

ILEOSTOMY*

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DURING the past decade considerable interest has been aroused in the surgical treatment of ulcerative colitis. Ileostomy, as the first stage in the removal of the colon as well as a complete method in itself to effect "cure," merits discussion. Appendicostomy, cecostomy and, except for certain cases, colostomy have been discarded as ineffectual surgical measures, and have in the past and do at present complicate further surgery when undertaken. Ileostomy deserves no such fate.

Realizing the magnitude of subtotal colectomy with subsequent removal of the rectum, the question has repeatedly been asked, Will ileostomy alone cure this disease? There are those^{1, 2, 3} who have felt if ileostomy is performed early enough in the course of the disease no further operative interference is needed and the ileostomy can be closed when the process has healed. Others^{4, 5, 6, 7} are of the opinion that ileostomy alone is seldom curative and, except in rare instances, should remain permanent.

This presentation will submit data concerning the indications for ileostomy—the preoperative medical preparation; the immediate preoperative surgical preparation; the technic of ileostomy; the postoperative management as to diet; the care of ileostomy; and the complications and the mortality. Also, the results of a questionnaire sent to members of three national surgical associations⁸ will be given, as well as experiences with ileostomy at the Roosevelt Hospital, New York.

At the outset, it is well to emphasize the importance of complete medical control of both preoperative and postoperative periods, and throughout the illness of these patients. Let the physician and surgeon jointly decide the time for surgical intervention and, further, the follow-up should be carefully observed by both physician and surgeon.

Indications for Ileostomy.—To subject an individual to ileostomy which, in all but a small percentage, is permanent requires cautious reflection. In the small group of about 10 per cent, where the rectum is free of the disease, ileosigmoidostomy is eminently suited; and in an equally small group, where the disease is proven limited to the left colon, colostomy, relatively easily managed, suffices.

The conditions requiring ileostomy may be classified under two headings: (1) Emergency; (2) elective.

Emergency.—In the emergency group impending perforation often necessitates immediate intervention. Heretofore, massive hemorrhage has been

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considered an indication for emergency ileostomy. Realizing by past experiences that ileostomy, performed at or immediately following massive hemorrhage, is almost always fatal, and that vitamins K and C have been a competent factor in controlling bleeding, we discard this from the lists of indications.

Elective.—More numerous are the patients in whom elective surgery can be planned. A previous report from the Gray Service of the Roosevelt Hospital⁹ pointed out that the medical prognosis in the individual case depends upon the extent of irreparable damage to the colon and the identification and control of factors contributing to activity of the disease.

In certain instances despite advanced and permanent organic changes in the colon, evaluation and control of these factors permits the individual to remain largely, if not completely, symptom free under ordinary conditions of life or activity. Such individuals necessarily must be classed as instances of satisfactory response to medical care. Surgical intervention is not indicated.

Others, despite repeated investigation and reevaluation, present progressive extension of the pathologic changes and are continuously handicapped by chronic symptoms of greater or lesser severity. Still another group continues to exhibit the characteristic periods of activity and remissions, accompanied by an extending involvement of the colon, and are seriously handicapped by their disease. Surgery must be considered for these two groups.

The results of elective surgery will depend upon two basic factors: (1) Technical procedures; (2) the preoperative and postoperative care. This implies and actually necessitates continuous cooperation by the surgeon and the internist.

Preoperative Medical Study and Preparation.—Adequate preparation for surgery demands meticulous, detailed, and prolonged medical investigation of the patient, in some instances as long as one year. Many abnormal conditions which should be corrected among them are: (1) Active food allergy. (2) Disturbed physiology of other parts of the digestive tract (gastric acidity produces diarrhea and flatulence; hypomotility of the colon with right-sided retention contributes to the degree of pain). (3) Psychic and emotional factors. (4) Conventional diets too low in proteins; thiamine chloride; vitamins A, C, D; and certain members of the B complex. (5) Anemias—hypochromatic and microcytic, at times hyperchromatic and macrocytic. (6) Disturbances of mineral metabolism involving particularly calcium, phosphorus and sodium chloride. (7) General malnutrition and inanition.

Anesthesia.—We have, in over one-half of the cases, used avertin, gas, oxygen and ether. Lately, however, we have used novocain, procaine hydrochloride and pontocaine, in small amounts, administered low in the canal, as a prolonged anesthesia is not necessary in carrying out this procedure.

Immediate Preoperative Surgical Preparation.—Immediate preoperative surgical preparation consists, principally, in thoroughly cleansing the colon by the use of daily irrigations with warm saline solution. It is important

that the fluid balance and the blood chemistry be regulated by the administration of infusions and, if necessary, transfusions. Recently, it has been shown that before and after surgical procedures, the vitamins, especially vitamin C, are markedly reduced; therefore, vitamin supplements are administered sufficiently to saturate the patient.

A nonresidue diet is advisable for 36 hours prior to proposed operation, and lead and opium pills and paregoric render the bowel quiescent.

Technic of Ileostomy.—Ileostomy as a surgical procedure has been known for 150 years.¹⁰ It was not, however, until 1913 that John Young Brown¹¹ made use of this procedure in ulcerative colitis. Since then various modifications of the Brown ileostomy have been employed. One of us (H. W. C.) for the past two years, has employed a form of ileostomy which has proved satisfactory.

A modified McBurney incision is made well away from the anterior superior spine (Fig. 1). The peritoneum is opened. The terminal ileum is carefully inspected (in about 25 per cent of the cases it was found that the terminal ileum appeared reddened, edematous and rigid, yet when reexamined at the stage of subtotal colectomy, only in four instances was it actually involved). We lay great stress about the advisability of not exploring the surrounding peritoneal cavity, at this time; for the reason that disaster has come of this. The wall of the cecum is thinned out. In places it is diseased and it is easy to perforate the cecal wall with the examining finger if great care is not taken. Garlock¹² cites one experience when, inadvertently, he pushed his examining finger through the diseased wall of the cecum.

The exact site of division of the ileum depends upon the amount of inflammatory process which is found to be present, and upon previous roentgenologic studies. Usually six to eight inches from the ileocecal valve, the small bowel will be found to be normal. Two façades of vessels in the mesentery are then divided for about three inches. It is, at this point, judicious to see that the ileocolic artery has not been injured. A small stab wound is then made one and one-half inches below the umbilicus, just to the left of the midline. This is to be the site of the distal divided end of the ileum, which becomes a mucous fistula. One purpose of placing this mucous fistula at this point is that at the second stage, when the entire colon is removed, this mucous fistula is in the line of the long, left, paramedian incision. Certainly, the most difficult part of subtotal colectomy is the division of the splenophrenic-colic ligament and it is for this reason that a long incision on the left side of the abdomen is preferable, so that this step of cutting the splenophrenic-colic ligament is made easier.

An Ochsner clamp is introduced through the stab wound below the umbilicus on the left side and is placed to the distal side, where division of the ileum is to be made. A Kocher clamp is introduced through the McBurney incision and this grasps the proximal portion of the ileum. The ileum is then divided transversely with the cautery or a carbolized knife (Fig. 2). The distal end of the divided ileum is then drawn out as a mucous fistula

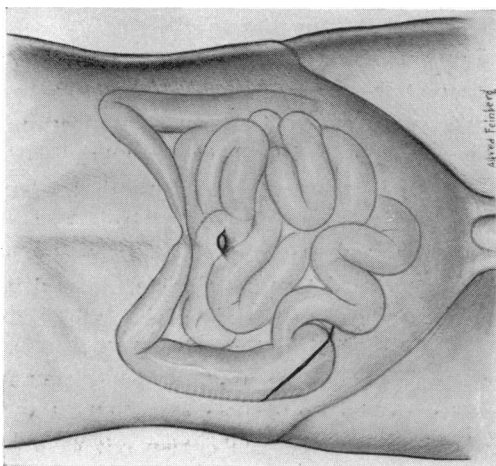


FIG. 1.—Diagrammatically representing a potential stricture in the transverse colon. McBurney incision, the lower angle curved well to the left. The entire incision should be well away from the anterior superior spine to permit the comfortable use of a bag.

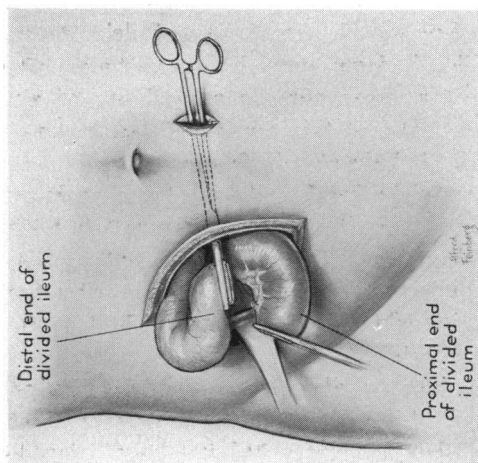


FIG. 2.—Distal divided end of ileum to be drawn through stab wound to left of midline. Proximal end brought out at lower angle of modified McBurney incision to constitute the permanent ileostomy opening.

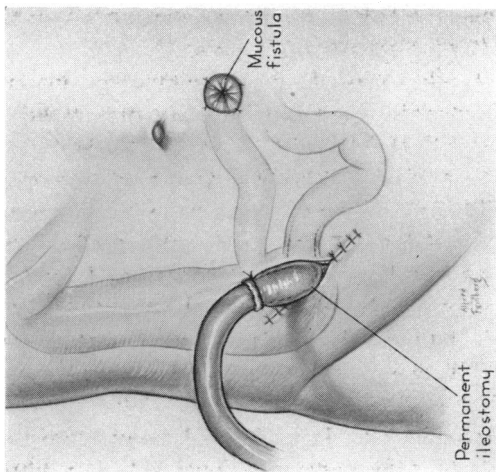


FIG. 3.—The permanent ileostomy with large caliber rubber tube in position. Also, showing a suitable site for the mucous fistula.

through the stab wound, to the left of the midline, and a few sutures are taken in the mesentery to prevent retraction (Fig. 3).

The proximal end of the ileum is then brought out through the lower angle of the McBurney incision; in fact, of late, we have found it preferable to divide the fascia over the rectus muscle, push the rectus muscle medialward, if necessary divide its outer fibers, thus being assured that the ileostomy will be toward the midline and well away from the anterior superior spine. In order to prevent loops of small intestine from prolapsing through the rent in the mesentery, and also in an effort to prevent the ileostomy from prolapsing, interrupted sutures attach the cut end of the mesentery to the peritoneum well underneath, and to the fascia. The wound is now closed in layers about the protruding ileum (Fig. 3).

Two inches of ileum should protrude from the anterior abdominal wall. The clamp is immediately removed from the protruding proximal ileum and a good-sized rubber tube is placed into the stoma and carefully tied with a segment of cotton tape. A greased gauze dressing is applied.

The tube connects with a bottle over the side of the bed and usually within 24 hours it begins to function. The tube usually remains secure in the ileum for about eight days, at which time it drops out and the contents of the ileum pour out on the anterior abdominal wall. Caution should be exercised to eliminate any excoriation of the skin.

We have found this best prevented by the use of: First, applying compound tincture of benzoin, over this is sprinkled Fullers' earth, and a salve made of aluminum powder; cod liver oil and zinc oxide are frequently used. From the beginning, the patient is instructed to look after his own ileostomy. Pledgets of cotton are supplied to him in abundance so that the discharge may be wiped away at frequent intervals.

Postoperative Management.—Immediately following ileostomy, a transfusion is administered. In order to insure the immediate functioning of the small bowel through the newly made ileostomy stoma, adequate fluids, by venoclysis, or Hartman's solution and 5 per cent glucose in saline are administered.

Serum protein, the chlorides and calcium content of the blood are carefully checked at intervals following operation. Determination of plasma and serum specific gravity is also of value in aiding the maintenance of chemical balance. If there is found to be a deficiency in vitamins K and C or if a raised prothrombin time is present, these vitamins are given. Thiamine chloride 25 mg. is given intramuscularly for three days prior to operation and for the first ten days postoperatively. This vitamin assures an improved appetite and aids materially in coaxing these patients to begin eating early following the operation and maintains the desire for food. This factor is important in the restoration of function of the ileal stoma.

The day of the operation, the patient is urged to chew gum and is given cracked ice. For the first day postoperative, soda crackers and melba toast with cracked ice are alternated every two hours with orange or lemon juice

until the ileostomy drainage begins. A soft, low residue diet is given in the afternoon as small feedings every three hours. The second day postoperative, the soft diet is continued as six feedings with copious amounts of fluids. On the third day after operation, a more solid diet is permitted. This diet is continued until the tube drops out, usually from the eighth to the tenth day, when a regular diet is instituted, unless food idiosyncrasy is known to be present.

In those patients where the serum protein tends to be low in spite of transfusions, a high protein, high carbohydrate diet is advisable.

The following beneficial results are enumerated: (1) The ileal stoma functions usually within 24 hours. (2) There is a minimum amount of postoperative gas and distention; thus the risk of vomiting and ileus is minimized. (3) The sense of well-being is rapidly restored. (4) The weight is maintained, so that usually the convalescent weight loss is seldom more than three to five pounds.

Complications of Ileostomy.—The complications of ileostomy, often annoying, are seldom fatal. Bleeding from the mucous membrane lining the stoma is occasionally thought by the patient to be involvement of the small bowel. In one instance bleeding so severe occurred that adrenalin and pressure bandages had to be resorted to.

Prolapse of the ileum is not uncommon in the earlier cases in our series before suture of the ileal mesentery to the fascia was carried out. Many prolapsed; several protruded four to six inches from the surface of the anterior abdominal wall, and still do. As yet, in no instance have we had to revise an ileostomy for this reason.

Retraction of the stoma from the abdominal wall may occur, especially in fat individuals where it has proved difficult to estimate the proper amount to withdraw from the abdomen. Careful fixation of the mesentery to the fascia will prevent this.

In three instances, narrowing of the stoma with impending stricture has resulted from too close suturing of fascia about the bowel. This we have overcome by repeated daily dilatations by the patient's index or little finger.

A poorly selected site for the ileal stoma in our one experience (too near the anterior superior spine) necessitated an additional operation in order to transplant the opening nearer the midline of the abdomen.

Due to an ill-advised suture in the ileal wall itself, secondary openings proximal to the stoma developed, in two of our patients, necessitating revisions in both instances.

Intestinal obstruction, particularly of loops of the small intestine, is a complication to be dreaded. One of the patients in our series suffered from acute ileus on two different occasions. Enterostomy fortunately relieved the first obstruction; removal of the ileostomy stoma to the left side of the abdomen was deemed necessary following the second episode, and subsequently proved to be justified. Two other individuals were temporarily blocked, were hospitalized and were relieved by palliative measures.

ILEOSTOMY

An unusually striking sequela of ileostomy was repeated attacks of pronounced collapse due to the loss of NaCl from the sudden and rapid ejection of fluid from the ileostomy stoma. This patient was so debilitated that he has returned to the hospital upon three occasions seeking intravenous administration of fluids and chlorides.

Results of Questionnaire.—The answers to our questionnaire revealed noteworthy information. We were particularly interested to learn: First, if patients had been cured by ileostomy alone; and second, whether subsequent closure of ileostomy had been justified.

TABLE I
Ileostomy Without Closure

No. of Patients	
77	Results not given
26	Results given:
	13 of these 26 were symptom-free; a few "cured"
	13 of these 26 symptoms continued
51	Deaths, or mortality of 33%
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Total	154

With the results given in only 26, excluding deaths, no conclusions can be drawn as the number is too small. It was of interest to note that in two patients the disease progressed beyond the ileostomy into the adjacent proximal loop, reemphasizing the now indisputable value of transverse or single barrel over loop ileostomy. However, the mortality following ileostomy of this group of 154 patients was 33 per cent, which is not unexpected considering the published reports of various other surgeons. This mortality impresses one with the seriousness of ileostomy. The principal reason for the mortality in many instances is that surgical aid is frequently sought too late. The acute, fulminating group with actual or impending perforation, massive hemorrhage, or chronic intractable patients who have been debilitated to a marked degree and who have been inadequately treated medically, are bad surgical risks. Admittedly, ileostomy is not a difficult technical procedure; it was, in the past, attended by a considerable mortality. Cattell's¹³ mortality of 22 per cent; Kunath's¹⁴ 83 per cent mortality following ileostomy in 12 patients, and our total mortality of 23 per cent, all emphasize the necessity of earlier surgical intervention and better preparation for operation. In certain individuals, thorough medical study and careful postoperative care are essential. In no small measure has the high mortality been due to a rapid and excessive loss of fluid and chlorides immediately after operation.

Of this small group who were subsequently closed, 59 per cent were restored to health, for an average of nine years. This is encouraging, yet from the answers it was difficult to conjecture the degree and the extent of the pathologic process prior to the preliminary ileostomy.

The shortest elapsed interval between establishment of ileostomy and closure was two months, the longest approximately seven years. The op-

timum time for closure (if they are to be closed) does not depend on the interval between the establishment of ileostomy and its closure, as on the condition of the bowel and extent of the colonic lesion as determined by roentgenologic and proctoscopic examinations and the clinical signs and symptoms.

TABLE II

No. of Patients	Ileostomy with Subsequent Closure
22 or 59%	Restored to health. Follow-up 2-20 yrs. (average 9 yrs.)
9 or 25%	Recurred:
	1—Nothing done
	3—Reoperated upon: Second ileostomy necessary (2 of these symptom-free. 1 not improved)
	5—Not stated what was done

Mortality in Those Closed

6 Deaths, or 16.7%:

- 1 Died 1 mo. later—leakage at site of anastomosis (ileosigmoidostomy)
- 1 Died 2 yrs. later—recurrence
- 1 Died 8 yrs. later—recurrence
- 3 Cause of death not stated

Nine of these patients showed a recurrence of their disease following closure; three were operated upon and second ileostomies were found to be necessary. It is our opinion that it is a rare experience to successfully close an ileostomy in ulcerative colitis when the colon shows extensive ulceration, fibrous or pseudopolypoid degeneration. Garlock,¹⁵ of the Mt. Sinai Hospital, New York, is strongly in favor of preserving the rectum, in the hope that the process will subside to the point where it will be safe to close the ileal stoma and divert the fecal current through the anal opening by performing an ileoproctostomy. The mortality of 16.7 per cent, or even higher death rate, can be expected not only from technical risks but from late recurrence. Mackie's¹⁶ contention is endorsed, that: "It is impossible to say that after any given period of freedom from activity the disease will not recur."

From replies received, but few of the patients fell into the acute, fulminating group, and it was evident that the majority of procedures carried out were of an elective nature.

EXPERIENCE WITH ILEOSTOMIES
FROM THE
GRAY SERVICE AT THE ROOSEVELT HOSPITAL

Three hundred five patients suffering from ulcerative colitis have been treated on the Gray Service at the Roosevelt Hospital during the last four years. Of these, 45 have been subjected to some surgical procedure. Sixty-nine maneuvers have been carried out on these 45 individuals. Of these, 30 have been ileostomies. There were 23 males and seven females. The

ILEOSTOMY

average age of these 30 patients was 29.8 years. The average duration of symptoms was seven years; the shortest illness recorded was two weeks and the longest was 25 years. It was of interest to note the status of these individuals when they came to surgery. Eight were subjected to operative interference on account of perforation, two on account of hemorrhage, three on account of obstruction and 17 because they were suffering from the disease in a chronic intractable form.

TABLE III
STATISTICAL RÉSUMÉ OF ILEOSTOMY DEATHS

	No. of Cases	Deaths	Mortality
Ileostomies:	30	7	23%
Emergency ileostomies.....	11	5	45%
Elective ileostomies.....	19	2	11%

Patient	Type	Cause of Death	Death
1. S. B.	Emergency	Inanition. Vitamin K deficiency	Medical
2. F. G.	Elective	Peritonitis	Surgical
3. F. K.	Emergency	Peritonitis	Surgical
4. G. S.	Emergency	Massive hemorrhage	Surgical
5. C. D. R.	Emergency	Peritonitis	Surgical
6. J. N.	Emergency	Paralytic ileus. Hemorrhage	Surgical
7. W. E.	Elective	Embolism	Surgical
8. D. R.	Emergency	Peritonitis	Surgical

The extent of the pathologic lesion, as presented, showed: Extensive ulceration in 17; fibrosis and shortening in 16; and pseudopolypoid degeneration in 12. In our experience with the earlier cases, we made a practice of suturing the distal divided end of the ileum and dropping it back in the peritoneal cavity. Realizing that a certain number of these cases would go for a long period of time before being subjected to subtotal colectomy; and due to a stricture with a subsequent blow out of a sutured distal end, it is brought out as a mucous fistula. One might well say that this was not necessary if careful roentgenologic study was made prior to ileostomy, in order to determine the presence or absence of an impending contracture. Cattell¹⁷ states: "My decision not to drop back the ileum was based on the observation of marked contractures developed in the colon after ileostomy."

The most striking feature of our experience in this disease has been a rapid gain in the vast majority of these patients after ileostomy. The average weight gained in 16 of our 30 patients was 27 pounds. The average length of time in which the weight was gained was five and one-half months.

Of the total ileostomies, there were seven deaths, or a mortality of 23 per cent. In discussing the mortality statistics of our ileostomies, we have divided them into "emergency" and "elective" ileostomies. There were 11 emergency ileostomies with five deaths, or a 45 per cent mortality. Of the

elective ileostomies, there were 19, with two deaths, a mortality of 11 per cent. Of the two deaths in the elective group, one died of peritonitis due to embarrassment of the circulation of the bowel wall, a technical surgical error; the second succumbed of an embolus six days after operation. Of those in the emergency group that succumbed, three died of peritonitis and two died of hemorrhage. We are fearful of performing ileostomy upon patients in the presence of massive hemorrhages.

We did not assume that ileostomy alone or ileostomy with reestablishment of the fecal stream could have proven curative in any of the 30 patients reported from the Roosevelt Hospital Series, and was performed solely as a preliminary step to the radical removal of the diseased colon and rectum.

There is an amazing psychologic improvement in patients who have submitted to ileostomy, principally, we believe, because they realize some radical curative measure has been undertaken. Following this procedure, except for a short period postoperative, the patient gains in weight and in strength. The ileal stoma is occasionally relatively quiet at night, and although they suffer the annoyance of an artificial and misplaced anus, they finally and fully realize that in order to live, they must put up with this inconvenience.

CONCLUSIONS

(1) Appendicostomy and cecostomy based upon false premises (irrigating the colon with antiseptic solutions, in the hope of destroying invading organisms and thus effecting a cure) are discarded as useless.

(2) Indications for surgery:

- A. Impending perforation.
- B. Progressive extension of pathologic lesion; patients continuously handicapped by the disease.
- C. Patients exhibiting periods of activity and remissions destroying their usefulness.

(3) Detailed and usually prolonged medical supervision should adjust the following disturbances:

- A. Active food allergy.
- B. Altered physiology of other parts of the digestive tract.
- C. Psychic and emotional factors.
- D. Avitaminosis.
- E. Anemias.
- F. Mineral metabolism involving particularly calcium, phosphorus and sodium chloride.
- G. General malnutrition and inanition.

(4) Prior to operation the fluid balance and blood chemistry are adjusted. Vitamin supplements are administered to maintain proper vitamin levels. A nonresidue diet diminishes the presence of small intestinal contents at the time of operation.

(5) A general and a small amount of spinal anesthesia are equally sufficient.

- (6) The steps of a new ileostomy are outlined.
- (7) The feeding of dry foods, followed almost immediately by a regular diet, insures a minimal amount of gastric distention and forcible peristalsis; results in early functioning of the ileal stoma.
- (8) The deductions from a questionnaire reveal that:
 - A. Ileostomy is rarely a curative procedure in ulcerative colitis.
 - B. In very rare instances, the continuity of the gastro-intestinal tract may be successfully reestablished.
- (9) Ileostomy is, in the majority of instances, primarily carried out as the first step in the complete removal of the colon and rectum.
- (10) At present, the mortality following ileostomy in the emergency group of our series was 45 per cent; however, in the elective group it was only 11 per cent.

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DISCUSSION.—DR. HARVEY B. STONE (Baltimore, Md.): One may divide the cases upon whom ileostomy has been performed for the treatment of ulcerative colitis into three groups, dependent upon their subsequent course following ileostomy: There is a small group that fail to improve either in their general condition or in the local disease in the bowel. On the contrary, they get worse. That group to which Doctor Cave has given a great deal of attention in his own work, although he did not emphasize it in the paper, probably are best treated by stage-colectomies. A much larger group improve materially in their general condition. They gain weight. They gain strength. Their blood count comes back to normal. Their temperature returns to normal. They regain their working efficiency but the disease in the bowel, although static, is not cured. That is the group about which the late Dan Jones used to say that ileostomy cures the patient but it does not cure the disease, and of the total group of ileostomy cases, this group, I think, is by far the most numerous.

Then there is a third smaller group who do recover, not only insofar as their general welfare is concerned, but the disease heals, consequent to the rest afforded the colon as a result of the ileostomy; and in these people the ileostomy may be closed and the alimentary tract restored to normal. I realize that there are many men, some of them quite experienced, who will deny the existence of such a group of cases—but there is such a group! It has been incontrovertibly proved by experience and, as a matter of fact, the statistics which Doctor Cave has just shown us reveal that in, I think, 37 cases of his total series closure was effected, and only 25 per cent of those closed had subsequent trouble. So that there is a group in which permanent definitive cure may be expected. It seems to me that the problem of the treatment of this disease should focus upon enlarging this group of cases at the expense of the other two groups, so that we may get more people in whom ileostomy can produce a definitive cure, and, to do this, it seems to me it is essential that the treatment be invoked before irreversible changes have taken place in the large bowel. I cannot see that there is much hope for a permanent cure after the disease process has extended into the wall of the bowel, under the mucosa, and converted the colon into a rigid, fibrous tube; therefore, I think that we should urge operation before these irreversible changes have taken place.

I believe there is at least a criterion which might be employed to decide when to advise ileostomy. In the past, I think it has been the custom to advise ileostomy on the basis of the two suggestions made by Doctor Cave: The progressively uninterrupted progress of the disease downward, what he calls his grave, continuous cases; or the intermittent but constantly recurrent group of cases. I would suggest that another test be applied in advising ileostomy, namely, the discovery, by repeated roentgenologic examination, of the beginning of permanent change in the large bowel. When the radiologist reports that all the haustration is disappearing from the colon and that, on fluoroscopic examination, it is beginning to lose its flexibility, you have there evidence of the initiation of irreversible changes; and that is the time to employ ileostomy before those changes have gone any further.

Why do we not do this? Well, I think there are two reasons: In the first place, clinically, many of these patients, even after having been ill a good while, enjoy a period, at least, of recovery, and the doctor and patient constantly hope that this individual case will, tomorrow or next week or some time soon, have a recovery which may be permanent, so that the constant hope of spontaneous or medical cure defers operation. I suggest that if roentgenologic examination shows changes in the organic structure of the colon, that hope be abandoned. The second reason ileostomy is deferred is because of the extremely disagreeable nature of the treatment. As a matter of fact, I think many people feel that the treatment is worse than the disease. It occurs to me that that is a challenge to surgery, to our technical mastery of this problem, to see whether there may not be some method by which a better type of ileostomy can be performed to diminish the disagreeable features consequent upon its performance.

(The speaker here demonstrated by lantern slides a procedure which he had employed in three cases.) After the ileostomy had been established, an incision was made mesially to it. A loop of ileum immediately above the stoma was drawn out, its two arms sewn together by a posterior suture, an incision made, similar to that of a Finney pyloroplasty, between the two arms, and the anterior suture completed. This resulted in the production of a loop that was self-anastomosed, and which formed a collecting reservoir immediately proximal to the position of the stoma.

This procedure was undertaken in the first instance to correct a very annoying, long prolapse through the ileostomy stoma. It did that efficiently, but it also considerably slowed up the number of discharges from the stoma, led to a considerable absorption of fluid and a thicker consistency of the material discharged. So that I have employed this procedure in two other cases, in the hope that this might improve the status of these people who have an ileostomy. This point in operative technic is merely offered as a first suggestion of an attack upon the problem of ileostomy, in order that it may be made a more tolerable condition and, therefore, reduce the reluctance of doctors and patients to subject patients to this form of treatment.

How can one tell when a patient, who has had an ileostomy performed, is a fit subject for closure of the stoma? Well, in addition to all the well-recognized tests, recovery from his illness, restoration to weight, blood count, *etc.*, in addition to a proctoscopic examination which shows a normal mucous membrane in the rectum and lower sigmoid and to roentgenologic study of the higher portions of the colon, I would suggest one further test: If a patient, otherwise apparently ready for closure of the stoma, has his colon injected per rectum with two liters of normal salt solution, the fluid retained a little while and then expelled, collected, centrifuged, and the precipitate examined microscopically for red cells and leukocytes, and none such found, I believe that one can then safely close the stoma.

DR. FREDERIC W. BANCROFT (New York, N. Y.): I should like to discuss the third group that Doctor Stone referred to—the group where the ileostomy may possibly be closed. I have closed four. One caused a very sudden recrudescence of the disease, resulting in mortality. One, I followed for one year, and was well when last seen; one, for four years, who was still well. I should like to give an eight-year-old history in lantern slides, if I may, of a man whom I operated upon in 1932. (Doctor Bancroft here showed lantern slides of the condition of the man before operation, and then following his ileostomy in 1933.)

A barium enema study was made in 1934, at which time the patient was seen by Doctor Stone, who sigmoidoscoped him; and we thought we were safe in reimplanting the ileum. This operation was performed, in 1934, by transplanting the ileum into the transverse colon. He was well for about one year, and then had a recrudescence of his diarrhea after chopping wood, fishing and paddling a boat, so that, in 1935, the cecum and ascending colon were resected as far as the anastomosis. Since that time, he has been very well; has been able to carry on his business; and has been very active in fishing, hunting, climbing and golfing. Barium enemata, in 1936, 1937 and 1939, showed a moderate polypoid formation of the descending colon, which has decreased within the past year, and which shows, very definitely, the disappearance of the pipe-stem appearance of the bowel. It is my impression that this polypoid formation, in some cases, is the result of healing—and not the progress of the disease. It has been now three years since he has had blood in his stool. His only objection to me as a doctor is that I will not let him play 36 holes of golf a day. I have restricted this exercise, as he has a rather weak abdominal wall and I feel that golf may be too much of a thrust on his abdomen.

DR. FRANK H. LAHEY (Boston, Mass.): I think this is an extremely important subject. I feel sure that a great many patients die needlessly every year due to the fact that we do not get the gastro-enterologists and the medical men to cooperate well enough with us about early ileostomies. Those of us who have the good fortune to have gastro-enterologists or medical men

associated with us, can get early ileostomies done because of the fact that we have made our mistakes together, and have learned not to put these cases off until the disease is too advanced. What we need is to get before the medical public the fact that this late delivery of patients with ulcerative colitis, who are candidates for ileostomy, to surgeons, results in most of the mortality of this disease.

We have had to date approximately 300 patients with ulcerative colitis, and it is only by the bitter experience with the results of delay that we have been able to convince even our own gastro-enterologists that these patients should be operated upon earlier. On the other hand, there are some things to be said in the gastro-enterologists' and medical men's favor who delay ileostomy. We must admit it is a very poor type of enterostomy and, no matter what one may say about its necessity, it must be admitted, also, that it is an undesirable type; therefore, no one wants it. It is but natural that the patient and his medical adviser should delay having it undertaken as long as they can. On the other hand, this is an extremely difficult psychologic situation and one, of course, that can and does result in undue delay and at times unnecessary fatalities.

I do not quite agree with Doctor Stone that this early change in the colon should be an indication for ileostomy because we have to admit that there are many patients with fairly rigid-appearing colons who are getting on very well. I wonder if I, myself, might not possibly accept a fairly rigid colon with some hazard rather than an ileostomy. From our experience with those patients who have had ileostomies (70 in number) in our hands and those patients who have not required surgery and who are getting on reasonably well without it (50 per cent of all the cases which we have seen), there are many who have quite rigid colons and who have had fairly rigid colons over a number of years but have still been able to manage without an ileostomy.

We should be careful as to the type of ileostomy which we employ. There is no doubt but that the end-ileostomy, of the divided type which has been described by Doctor Cattell in this clinic, is the best type. But this type requires considerable technical manipulation which in very advanced and toxic cases will undoubtedly result in fatalities which would not occur in less advanced types. It is, therefore, important to divide those cases into the very severely ill who will stand nothing more than the loop-ileostomy, even if it is undesirable, without manipulation of the colon in any way, and those in whom a divided-ileostomy may be performed and so implanted in the abdominal wall that later colectomy can be undertaken without difficulty.

One other point, and that is that everyone who deals with ileostomies will have trouble with them. We have had them prolapse and we have had them pull away; therefore, some time ago, we advocated the suture of the mesentery to the abdominal wall. This is a very important point in preventing prolapse and the pulling away of the ileum in these cases.

One other very important point is that some type of fairly tight suction tube be introduced into the ileostomy immediately after it is made until good wound healing has taken place, because liquid fecal discharge is one of the things that breaks the ileostomy down. Doctor Lium, an exsurgical fellow in our clinic, has devised a type of ileostomy tube which can be inserted into the ileostomy immediately, which will keep it dry while the wound heals soundly, and I think that is an important point.

We have here, I believe, a most difficult situation, and what Doctor Cave has said is extremely important, that is, we will always have difficulty as long as the gastro-enterologists or medical men handle these cases separately, and then turn them over to us as technicians solely to do these things. When they

can see and feel responsible for the undesirable effects of delay, and when even after temporary good results with ileostomy, later recurrence of blood, increased pulse rate and elevated temperature and fatalities also take place as the result of delay, then we will get them to submit their patients to early ileostomy and to early colectomy.

One other thing, and that is you can assure a patient with ileostomy that after you have performed the colectomy the ileostomy will be easier to manage, the number of stools will be less, and the type of discharge will tend to be more solid.

DR. VERNON C. DAVID (Chicago, Ill.): I should like to endorse the early ileostomy; largely from the standpoint of some of the very serious things that happen in delayed ileostomy, and in which serious damage of the bowel has occurred. My experience has differed somewhat from Doctor Bancroft's intimation that polyposis, occurring in chronic ulcerative colitis, is a favorable lesion. We have recently had the opportunity of examining a colon which for many years had been ulcerated in which polyposis had occurred, and contrary to our usual view that these lesions are purely hyperplastic lesions of isolated areas of mucosa which have been preserved between the ulcers, one can trace not only hyperplastic lesions but also can find tumors which in all respects resemble papillomata and adenomata of the colon.

One further remark about the undesirability of having late ileostomy. The disagreeable complication of stricture and thickening of the bowel and the development of polypi has occurred in three of our patients who have developed, after long-standing ulcerative colitis, carcinoma of the colon. We have, at the present moment, a woman in whom, about six months ago, we resected the transverse colon for carcinoma, who now has another carcinoma in the rectum. So that these long-standing ulcerations with polyposis have really serious significance.

DR. EDWIN M. MILLER (Chicago, Ill.): Presented a slide of a child, age seven, with an intractable ulcerative colitis, in whom an ileostomy, after a six-month period of trial, has been eminently successful thus far. After three months on the Medical Service, following an illness of seven months previously, she was referred to us. The ileum, as one can see, was completely divided, and the skin flap brought together between the open ends of the bowel. She has very rapidly picked up physically and mentally, and has become one of the happiest little patients we have in our ward at the County Hospital. There has never been anything applied on the skin to prevent irritation, still the skin has always been in excellent condition. She has spent most of her nights and a part of the time during the day face down upon a frame in which there is an opening, so that the contents of the proximal ileum drains directly into a receptacle, and during the day, at intervals, the nurse irrigates this area with a little sterile water.

I do not know when, if ever, I shall be able to close this ileostomy, but I do have an idea that, after sufficient time has elapsed, I shall try to see what the colon will tolerate, by collecting some of the material from the proximal bowel and introducing it into the colon through a catheter, and having done that, over a sufficiently long time, without having evidence of a flare-up of the active process, I may find that the time will have arrived when we may close the ileostomy permanently.

DR. HENRY W. CAVE (New York, N. Y., closing): I do not agree with Doctor Stone in the question of performing ileostomies early. If an ileostomy is to be established early, the simple method is to bring out a loop of the

terminal ileum, sew the loops together side-to-side, divide the loop, bring out the distal end at one end of the wound and the proximal end at the other end of the wound, as is done in the Devine procedure in the colon. Although I have not employed it, I believe it probably would be a simpler procedure than the one Doctor Stone has suggested. I firmly believe that patients showing early changes in the colon should have a prolonged and adequate medical supervision. Dr. Thomas T. Mackie, Director of the Grey Laboratories for the study of ulcerative colitis at the Roosevelt Hospital, has shown me patients with early changes in their colon that would seem as though they were going on to an irreversible stage. These patients, by medical management, have been cured for periods of seven to eight years. But it seems to me advisable that a conservative attitude should be taken in performing ileostomy too soon.

We have one patient, a male, age 50, whose disease started at the age of 25, and he has had the disease for 25 years. We have roentgenograms showing the start of the disease after 20 years. It was well into his rectum, but it traveled up his ascending colon into the splenic fixture, across his transverse colon and down to his cecum, and his terminal ileum is involved as well. He finally, after having had the disease for 25 years, submitted to ileostomy; and during these 25 years he has enjoyed very good health.

Another patient had an ileostomy performed eight years ago. She got along well, except during the fall, when she suffered from hay fever, at which time she would have profuse bleeding from the rectum. After eight years, she finally submitted to a subtotal colectomy, and since that time has gained 16 pounds in weight. She, apparently, had been absorbing from this diseased colon and it was a menace to her. Therefore, after eight years, we felt that for her to be in better health the diseased viscus should be removed.

Doctor David has commented on the question of the incidence of carcinoma superimposed on chronic ulcerative colitis of the colon. From the literature, more than I can gather, I would say that 3 per cent of the patients who have reached an irreversible stage of pseudopolypoid degeneration will develop cancer.