City Hospital, with 52 deaths; a mortality of 43 per cent. These cases have, for the most part, been treated by simple closure of the ulcer with drainage. There have been a few small series of cases reported, with low mortality, notably Gibson's. He reported 14 cases operated by simple closure, with one death. However, with a few exceptions, the general mortality of perforations treated by simple closure runs between 30 and 40 per cent.

It would seem that in dealing with such a serious condition, anything which might improve results must be seized upon and tried out. It was for this reason that the operation of posterior gastroenterostomy was added to the treatment. The principal advocate of this has been

John B. Deaver. He has been using it practically as a routine operation for the past 15 years, and his latest statistics show 67 operated cases, with five deaths, a mortality of 7.5 per cent.

Gibson, of New York, has had remarkable success with the simple procedure, and heads the list of the opponents to the more radical operation.

My colleague, Dr. Walker, reported 98 cases operated at the Boston City Hospital, almost entirely by simple closure and drainage, with 21 deaths; a mortality of 27 per cent. Richardson reported 90 cases from the Massachusetts General Hospital with 32 deaths; a mortality of 35.5 per cent. Walker concluded that gastroenterostomy was unjustifiable, in spite of the fact that it had been done on only a few cases. Richardson rejected the operation in spite of the fact that out of 12 cases in which it was done, 10 recovered; a mortality of 17 per cent. compared with 35.5 per cent. for the whole series.

From the foregoing, it is obvious that primary gastroenterostomy had received a rather effective "black eye" in Boston. In spite of this, however, greatly influenced by the astonishing results of Deaver, we believed in the primary operation, and were only waiting for what we considered to be a suitable case. This opportunity came in November, 1918, and the result was so striking, the convalescence so smooth, that we have employed it in all the cases of acute perforation which have since fallen to our lot. The total is eight cases. A brief résumé of the histories follows:

CASE 1. P. D. Male. Laborer. Age 47. Admitted B. C. H. November 26, 1918. Previous history of digestive disturbance. Seizure three hours before admission. Liver dullness absent. Diagnosis pre-operative. Perforated ulcer. Operation. Perforation found in first part of duodenum. Closed and infolded. Posterior gastroenterostomy. Drainage. Convalescence uneventful. Discharged December 12, 1918.

CASE 2. A. W. Male. Blacksmith. Age 22. Admitted B. C. H. September 20, 1919. No previous digestive disturbance. Seizure six hours before admission. Liver dullness absent. Pre-operative diagnosis. Perforated ulcer. Operation. Perforation found in first part of duodenum. Closed and infolded. Posterior gastroenterostomy. Convalescence uneventful. Discharged October 6, 1919.

CASE 3. E. A. Male. U. S. Marine. Age 30. Admitted to B. C. H. November 2, 1919. No previous history of digestive disturbance. Seizure eight hours before admission. Liver dullness absent. Pre-operative diagnosis. Perforated ulcer. Operation. Perforation found in anterior wall of first part of duodenum. Con-

valescence uneventful. Discharged November 11, 1919, to Marine Hospital, Chelsea.

CASE 4. J. H. Male. Janitor. Age 72. Admitted B. C. H. November 9, 1919. History of previous digestive disturbance. Seizure eight hours before admission. Liver dullness absent. Pre-operative diagnosis. Perforated ulcer. Operation. Perforation found in anterior wall of stomach, 1½ inches from the pylorus. Perforation infolded. Posterior gastroenterostomy. Convalescence uneventful. Discharged November 22, 1919.

CASE 5. D. McP. Male. Mechanic. Age 47. Admitted B. C. H. April 27, 1920. History of digestive trouble. Seizure five hours before admission. Liver dullness absent. Pre-operative diagnosis. Perforated ulcer. Operation. Perforation found in anterior wall of stomach close to the pylorus. This was closed and infolded. Posterior gastroenterostomy. Drain to the site of perforation and on account of the very large amount of gastric contents in the pelvis, a suprapubic drain was inserted. Convalescence uneventful until the third day, when a cough appeared, accompanied by a rise in temperature to 102.5 degrees. Physical examination showed an infarct in the right lung. Convalescence from then on, uneventful. Discharged May 14, 1920.

CASE 6. A. L. Male. Laborer. Age 30. Admitted B. C. H. December 4, 1920. No history of previous digestive trouble. Seizure six hours before admission. Diagnosis on admission was gallstones. He was in the hospital six hours when seen by us. At this time, 12 hours after seizure, the diagnosis of perforated ulcer was made. Operation. Perforation found in anterior wall of second part of duodenum. This was closed and infolded. Posterior gastroenterostomy with drainage. Convalescence uneventful. Discharged December 27, 1921.

CASE 7. A. Z. Male. Shipwright. Age 57. Admitted B. C. H. March 3, 1921. Previous history of digestive trouble. Seizure 30 hours before admission. Pre-operative diagnosis. Perforated ulcer. Operation. Abdomen filled with bile-stained fluid which suggested ruptured gall-bladder. Gall-bladder found to be very much distended and filled with stones. Perforation found low in the posterior wall of the second part of the duodenum partly occluded by fibrin. The anatomical relations were so confused on account of the staining with bile, and for fear of wounding the portal vein, no attempt was made to suture the perforation. Posterior gastroenterostomy was made. Gall-bladder removed. Drain placed down to the site of perforation. Convalescence was stormy for a while. Drained duodenal contents from third day on. Discharged April 7th, 1921. The discharge diminished gradually and the wound was entirely healed on May 8, 1921.

CASE 8. L. T. Male. Laborer. Age 38. Admitted to B. C. H. October 1, 1921. Previous history of digestive trouble. Seizure five hours

before admission. Liver dullness absent. Convalescence uneventful. Discharged November 4, 1921.

SUMMARY.

SEX	AGE	TIME INTERVAL	OPERATION	RESULT	TIME IN HOSPITAL
Male	47	3 hours	Closure and Gastro-enterostomy	Recovery	16 days
"	22	6 "	" " " "	"	16 "
"	30	8 "	" " " "	"	9 "
"	72	8 "	" " " "	"	13 "
"	47	5 "	" " " "	"	18 "
"	30	12 "	" " " "	"	24 "
"	57	30 "	Closure, Gastro-enterostomy and cholecystectomy.	"	25 "
"	38	5 "	Closure and Gastro-enterostomy	"	14 "

Average age, 43 years; average time interval, 9½ hours; average stay in hospital, 17 days.

We realize that this small series, while personally gratifying, is without value from a statistical point of view. However, the cases are consecutive; they represent a wide range in the time interval, age, and general physical condition of the patients: they certainly cannot be called selected cases. It would seem, then, that this method of treatment offers some chance of improvement in our results. Not that we would recommend any routine procedure for this condition. We should judge each case on its merits, and after consideration of all factors, do the operation which seems best under the circumstances.

The most important factors to be considered are: *First*, elapsed time between perforation and operation, for the danger increases rapidly with the increase in the time interval, each moment adding to the degree of contamination and the chances of peritonitis. *Second*, the general condition of the patient; and this includes a comparison between his condition before perforation, and the degree of shock present after perforation. In other words, How hard has he been hit? *Third*, the size of the perforation and the rate of leakage; the degree to which it has been closed by fibrin, omentum, or food particles. *Fourth*, the degree of peritonitis already present, remembering that true peritonitis occurs only late in the disease. *Fifth*, the condition of his stomach at time of perforation; was it full or empty? *Sixth*, the degree to which the pylorus will be occluded when the perforation is closed, and this is a very important item, because a perforation cannot be closed without encroaching upon the lumen of the bowel. But adequate treatment demands not only treatment of the perforation but also of the underlying ulcer. This must be folded in, and of course that means further constriction. Furthermore, the amount of constriction must be greatly increased by subsequent oedema and swelling, caused by our operative manipulations. This, in our opinion, is one of the very important causes for the bad results in cases treated by simple closure.

From the foregoing, it is obvious that no hard and fast rule can be laid down for the treatment of these cases. Nor can the conditions be prog-

nosticated until the abdomen is opened, and each of these factors considered. For example, a man with a small perforation, occurring when the stomach is empty, may have only a small accumulation of fluid in his abdomen, and may be a good surgical risk even after thirty-six hours. On the other hand, a man with a large perforation, after a full meal, may be in desperate condition, with gastric contents throughout the abdomen, in an hour or two. Furthermore, the condition may be greatly influenced by the behavior of the surrounding coils of intestine. For example, the transverse colon may distend with gas and, by pressure against the anterior abdominal wall, prevent the gastric contents from reaching the general abdominal cavity. This condition I have seen on two occasions. In favor of immediate gastroenterostomy it may be said that the possibility of pyloric obstruction, whether from closing the ulcer, from oedema, or from later cicatricial contraction, is obviated, the stomach and duodenum are immediately put in a condition of rest, and the necessity for a secondary operation is removed. The mortality is diminished and the convalescence more smooth.

The objections to this procedure are that it prolongs the operation, adding further shock to a patient already in a serious condition; that the lesser peritoneal cavity is opened to infection; that perforation cures the ulcer and therefore removes the necessity for gastroenterostomy. The first objection is certainly obvious. Something is added, both to the time and shock, and this must necessarily contraindicate the operation in patients already prostrated. But, as has been pointed out by Deaver, these cases stand surgery very well, and it is only in the occasional case that gastroenterostomy would increase the danger. The objection to opening the lesser sac doesn't seem to amount to much, since no one has reported a case in which infection of the sac has been caused thereby. The contention that perforation cures the ulcer has been disproved by the many cases of re-perforation which have been reported. Furthermore, the reports of end-results available, and our own experience in perforation treated by simple

closure, would indicate that the ulcer persists and causes symptoms in a large percentage of cases.

In view of these facts, it would seem that we have available a therapeutic measure of considerable value which has not been reasonably tested in this locality. Our own experience would indicate that, if this procedure is more generally adopted, there will be a sudden and decided improvement in our statistics.

STIFF FINGERS.

BY FRED J. COTTON, M.D., BOSTON, AND
EDW. J. SAWYER, M.D., BOSTON.

CONCERNING stiff fingers in their various sorts, which are much commoner than they should be among us, even now, we have had no very definite scheme nor any considered form of attack.

After trauma as, typically, in Colles' fracture, with or without "traumatic arthritis" as a sequel; after metacarpal or phalangeal fractures, especially the compound ones; after mashing of soft parts of the hand; after all infections and particularly the so-called cellulitis cases; after burns, with or without infection; after the run of an acute rheumatism or a subacute attack in hand or wrist;—in all these conditions and in other odd calamities one meets with stiff wrists, stiff fingers, and no little suffering and disability,—out of all proportion to the cause or the lesion, for the lesion in fact is apt to be merely a scar fibrosis of one or another structure about the joint—in the "soft parts"—only rarely in the tendon sheaths which have been heavily overplayed in our teaching.

Some of the cases yield to the baking and massage that has become so usual lately that in our hospital records they write "B. & M." just as they still write "D. & C." for a routine measure hardly less justified as a scheduled routine.

Many pelvic cases, however, have never yielded to the magic of "D. & C.", and some wrists and fingers show a like stubbornness to the blandishments of "B. & M."!

Not a few become inveterate, though with little or no joint damage, and with actual lesions apparently inconsiderable.

It is fair, I think, to consider any case under ordinary physio-therapy treatment—and I include in this all the Zander, Tait-McKenzie measures—for three months without something near a cure, as fully ripe for a surgical overhauling.

Some there be that need bone surgery or tendon plastics or scar excision with flap plastics.

These are not our concern for the moment.

What we mean is the class of cases that have gone on for months almost unchanged,—the kind of cases that used to have a calamitous (though kindly meant) "*brisement forcé*."

Most of these can be handled by traction. During the war every doughboy knew the banjo or "ukelele" splint.

The principle—very old—of the "ukelele" was that of continuous traction, or, to put it concisely, of *distraction* and *traction*, the pulling of joint surfaces APART to lessen the terrific intra-articular pressure from the attempt to flex or extend the fingers.

Also the deep principle that massage can endure but a quarter or half hour a day,—1/96 to 1/48th of the time, while traction can equal 96/96—a not inconsiderable advantage, if you think of it.

Some months ago we found ourselves doubtfully blessed with a few of these cases, carefully treated by routine methods, getting no where at all.

CASE 1. F. W. Male. Age 53. Injury to shoulder, May 1920. Secondary stiffening, definitely arthritic, of wrist and fingers. Routine treatment with good P. T. handling. His home doctor advised amputation of at least two useless fingers.

January 1, 1921, all finger-tips under forced flexion could be brought only to the level of the knuckle joints and two inches away from the palm.

Apparatus as sketched in Fig. 1 was applied with the elastic pull regulated by the very competent patient. This was the full range of flexion possible at that time. He wore this apparatus for two months, then a strong elastic band about the knuckles to flex them was worn as constantly as possible. After about 2½ months the result was as shown in Fig. b, and a fortnight of massage and active exercise restored him to normal function.

CASE 2. R. B., Man of 55. Colles' fracture one year previous with mild arthritic reaction and stiff wrist and fingers.

Wrist capable of 45 degrees flexion, with no supination, and pronation 20 degrees short of his limit (measured by the other hand). Under physio-therapy the wrist came back to near normal but the fingers, particularly the first and fourth, remained stiff at knuckle and finger-knuckle joints so that they could not be brought within a half inch of the palm.

Traction apparatus applied (as in Case 1.) with pull in the line of the deformity *gradually* changed to slightly more flexion. This was March 8, 1921. April 4th all fingers touch the thenar eminence with a good grasp.

Patient discharged with perfectly good hand.

Time prior to treatment—1 year.

Time under treatment to final result—27 days.

CASE 3. H. T., Man of 38. Machinist. Four months previous, crushing wound back of right hand involving adhesion to tendons of 1st and 2d fingers.

Operation Jan. 25, 1921. Secondary repair