

The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. LXI, No. 2

CHICAGO, ILLINOIS

JULY 12, 1913

POSTERIOR GASTROJEJUNOSTOMY IN ACUTE PERFORATIVE ULCER OF THE STOMACH AND DUODENUM *

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PHILADELPHIA

There are but few affections which can be compared with acute perforation of a duodenal or gastric ulcer in respect to the certainty of death without operation, contrasted with almost equal certainty of recovery if the appropriate operation is done in the early hours after perforation. Prompt diagnosis and rational treatment, therefore, are the chief issues, and the necessities of immediate action in the event of perforation demand a condition of preparedness on the part of the physician and surgeon if they are to seize the opportunity of performing the modern miracle of transmuting the very throes of death into life and health.

Perforation of duodenal or gastric ulcers is infrequent, but not so rare that any active physician will fail to encounter one or more instances in the course of his practice, while the active surgeon will see even more. In the last ten years I have had thirty-six cases. It has seemed to me that these have increased in number in the latter part of this period, a circumstance which I refer not to increased frequency of the disease but to more accurate recognition and application of treatment. The cases of fatal "acute indigestion" are diminishing somewhat by the withdrawal of this as one of the important conditions erroneously so-called.

DIAGNOSIS OF PERFORATED ULCER

The diagnosis in the early stages is usually so easy that when it is missed it is the result of inexperience or of being caught off guard. I have been impressed by the accuracy with which my house surgeons have recognized the condition, particularly when the question is fresh in mind by reason of a recent case.

The leading symptom is pain; the leading sign is rigidity; the leading clue is a history of previous indigestion of ulcer type. The pain and the rigidity are invariably present. The suggestive history is occasionally lacking.

The pain of perforation is sudden and violent. There may have been premonitory pains of great severity, but the pain of perforation is agonizing and unbearable. It may come on during exertion or follow the ingestion of food or fluid. It will be described in various terms, but of its intensity there is no question. Its very severity often precludes exact localization by the patient. It is abdominal, not pelvic, midabdominal often, epigas-

tric or hypochondriac often, and in the iliac fossa occasionally, radiating to the back at times, but in general in the early portion of the seizure it is upper abdominal. Sometimes the patient detects a sensation at the moment of rupture as if something had burst in his abdomen. The posture is characteristic. These patients lie on their backs, the thighs flexed, every muscle tense, the facies anxious, and they are disinclined to shift their position.

General rigidity of the abdominal muscles sets in at once after perforation. The rigidity is of the extreme type often called board-like. It is most marked in the upper abdomen. So tense are the muscles that the abdomen is at first retracted, and, at times, a transverse depression is seen at the level of the umbilicus. There is no other condition in which the upper abdominal rigidity is so early and so marked as in perforated ulcer.

Extreme tenderness also is present at once after perforation. At first it is located over the site of perforation, but with the rapid spread of peritonitis, other areas of peritoneum become sensitive to pressure, and a source of difficulty in diagnosis is thereby introduced. In perforated duodenal or pyloric ulcers particularly, the peritoneal irritation spreads rapidly along the paracolic grooves into the right iliac fossa, and when the patient is first seen a few hours after perforation this area may be quite as tender as the epigastrium, thus accounting for a frequent error of diagnosing perforated ulcer as perforative appendicitis.

Were it the physician's privilege to be present at the time of perforation and observe the sequence of development of symptoms and signs, the spread of the peritonitis from above downward could be followed and the diagnosis made correspondingly easier, since appendicular peritonitis can as easily be traced from the iliac fossa to the upper peritoneum. Such an opportunity is rare and we must therefore bear in mind this characteristic rapid spread of peritoneal involvement, when we first see the patient after an interval has elapsed. Pelvic and rectal tenderness supervenes rapidly and may be of assistance in determining the existence of general peritoneal inflammation.

A history of prior abdominal trouble was present in all the cases which have come under my observation, the duration of symptoms ranging from two weeks to fifteen years. The sufferings of the patient dull his memory for details and render the time inopportune for the development of an exact history. Still, at times, from the patient himself, from his physician or from his friends, a satisfactory ulcer history can be obtained. Occasionally, as happened in several instances, no clear history pointing to preexisting ulcer could be obtained, even by questioning after recovery. This history then, when present, is of great assistance, but its absence by no means excludes the diagnosis of perforation.

* Read in the Section on Surgery of the American Medical Association, at the Sixty-Fourth Annual Session, held at Minneapolis, June, 1913.

This is the practical picture of perforated ulcer. If it is remembered and all the rest forgotten I am convinced that more diagnoses will be made than are made at present. The diagnosis is a feat of clinical observation and deduction based on the great outstanding and individual features of the disease. The attempt to place any other symptom or sign on the same plane of importance with those just mentioned will in individual cases result in disaster. A brief discussion of the subsidiary symptoms and signs will suffice.

Shock at the onset has been observed. In a greater or less degree it is not infrequently associated with the severe pain of perforation. But people are differently constituted in respect to the reaction to pain. Shock may be slight or very transient, and in most patients after a very few hours not even the slightest element of shock can be seen.

Vomiting is almost constant and is a symptom of value. It is not invariably present, however, and is a symptom of such common occurrence in varied general and abdominal disorders that it serves but little purpose in diagnosing the condition of perforation. Nausea and vomiting may be noted as of almost uniform association of auxiliary, but not distinctive, value. Blood in the vomitus is seldom seen, but when present is decidedly helpful.

The temperature, pulse and respiration rates are very misleading if the attempt is made to attach diagnostic importance to them. Let me cite, without selection, a few of the observations made on the operative cases in this series:

Temperature	Pulse	Respiration
98.3	104	24
99.4	92	24
99.	108	34
97.4	112	32
98.2	78	36
99.	96	28

These observations are fairly illustrative of the temperature, pulse and respiration at times ranging from six to fifteen hours after perforation. It will be seen that the temperature is least affected, not infrequently being normal, but naturally showing a slight tendency toward elevation.

The pulse is, as a rule, moderately accelerated. Again, it may be normal. There is nothing distinctive in its quality, which is frequently full and good.

The respirations are increased slightly as a rule. This is due, more than to any other factor, to the rigidity of the abdominal muscles and the diaphragm, which forces the breathing to assume the true costal type necessitating more frequent respirations for the purpose of aeration. In short, in the remedial stage of perforation there is nothing in the temperature, pulse and respiration to suggest the urgency of the patient's condition. Later, when the patient is getting ready for the pathologist instead of the surgeon, the temperature, pulse and respiration show great changes, a description of which is interesting for the student of the biology of disease but lacking in help to the sufferer.

Distention, the accumulation of fluid in the abdomen and the subsidence of peristalsis, "the silent belly," are also terminal events, of prognostic, but not of diagnostic, importance.

Free gas in the abdominal cavity and the obliteration of liver dulness are also signs which should be stricken out of the text-books or labeled indelibly as false friends. Too much stress has been laid on these signs as indicative of perforation of the bowel. Liver dul-

ness may be diminished or abolished either by gas in the peritoneal cavity or by gas in the intestine, but in either case it requires a large amount of gas to produce this effect. If the gas is in the intestine it requires marked distention, which, in the case of perforated ulcer, can come about only when peritonitis is advanced and as a rule irremediable. If it be free gas in the peritoneal cavity which causes obliteration of liver dulness, it must be present in considerable amount.

It is obvious that in the early stages of perforation the amount of gas which escapes from the opening must be dependent on the size of the opening and the amount of gas present in the stomach and adjacent bowel. I have operated in a case in which the opening in the ulcer was 3 cm. in diameter, but as a rule these perforations are small, in many cases being described as pin-point, and at the time of operation only fine bubbles of gas can be seen escaping very slowly. It would require a long time for the free gas thus escaped to produce much effect on liver dulness. Yet a high grade of peritonitis may already be present from the infection which has been liberated. I have operated in cases in which there was no free gas whatever in the abdominal cavity. When there is practically no gas in the stomach or duodenum there is naturally no escape into the peritoneal sac. Gas is not formed by the activity of gas-forming organisms in the peritoneal cavity until late in the disease. As an aid in helpful diagnosis, therefore, the obliteration of liver dulness is more of a hindrance than a help.

The leukocyte count is of some help, chiefly in differentiating such non-inflammatory conditions as gastric crises and abdominal angina. A leukocytosis appears very quickly in the vast majority of cases. In nineteen cases in which a complete blood-count was made the average leukocyte count was 16,082 per cubic millimeter and the polymorphonuclear neutrophils averaged 85.3 per cent. In one case of perforated gastric ulcer, however, the leukocyte count was 7,300 and the polymorphonuclear percentage 70. The perforation had existed eight and one-half hours and a well-marked diffuse peritonitis was present. A second case of perforated duodenal ulcer gave 8,850 leukocytes and a polymorphonuclear percentage of 89. The highest count observed was 23,600, and the highest polymorphonuclear percentage was 95 in two patients, both of whom recovered. In this condition, therefore, as in appendicitis and other intra-abdominal inflammations, I deprecate the attempts which are occasionally made to set up the leukocyte or polymorphonuclear count as arbiters of diagnosis or prognosis.

Finally, in the cases in which uncertainty exists as to the precise diagnosis the evidences of an acute abdominal catastrophe requiring surgery are so plain that from the point of view of treatment no mistake should occur.

METHOD OF TREATMENT

In discussing the method of treatment one thing should be clearly understood at the outset, namely, that success depends on promptness of action more than on any other single factor. If closure of the perforation is effected during the first twelve or eighteen hours a considerable percentage of recoveries may be expected even though the surgeon be inexpert. After about twenty-four hours the vast majority of patients are beyond human skill.

The influence of the time factor is seen especially well in this series. No operation was performed in ten cases, six of duodenal and four of gastric ulcer. In the

six duodenal cases all the perforations had occurred over two days and the patients were practically moribund on admission. In only one of these cases was the attempt made to operate. In this case after a few whiffs of ether the patient became pulseless and the attempt was abandoned. Three other patients were in a dying condition, and the remaining two died without operation one and one-half hours after admission.

Of the four patients with gastric perforations, one, with a perforation of three days' standing, arrived at the hospital in a dying condition; one was practically moribund and died in five hours; one was pulseless, the symptoms of perforation dating back one week, and died in ten hours. Only one is given in the records as having sustained perforation within twenty-four hours. This patient was a man aged 40 who had felt the symptoms of perforation only six hours previously. Nevertheless his condition was such that he died untouched one hour after admission. This is the only patient that had had the perforation within twenty-four hours or less before operation who failed to recover, and this case shows that an occasional patient will succumb with fulminating rapidity. The ulcer in this case was 1 cm. in diameter and was situated on the anterior surface of the stomach.

These cases represent the only selection against operation, and had I felt that there was a chance of recovery or even of enduring the operation they would have been given the benefit of the doubt. At the present time in reviewing the records I am convinced that there was no chance of saving these patients, for as has well been said "the resources of surgery are rarely successful when practiced on the dying."

In the twenty-six patients operated on there were eight gastric and eighteen duodenal ulcers. Twenty-five recovered and one died. The death occurred in a patient who had a perforated duodenal ulcer of twenty-nine hours' standing. This was the only case in which more than twenty-four hours had elapsed before operation. The operation was simple suture of the ulcer, completed as rapidly as possible on account of the patient's condition. Death, however, occurred from toxemia in ten hours. Three of the patients had perforations which had existed for twenty-four hours before operation. The remainder were all operated on at various times within that interval. The patient that died also had the only case of duodenal ulcer in which simple suture of the ulcer was done. In all the rest a posterior gastrojejunostomy was made at the primary operation. In only two cases of gastric ulcer was a simple suture of the ulcer performed. The remaining six had a gastrojejunostomy in addition.

The line of treatment adopted in this series was (1) closure of the ulcer; (2) plication of the duodenum to obliterate its lumen and fortification of this area by covering with the gastrohepatic and the gastrocolic omentum; (3) posterior no-loop gastrojejunostomy; (4) tube drainage of the pelvis through a suprapubic stab. The after-treatment consisted in the sitting posture, continuous proctoclysis, prohibition of everything by mouth until peristalsis was reestablished as evidenced by auscultation and especially by the passage of flatus. The stomach-tube was employed freely for vomiting, regurgitation or gastric distention. Experimentation with food was begun after the passage of flatus, beginning with albumin water. No purgatives were given, but a cleansing enema was given on the third day after operation.

These results warrant a strong plea for the performance of gastrojejunostomy as a primary procedure in addition to the closure of the perforation. The only exception I would make is in the case of patients who are desperately toxic or shocked, and the only condition I would impose is sufficient degree of familiarity and dexterity with the operation of gastro-enterostomy.

I have already spoken of the good general condition of the majority of these patients in the early hours after perforation. Gastro-enterostomy is one of the least taxing of major abdominal operations in respect to shock. Are not the objections to its performance rather theoretical than real, and should not the benefits of the operation, both immediate and remote, outweigh the fancied dangers? The slight prolongation of the operation need only rarely be considered as a contra-indication. If one has any belief in the curative powers of gastro-enterostomy the future of the patient must be brighter than if suture only has been done. Patients will seldom submit to a secondary gastro-enterostomy after recovery from perforation. The supposed danger of the infection of the lesser peritoneal cavity by gastro-enterostomy has been much overrated. I have not seen an instance of this condition. The early peritonitis of perforated ulcer seems to be in many cases more a chemical than a bacterial peritonitis due to the irritating secretion from the duodenum and stomach. Of twenty cases in this series in which a culture was made from the peritoneal fluid, fourteen showed no growth. The colon bacillus was found four times, streptococcus once and a mixed culture of *Staphylococcus aureus* and *albus* and the *Bacillus alcaligenes* in the remaining case. This is quite a different state of affairs from the peritonitis due to perforation of the lower portion of the bowel. Of course, infection rapidly occurs, organisms accumulate and the end-result is not different from infection of the peritoneum from other sources, but it is evident that the bacterial element in perforated gastric and duodenal ulcer is less serious in the early stages than might be supposed. Moreover, if the general peritoneal cavity is able to dispose of the accumulated infection present at the time of operation, the lesser cavity may be trusted to dispose of the slight soiling at the time of gastro-enterostomy.

The primary gastro-enterostomy places the perforated area at rest, favoring immediate quiescence and ultimate healing. Coexisting ulcers, if present, are favorably influenced. The chance of perforation of a second ulcer is diminished. The risk of hemorrhage from the bed of the perforated ulcer or from a second ulcer is minimized. In the case of duodenal perforation any narrowing in the lumen due to suture is compensated for by the anastomosis. This permits thorough and sufficient enfolding of the ulcer without fear of gastric retention. In my cases I have purposely caused pyloric stenosis by plication in order not only to safeguard the closure of the perforation but also to establish and render permanent the function of the new opening. The risk of leakage is greatly lessened by this procedure. The administration of fluid and food by mouth can be begun earlier and with confidence.

All these factors make for a reduced primary mortality. Paterson, in 112 consecutive cases of perforated gastric ulcers, found that 11 per cent. of the patients died shortly after operation from a second perforation, from hematemesis or from leakage along the line of suture. In my series there were no deaths from these causes, a fact which may justly, in part at least, be

attributed to the favorable influences of the gastro-jejunosotomy.

The only complication which gastro-enterostomy has added, so far as I can judge, is in one case of intra-abdominal hematoma probably from a vessel in the transverse mesocolon. It was necessary to operate and drain for this condition. One patient vomited for several days after operation, but recovered without any secondary procedure. The wound was infected in five cases. Postoperative obstruction occurred in two cases, requiring operation. Both patients recovered. In one case the obstruction was certainly, and in the other it was probably, due to adhesions along the tract of the pelvic drainage-tube. In the future in early cases with but little inodorous fluid I propose to omit pelvic drainage. Irrigation I never employ. The peritoneum not only does not need it, but is better able to cope with the infection if not flooded with watery fluid. Neither do I mop out the fluid through fear of doing injury to the endothelium. Through the suprapubic stab I aspirate the pelvic fluid during and after the operation.

With the remote results of this method of operation I am equally pleased. This phase of the subject I shall be obliged to reserve for a subsequent communication. I am at present advocating primary gastrojejunosotomy for its beneficial influence on the immediate mortality of perforation. It is fortunate that this operation chances also to be the curative operation for many varieties of chronic ulcer, and we are not surprised, therefore, that its beneficial influence is felt in the subsequent history of these patients.

Finally, I wish to reiterate my conviction that, while gastro-enterostomy does not compare in importance with closure of the perforation in gastric or duodenal ulcers, it is nevertheless a factor of first magnitude in the immediate cure and ultimate result.

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ABSTRACT OF DISCUSSION

DR. A. J. OCHSNER, Chicago: I wish to emphasize the very great importance of recognizing the necessity of immediate surgical intervention whenever the group of symptoms that has been given exists. Now, if this group of symptoms should be present in a case of perforation of the gall-bladder, or of a thrombosis of one of the mesenteric vessels, or of acute pancreatitis, the indication for treatment would be precisely the same. Then if a surgeon of only mediocre ability should be present, the question might arise as to whether it would be best to wait for the purpose of obtaining a surgeon of great skill. The patient with any one of these conditions is very much more likely to recover in the hands of any surgeon who is clean and who knows enough not to do too much, within twelve or eighteen hours, than he would be in the hands of the best surgeon twelve hours later. So that here you have a condition in which the mediocre surgeon must simply provide a closure of the leakage and drainage for the surgeon who is to perform the gastro-enterostomy.

I believe that Dr. Deaver's advice to do a gastro-enterostomy is good. I believe it would be wrong for one who has not performed this operation to do it. The risk is too great, but any one can cover an ulcerated surface by folding it lengthwise; or he can cover it with a piece of omentum and then put in drainage. Dr. Deaver also advised stomach lavage and proctoclysis. That is good advice. We need not fear any harm from stomach lavage, provided nothing is put into the stomach after washing it out. If you follow out that treatment you will give the patient a mighty good chance to recover.

Dr. Deaver also tells you that the posterior gastro-enterostomy puts the parts at rest. Gastric lavage does the same thing. No matter what is wrong inside the gastro-

intestinal tract, the two things to do are gastric lavage and proctoclysis.

I wish to emphasize particularly this one point, of taking these symptoms to mean that you must provide this form of relief. Suppose you have made the wrong diagnosis. If the patient comes to you a little late and you make a diagnosis of appendicitis or extra-uterine pregnancy, you make an opening over the appendix and you find it only slightly inflamed; if you find a few bubbles of gas there, you will say that there is a hole higher up. Of course, if there is a perforated appendix, you will know where the gas comes from, but that is a symptom or sign which must invariably lead you to make an opening higher up and do whatever your ability permits you to do.

DR. R. C. COFFEY, Portland, Ore.: If all duodenal ulcer operations could be performed by Dr. Deaver, I would not say a word in discussion, because I think he has outlined the perfect treatment, provided you have at hand an expert surgeon like Dr. Deaver and a hundred others I could mention. Unfortunately that is not always the case, particularly in the West. Probably two-thirds of the operations for acute abdominal conditions are done, not by the surgical specialist, but by the general practitioner who first sees the patient, the man who does his own appendectomies, and who goes into the abdomen with the full expectation of finding appendicitis in more than half of the cases. Instead of that he finds the condition that Dr. Deaver described. This is illustrated by the fact that within a week my assistant called my attention to the fact that I had done more cancer operations in the last year than I had done appendectomies. The reason for that is that the acute work in the West, like appendicitis operations, is done largely by the general practitioner. If the men who are capable of removing the appendix in an emergency were to treat the condition Dr. Deaver described, the mortality would be tremendous. On the other hand if they took the more moderate course, they would save a great number of their patients. If Dr. Deaver's paper were to be read only by surgeons, it would be ideal, but over half of the patients in this country are not operated on by skilful men but by men who do their own surgery, and who, instead of doing a gastro-enterostomy in thirty minutes, do it in three hours. It is dangerous. Those men who are not prepared to do gastro-intestinal surgery, but who are doing good emergency work, like appendicitis operations, ought to stay away from the more dangerous ground.

The treatment Dr. Deaver describes is the correct one. I bring the omentum over the ulcer. There is no danger of producing a fistula, providing you have the whole area covered with omentum. That will give you a good result, and men with mender skill or surgical ability will have almost as good a result as the expert surgeon who attempts to do the radical operation. Furthermore, gastro-enterostomy does not cure in a large percentage of these cases. The suturing over of the ulcer which has perforated is necessary. Infolding the intestine is only a temporary affair, and if you will take a roentgenogram a few weeks after the operation you will find that the duodenum is back where it was before the operation.

DR. W. J. MAYO, Rochester Minn.: There are several things that Dr. Deaver brought up that are of very great importance, and one is that he puts all of his emphasis on the duodenal ulcer. Years ago it was gastric ulcer that was emphasized, but to-day it is duodenal ulcer because the surgeon has shown as good results from operations on patients with duodenal ulcer in at least 75 per cent. of all cases.

Dr. Deaver spoke of the acute abdomen. That is also a very important subject. The things that produce the acute abdomen are, first, the appendix; second, the duodenum; third, the condition of acute pancreatic perforation; fourth, perforation of the stomach, and of the gall-bladder; and in the pelvis we get conditions that simulate a thrombosis of the mesenteric vessels. If we keep these five things clearly in mind, we will get the vast majority of cases that will go to the general surgeon.

Dr. Deaver put emphasis on the question of early operation, just as Murphy, Deaver, Ochsner and others have done in

regard to appendicitis. But it is even more important that we should have an early operation in duodenal ulcer, because in the average case we cannot expect to do the operation in twenty-four, thirty-six or forty-eight hours and still expect the patient to recover; the operation to be life-saving must be done within the first twelve hours. As Dr. Deaver said, the condition of the patient is extremely good in the first twelve hours, therefore, we can do a gastro-enterostomy if we have the patient where we can give him the best possible care, but that can be done only in good hospitals, with skilled assistants, with conditions favorable and with men familiar with the operation. It is better, however, to be operated on by the man with little experience, in twelve hours, than by the best surgeon in the world after twenty-four hours. He must do the one thing that will cure the patient at that time, and he must be mindful of the fact that the patient needs to have a second operation, and that it is only the living patient who can have a second operation.

The secretions in these ulcers are extremely acid. A chemical peritonitis occurs, and in a few hours the bacteria gain power, the infection spreads all over the already irritated peritoneum, and the patient dies. In gastric ulcer I would like to have Dr. Deaver say what course he would pursue in the first twelve hours. We have tried several plans. One of the best is to strap up the stomach, put a drain into the opening in the stomach, and drain into the bottom of the peritoneal cavity.

DR. WAYNE BABCOCK, Philadelphia: I feel, as have the last two speakers, that the chief problem is whether or not gastro-enterostomy should be done in these cases. I have had an experience with eighteen cases of acute perforated ulcer in the duodenum in which the condition was recognized, and the frequency of the condition as compared to acute gangrene of the appendix is about one to twenty-five. Many of the patients were admitted with the proper diagnosis, and many entered with a diagnosis of appendicitis. As Dr. Deaver said, residents after seeing one case usually recognize the second case.

The results of our treatment have been somewhat interesting because in no case have we done a gastro-enterostomy. In the early cases I believe I operated on these patients with a diagnosis of appendicitis, for symptoms are often in the appendix region, and when the abdomen is opened the appendix is found blistered, but the striking thing is that the fluid around the appendix is mucilaginous, not thin as one finds with appendicitis. Once we recognized this point we immediately opened above and found the ulcer. It is interesting that only seven of these eighteen patients gave a previous history of ulcer; two gave a history of somewhat recent abdominal traumatism. Of these eighteen, sixteen were men and two were women; young adults, of middle age. Eleven came to the hospital and were operated on after twelve hours had elapsed; seven reached the hospital and were operated on after twenty-four hours had elapsed. There was one that reached the hospital after seventy-two hours and one on the fifth day. The interesting feature in the last-mentioned case was that the patient recovered although there was a general peritonitis with a greatly distended abdomen. The patient who came to the hospital on the third day also recovered.

At the end of twelve hours one man died as the result of secondary abscess of the liver. Of the two that entered the hospital after twenty-four hours, one man entered on the twenty-seventh and the other on the thirtieth hour; both died, having been moribund on admission. The other fifteen recovered. In one case with a recent ulcer diagnosis, at first the attempt was made to suture the ulcer, but the suture does not hold well in sodden tissue, so after our first experience we put a pad of gauze against the ulcer and drained the abdomen and put the patient to bed.

The final results are of special interest. Of these fifteen patients only one continued to show ulcer symptoms; the other fourteen remained free from symptoms. The fifteenth returned after ten months and had a secondary gastro-enterostomy. In the case of the others, if a gastro-enterostomy

had been done the good results obtained would have been ascribed to that operation and not to the procedure employed.

DR. K. A. J. MACKENZIE, Portland, Ore.: I have had very limited opportunity of observing the condition under discussion. The cases I have had, however, have served as some food for reflection and study. I can recall five acute cases of perforation in which there was extravasation of the contents of the stomach or duodenum, or both. These cases have been invariably accompanied by shock, so that in most instances operation looked like a serious matter. It was done, however, and satisfactorily in all instances but one. This patient died after seven days. Another patient had additional perforations and recovered after secondary operation. Two others managed to make their escape.

When the question of gastro-enterostomy is being considered as a measure of affording permanent relief in these cases, it makes me think seriously as to whether or not it is sound surgery; whether the technic which consists simply of incision of the abdomen and closure of the opening in the bowel, with adequate drainage and enterocolysis, is not perhaps the best. After all, we should avoid serious operations such as Dr. Deaver mentioned, because, even in the hands of skillful operators, they must consume at least twenty or thirty minutes. I am appalled to think that any group of patients should be able to stand it, so I would protest against such a procedure. Any surgeon who is a great anatomist like Dr. Deaver takes a serious responsibility in proposing such an operation before a gathering of this kind. I should say that even in the hands of the average operating surgeon the mortality would be very much higher than it would be if a more simple procedure were followed, such as that proposed by Dr. Babcock. I do not think that the great surgeons should recommend these more serious operations. It reminds me of what Mr. Lane proposed some years ago, the removal of the colon; we have no opportunity afterward of unscrambling the egg. When a proposal such as this is made, when this paper, for instance, goes out into the world, a great many operations will be performed, whether by skilled surgeons or otherwise matters not, and many patients will die. The mortality will be large, so large that the figures will be appalling, and those who propose this operation must feel some degree of responsibility.

DR. H. T. STURTON, Zanesville, Ohio: It might be of interest for me to recite an experience that I had a few years ago with a strong, otherwise healthy man of 29, who complained of indigestion of several years' standing and gave a history of having had the symptoms that Dr. Deaver would pronounce those of perforation of the stomach. I examined him and concluded that he was suffering from a gastric ulcer. I advised operation. On opening the abdomen, I found the omentum plastered to the stomach, and not having the experience nor the skill of Dr. Deaver I proceeded to uncover the stomach to see what had happened. I found that there had been an ulcer and that a perforation had occurred, which Nature had buried very kindly, much better than even a Deaver or a Mayo could have patched it up. The result was that that man was very miserable the rest of his life, and advised all his friends never to submit to an operation, because he had been very comfortable before and was very miserable afterward. So that if we are going to operate on all these patients who simulate ulcer of the stomach or duodenum, God pity humanity. So far as I am concerned personally, if I had an ulceration of the stomach with perforation, I tell you that, notwithstanding the greatness of the men who have spoken, I would rather be treated by the poorest physician than be operated on by the best surgeon.

DR. JOHN B. DEAVER, Philadelphia: I am very much obliged to those who agreed with me so heartily. As for the last speaker, he belongs in the medical section, not in the surgical, but if he stays here long enough he may soak up some wisdom. As to the question of the family doctor operating, we are not living in that age, I hope. This is not an operation for the family doctor to do; it is not an operation for the man who does obstetrics and attends scarlet fever and measles. It is an operation for the surgeon and only the expert sur-

geon should undertake it. There are certain conditions that are extenuating circumstances. Judgment must be exercised. The operation must be adapted to the case and not the case to the operation. Nevertheless, the principles underlying my contentions are correct—this operation accomplishes the greatest amount of good in the greatest number of cases. We need pay no attention to the crossroads surgeon. The man who has not the experience and ability has no business to do intestinal surgery. Only those surgeons who have spent a lifetime doing this work ought to be allowed to do it. There are few places in this country in which a surgeon cannot be found who can do this work within twelve hours. Patients do not die in twelve hours. I have never seen one die yet. At the end of twelve hours you can do so much surgery that you will be surprised that they do not die. They never die if you are operating in a sterile field. The Germans called attention to the bacteriology in this class of cases, and the good surgeon of to-day is the man who understands bacteriology. In my thirty cases there were only four from which I could grow a culture. The others were sterile, and the patients were operated on within twelve hours. That is the time when we are operating in a sterile peritoneal cavity.

Dr. Mayo emphasized certain points that are true. Certain cases of gastric ulcer really do not permit of a posterior gastro-enterostomy. I have had one patient with three consecutive perforations, the last one being in the posterior wall of the stomach. He recovered. This is a very important subject. I am sure that you understand my position in the matter, particularly as to who should and who should not perform these operations.

RADIUM IN SKIN DISEASES *

FRANK E. SIMPSON, M.D.

CHICAGO

The preliminary note that I present at this time with reference to the action of radium in skin diseases is based on studies made on forty-five patients with fifteen different skin affections who have had in the aggregate about one thousand applications of radium.

Some experiments made on guinea-pigs with the help of Dr. Korper of the Sprague Memorial Institute to determine the effect of radium on experimental cutaneous tuberculosis will be only briefly referred to here.

The whole subject of the physics of radium is on a well-established foundation. Radium gives off spontaneously two different therapeutic forces—the emanation and the rays. The emanation has been used principally in the domain of internal medicine.

In the treatment of skin diseases the rays are mainly utilized by simply applying the radium directly to the diseased area. A very useful modification of this method consists in the interposition of screens or filters between the radium and the skin. The use of screens was developed originally by Wickham¹ from a consideration of the different characters of the alpha, beta and gamma rays emitted by radium. The alpha and soft beta rays produce a dermatitis rather easily. The hard beta and gamma rays, isolated by screening out the alpha and soft beta rays, act deeply and produce little or no superficial inflammation unless the action has been very prolonged.

Reaction in the tissues produced by radium may be, first, "selective." Certain vascular nevi may be dissipated without visible inflammatory changes in an absolutely unique manner.

Second, radium reaction may be "inflammatory." In practice, one utilizes, of course, both the selective and the inflammatory reactions in achieving results.

Taking as a type a radium applicator having a flat surface of 4 sq. cm. and containing 4 cg. of mixed radium sulphate and barium bromid (alpha rays 20 per cent., beta rays 76 per cent., gamma rays 4 per cent.), one may produce various results on healthy or non-inflammatory pathologic tissue. The reaction produced depends principally on the length and frequency of the exposure to the rays.

After an exposure of thirty minutes redness appears on the skin in about three days. This is accompanied by slight burning and itching. Desquamation occurs and in about three weeks the reaction has subsided. An exposure on three successive days, one hour each day, produces an inflammatory reaction that is marked and unique. At the expiration of about three days redness appears. The skin becomes itchy, somewhat swollen and tender to the touch. A crust gradually appears which is of greenish-yellow color and rests on a dry or slightly excoriated base. The crust, which may be 0.5 cm. thick, resembles in appearance that of impetigo contagiosa. The crust lasts for two or three weeks and may fall off spontaneously and renew itself several times. Finally, at the expiration of four or five weeks, a pink and then a normal skin surface is left.

In applying radium for curative purposes the personal factor is important. Regard must be paid to the exact character of the lesion in order to bring about a favorable result.

REPORT OF CASES IN WHICH RADIUM WAS USED

The cases in which I have used radium may be briefly reviewed:

EPITHELIOMA

I have treated about a dozen cases of epithelioma situated on the face. In this number are included two cases of epithelioma of the lower lip. In neither of these was there any demonstrable metastasis.

In one case, in which an epithelioma had existed at the mucocutaneous junction of the lower lip for three years, radium was applied unscreened for three hours and then with a silver screen (0.1 mm. thick) for four hours. The applications extended over several weeks. A slight dermatitis and some soreness of the lip followed which soon subsided. It would now be difficult to detect the site of the former epithelioma.

In a second case, an enormous epithelioma had been present on the lower lip for eight years. It had taken on great activity in the eight months prior to my observation and when first seen involved almost the entire lower lip. At first radium was applied unscreened. After three preliminary applications the exposures were continued through silver screens (0.1 and 0.5 mm. in thickness). The applications were made both on the external and internal surfaces of the lip. This "cross-fire" method, advocated by Wickham,² evidently allowed greater concentration of the rays at a depth without injury to the superficial tissues. In the course of two months the patient received twenty applications. While complete recovery has not yet occurred the progress has been very satisfactory. At the present time only a very slight infiltration marks the site.

I would not be understood as advocating this as the method of choice in epithelioma in this situation. In patients who refuse operation and in whom there is no evidence of metastasis, radium treatment has been shown to be effective. In ten cases of epithelioma of the rodent-ulcer type, situated on the temple, at the side of the nose and other parts of the face, I have obtained successful results with radium.

* Read in the Section on Dermatology of the American Medical Association, at the Sixty-Fourth Annual Session, held at Minneapolis, June, 1913.

1. Wickham and Degrais: *Radiumthérapie*, Second edition, 1912 p. 43.

2. Wickham and Degrais: *Radiumthérapie*, p. 77.