Carcinoma of the Caecum and of the Left Colon

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To consider carcinoma of the caecum as a clinical entity apart from carcinoma of the left colon might, on superficial thought, be considered to be of only academic interest. This, however, is not the case. The clinical picture resulting from carcinoma of the caecum is entirely different from that which results from carcinoma of the left colon. As a result, the diagnosis and treatment of carcinoma of the caecum present difficulties which arise because of the difference in the content of the right, as opposed to the left colon, as well as from the different physiological function of these two areas.

90% of the fluids and 10% of the solids taken out of the gastrointestinal tract are absorbed by that section of colon which lies between the ileo-caecal valve and the splenic flexure. The content of the right colon is fluid, or semi-solid, while the content of the left colon is dehydrated, solid or semi-solid. The colon from the splenic flexure to the sigmoid is but a highway, and in normal health is empty. Likewise is the rectum empty, the sigmoid colon acting as a reservoir.

In addition to this difference in the physiological function of the right, as opposed to the left colon, there is also a definite anatomical difference. The colon from the caput coli to the mid-transverse colon has a very rich blood supply from the superior mesenteric artery, which gives three branches—the ileo-caecal, the right colic and the middle colic. These three branches have, however, free anastomosis with each other, there being as many as three arcades of anastomotic vessels between these three main sources, whereas on the left side there is a very poor anastomotic circulation between the left colic and the middle colic arteries. There are no arcades of anastomotic vessels, and the connection is solely by means of the marginal artery which parallels the colon. Furthermore, there is also a very poor anastomosis between the left colic and the first sigmoid branch. The four sigmoid arteries, however, have a very free anastomosis one with the other, but again
the collateral circulation between the last sigmoid branch and the superior haemorrhoidal artery leaves an area of the recto-sigmoid colon which is dependent on a very poor anastomotic circulation, represented solely by a small marginal artery. Furthermore, one must take cognizance of the character of the blood supply to the colon. The vessels enter the colon at right angles and are terminal vessels. Therefore if one is contemplating a resection of the colon with an end to end anastomosis, the clamps outlining the segment of bowel to be resected must be placed on the bowel so as to form a "V," the apex of the "V" being towards the mesentery of the colon. In this way one is making certain of an adequate blood supply on the anti-mesenteric side of the bowel.

Contrary to the usual text book statement, leaks in end to end colonic anastomoses have occurred on the anti-mesenteric, rather than on the mesenteric portion of the circumference. This we believe is due to improper placing of the clamps at the site of section of the colon, so that the blood supply to the anti-mesenteric segment of bowel is inadequate.

The gross pathological lesion represented by a carcinoma of the caecum explains the symptomatology. Such lesions are fungating lesions, usually arising on the posterior wall of the caecum, and involve only a small portion of the circumference of the bowel, are non-stenosing, and therefore, will give no symptoms resulting from obstruction. However, because of the fungating, ulcerating type of growth, there is a continuous blood loss, and there will be found persistent occult blood in the stool if one will but look for it. Occasionally the patient will suffer from severe massive melena. As a result of the above, the patient may seek relief from fatigue and dizziness, which will be explained by the finding of an iron deficiency microcytic anaemia. Unfortunate indeed is such a patient who falls into the hands of an expert physician who will accept the diagnosis of an iron deficiency secondary anaemia without determining the cause of the blood loss, because should such a patient be treated with an adequate high protein diet and iron therapy, his haemoglobin will rise, his anaemia will disappear, and his feeling of well-being will be great, but only after several weeks, or maybe a few months, will the physician realize that it is impossible with dietetic and medicinal measures to maintain a constantly high haemoglobin with freedom from fatigue. In other words, the anaemia returns, and unless the cause is found the patient may reach the state of an aplastic anaemia. Each year we are asked to see a few patients who have been thus treated, in whom the diagnosis ultimately has been proven to be a non-stenosing, fungating carcinoma of the caecum, which has become inoperable, or has perforated retro-peritoneally, with the formation of an abscess. Our plea, therefore, is that patients who seek relief from a secondary iron deficiency anaemia be given the advantage of an examination of the
stool for occult blood. If occult blood be found, a careful investigation of the right colon should be carried out by X-Ray studies, in order to exclude neoplasm of the right caecum.

There is one pitfall, however, which one must avoid, and it is illustrated by the following case:

A patient, known to have a duodenal ulcer, proven by X-Ray, suffered a massive melena while on a journey. The patient was taken to a hospital, given conservative treatment, with an adequate diet and iron therapy, and was enabled to return to her own home. Her physician, being a very astute clinician, asked that she bring a sample of stool once a week to be examined for the presence of blood. When asked to see the patient in consultation, the stool had for five consecutive weeks shown occult blood. The problem presented was—“what is the course of action which should be carried out when a patient who is suffering from a duodenal ulcer has for five weeks shown continuous occult blood in the stool?” The answer is that the duodenal ulcer does not produce continuous occult blood in the stool; that one must look elsewhere, and in this particular case palpation of the abdomen revealed carcinoma of the caecum.

Carcinoma of the left colon, however, shows an entirely different gross pathological lesion. Here, instead of the non-stenosing fungating carcinoma, we find a small scirrhous annular carcinoma, producing mechanical obstruction. This reflects itself in the symptom of a change in bowel habit, either an increasing constipation, or the need for an increasing dose of cathartic. Secondary anaemia from hemorrhage is not a problem characteristic of left colon carcinoma. Here, the problem is the result of chronic intestinal obstruction. Thus while we have a nutritional problem in both the right and the left colon, the major problem on the right side is one of anaemia of the iron deficiency type, whereas on the left side it is a problem of chronic or acute intestinal obstruction. Therefore our primary duty in left colon carcinoma is to deal with the intestinal obstruction and overcome the disasters of this condition before dealing with the carcinoma, whereas on the right side we must overcome the anaemia and protein nutritional imbalance before dealing with the carcinoma.

Despite all the work which has been done in attempting to solve the problems of intestinal obstruction, very little real decrease in the mortality has been accomplished until recent years, when the disaster of distention has become apparent. As early as 1933, in our own Department of Physiology, Norman Taylor stressed the disasters of distention, which is an inevitable accompaniment of intestinal obstruction. However, we did not appreciate the significance of his teaching. The disasters of distention were not appreciated until Miller and Abbott,
using the double lumen tube for physiological experiments, ultimately applied this tube to the relief of small bowel obstruction. We had, following the work of Hayden and Orr in 1924, realized the value of correcting the dehydration and restoring the electrolytes, but unfortunately this was not accompanied by any dramatic decrease in the mortality. However, the moment that the disasters of distention were appreciated, and means devised to control them, the mortality began to lessen.

Should one suspect that a patient, suffering from an intestinal obstruction, has a left large bowel carcinoma, one can readily confirm this suspicion by means of a flat X-Ray plate of the abdomen, which will show the distended colon; while the site of the obstructing lesion can be definitely localized by giving a Barium Enema. One must, however, avoid the humiliation of giving a Barium Enema for a carcinoma of the rectum palpable with the finger, which often is so difficult to demonstrate radiologically. We presume that a digital-rectal examination is always a precursor to other physical aids to the diagnosis of a lesion of the colon.

Having established the diagnosis of left colon carcinoma, we must then ask the question—"Why is this patient sick?" We believe that he is sick because of the disasters consequent to obstruction of the colon. These are dehydration and biochemical imbalance of the electrolytes, resulting in a hypochloremic, nutrition disturbance, and particularly a hypoproteinaemia. There is one important fact to realize during this stage of the investigation: as a result of the dehydration and the nutritional imbalance, the patient may have a very scanty urinary output, and the non-protein nitrogen of the blood may be raised to levels far above normal. The unwary might conclude that this disturbance is due to uraemia, as the result of primary renal damage, and thus be lulled into inactivity. One must recognize the clinical state of gastrointestinal azotemia. The administration of water, blood, plasma and amino acids parenterally will very rapidly restore the biochemical and nutritional balance.

If the diagnosis that the obstruction is due to a lesion in the left colon has been established, the unwary might feel that the carcinoma should be attacked directly. However, if a patient were simultaneously suffering from acute appendicitis and a carcinoma of the breast, we would not operate on the carcinoma of the breast primarily, even though we know that it is a lethal disease, but we would operate on the acute appendicitis, which is creating the immediate urgency, and then at an opportune time deal adequately with the carcinoma of the breast. So in intestinal obstruction due to a carcinoma of the left colon, the intestinal obstruction is creating the emergency, and therefore demands the prior attention.
Believing that relief of the distention will most adequately overcome the disasters of obstruction, this should be accomplished with the minimum disturbance. While the Miller Abbott tube will control the distention in small bowel, it is completely inefficient in controlling the distention resulting from left colon obstruction. Because of the competence of the ileo-caecal valve, we are faced with what amounts almost to a closed loop obstruction. We believe that a blind caecostomy will relieve this type of distention with a minimum of trauma more efficiently than any other procedure. Because we are dealing solely with the obstruction which is creating the emergency, there is no need whatsoever to carry out a laparotomy to confirm the diagnosis of left colon carcinoma, nor to determine its extent. As a result of the oedema in the colon proximal to the obstructing carcinoma there is a very marked interference with the natural barrier of the bowel wall. Manipulation and handling of the oedematous distended colon further decreases the efficiency of the bowel wall as a barrier preventing the egress of the infected colon contents to the peritoneal cavity. Just as if one puts the finger inside the roof of a tent when it is raining, the tent will leak, so will the manipulation of this oedematous obstructed colon permit the passage of organisms from the bowel lumen to the peritoneal cavity, with resulting peritonitis in a very high percentage of cases. For this reason we believe that a blind caecostomy, that is, the doing of a caecostomy without any exploration of the peritoneal cavity, is the optimum procedure. This procedure is so simple that it has been difficult to teach it to the resident staff, who think that it must be difficult, and that one must do an elaborate operation. A split muscle McBurney incision is made in the right lower quadrant. A portion of the caecum one inch in diameter is brought out beyond the skin of the abdomen. Four interrupted sutures unite the caecum to the skin. No sutures are placed through the other layers of the abdominal wall and the caecum, because of the fear of infection. Such a caecostomy is opened twenty-four hours after it is performed, and is efficient at the time when it is needed. It is true that an operation is required for its closure, but this is a small penalty for saving the patient from death due to intestinal obstruction. On occasions the stenosis caused by the left colon carcinoma is so great that the caecostomy is not adequate to permit the regression of the oedema about the carcinoma in the bowel wall sufficiently to make subsequent resection safe. For this reason we add to this decompression operation a colostomy, the operation for defunctioning the colon, which puts into practice one of the basic principles of all surgical therapy: the diseased area should be put at rest. This is achieved by means of a Mickulicz type of transverse colon colostomy. This so adequately defunctions the left colon that the oedema rapidly subsides and chemotherapy introduced through the distal stoma controls the infection, and subsequent operation is made safe. This
defunctioning of the colon permits the efficient irrigation of the distal loop until it can be rendered almost bacteriologically sterile.

If the lesion responsible for the obstruction lies at the level of the recto-sigmoid or upper rectum, the decision must be made as to whether adequate removal of the involved bowel, with restoration of continuity of the tract, can be carried out, or whether a combined abdomino-perineal excision should be done. This decision will be based upon two facts: (1) the spread of the malignancy through the lymphatic field, and (2) the efficacy of the blood supply of the colon at the site of section. Studies of the lymphatic drainage of the rectum which have been carried out by the late Sir David Wilkie in Edinburgh, by David and Gilchrist of Chicago, and by Fred Coller of Ann Arbor, have demonstrated most admirably that the lymphatic drainage from a carcinoma of the recto-sigmoid and upper rectum is upwards, and not downwards. For this reason when one resects a neoplasm at the level of the recto-sigmoid or upper rectum, and removes an adequate length of bowel distal to the tumour, we can feel confident that we have adequately excised the lymphatic drainage of the lesion. We therefore must assess the blood supply to the rectal stump. We know that the blood supply to the sigmoid is adequate. Because of the poor anastomotic circulation between the last sigmoid branch and the superior haemorrhoidal artery, a division of the superior haemorrhoidal artery would leave a very poor blood supply to the upper rectum. However, if one removed the rectum down to the level of the levator ani muscles, there is an adequate blood supply arising from the inferior and middle haemorrhoidal arteries, and from the pudendal arteries to adequately nourish this rectal stump. Thus if one is attempting a resection of an upper rectal carcinoma, and has in mind a restoration of the colon in continuity, the rectum should be excised to the level of the levator muscles in order to ensure an adequate blood supply to the residual rectal segment.

With this hypothesis we have satisfied ourselves, with a fairly large series of cases over the last eight years, that adequate excision of recto-sigmoid and upper rectal carcinomata, with restoration of continuity, can be carried out in a large percentage of cases, thus avoiding a permanent colostomy. We have adopted the practice of a preliminary defunctioning transverse colon colostomy in every case in which such a low anastomosis is carried out. This has resulted in a mortality of 5.6%. We have had no case of colo-vesical fistula, and no case of recto-vaginal fistula. We have had one perineal fistula, which healed. On several occasions there has been a discharge from the rectum which would indicate that there had been a local abscess which discharged into the rectum, from which the patient made an excellent recovery. This happy experience has made us very loth to consider excision of
carcinomata of recto-sigmoid and upper rectum as a primary procedure without a previous defunctioning colostomy.

The preparation of the patient for a right colectomy, however, is an entirely different problem. Our major problem here is one of correcting the anaemia and restoring the nutrition, as well as reducing to a minimum the bacterial and residual content of the right colon. This is done by administering a low residue diet, with the addition of chemotherapy. Salines are given daily, in order to have at least two liquid stools each morning; followed in the afternoon by a daily saline enema. This regimen is carried out for five days. On the sixth day no saline is given, only a fluid diet and four divided two-drachm doses of paregoric are given on the afternoon before operation. During this period of preparation an adequate hydration of the patient is maintained. If the patient is able to pass 900 c.c. of urine every twenty-four hours, we assume that the dehydration has been overcome. Massive transfusions of whole blood will overcome the anaemia, and intravenous administration of plasma will correct the hypoproteinaemia. In this way, because of the fluid content of the right colon, we have elected to carry out, as the operation of choice, a one-stage right colectomy, resecting the colon supplied by the ileo-colic and right colic vessels, together with the lymphatic supply, and restoring continuity by means of an end to end anastomosis of the terminal ileum to the transverse colon, making the anastomosis over a rubber tube held in position by a catgut suture, and splitting the terminal ileum on its anti-mesenteric side sufficiently far to make the stoma of the terminal ileum equal to that of the colon. This procedure has given us most satisfactory results.

IN CONCLUSION:

(1) If a patient seeks relief from a distress which is proven to be due to a secondary anaemia, always examine the stools for occult blood before prescribing an adequate diet or iron therapy.

(2) Carcinoma of the colon, irrespective of its site, presents a problem of disturbed nutrition.

(3) The right colon presents a problem in nutrition plus a severe secondary anaemia.

(4) Carcinoma of the left colon presents a problem of nutritional upset plus the disasters dependent upon chronic subacute intestinal obstruction.

(5) A right colon carcinoma may be safely and adequately dealt with by means of a one-stage resection, with end to end anastomosis over a rubber tube.

(6) Resection of the left colon, because of the poor blood supply and the solid character of the content, is much more safely carried out if preceded by a transverse colon defunctioning colostomy.
DUODENAL Ulcer is not a local disease. It is a local manifestation of a constitutional fault. There is no medical treatment for a duodenal ulcer: there is no surgical treatment for a duodenal ulcer. There is, however, a management of a patient who suffers from a duodenal ulcer which will combine the highest in the science and art of both physician and surgeon.

The term "Peptic Ulcer" is bad for two reasons:

1. It is loosely applied to both gastric and duodenal ulcers.
2. It pre-supposes a digestive phenomenon as an etiological factor.

It, however, is particularly undesirable to group gastric and duodenal ulcers as being similar. The only common factor is ulceration. A duodenal cap ulcer never becomes malignant. Gastric ulcers are often malignant, even when not suspected. As will be shown later, the mortality from haemorrhage from gastric ulcer is very much greater than the mortality from haemorrhage from a duodenal ulcer. The indications for operation for a duodenal ulcer are different from the indications for operation for a gastric ulcer. Our discussion will be confined to duodenal ulcer.

While we do not know the cause of duodenal ulcer, we are convinced that the patient's symptoms are aggravated by fatigue, tobacco, infection, both general and focal, lack of self-discipline, and a high concentration of free hydrochloric acid in the gastric contents.

A simple, uncomplicated duodenal ulcer does not need the addition of surgical therapy for its management. Surgical therapy is only necessary when a simple ulcer becomes complicated by:

1. Acute perforation
2. Pyloric Obstruction
   a. due to oedema—acute obstruction
   b. due to scar—chronic obstruction
3. Penetration into adjacent organs.
4. Massive or recurring haemorrhage.
5. Duodenal Ulcer Occulta.

There is no argument about the necessity for surgical intervention when a patient suffers an acute perforation of a duodenal ulcer. There is, however, a real need to debate when such intervention should be undertaken. Before we can decide the optimum time to undertake this
operation, we must answer four questions about a patient who is suffering from an acute perforation of a duodenal ulcer:

(1) Why is the patient sick?

(2) Why is an emergency operation ever necessary in gastrointestinal disease?

(3) What is the surgeon's responsibility in such an emergency operation?

(4) Upon what do we depend for closure of a gastrointestinal perforation?

The answer to the first question—Why is the patient sick?—may seem obvious. Indeed, the most commonly accepted answer is this: "As a result of the acute perforation of the duodenal ulcer, the patient is suffering from peritonitis." Many observers, however, fail to question the etiology of the peritonitis, and accept a bacterial agent as the sole cause. In 59 patients, cultures were taken from the peritoneal cavity at the time of the operation; 34 of these were sterile. Of the 25 which showed organisms on culture, most were non-pathogenic organisms. One was a pure culture of typhoid bacilli. In two instances colon bacilli were recovered, and only once was a haemolytic streptococcus grown. This organism was recovered from a 49-year-old man with a twelve hour perforation, who had a perfectly uneventful convalescence following closure of his perforation and closure of the peritoneal cavity without a drain. We must therefore look farther afield to explain why the patient is sick. We believe that the seriousness of the patient's illness is in direct ration to the degree and duration of his pain, which in turn determines first the degree of exhaustion, second, the extent of the biochemical imbalance. It is necessary in addition to assess carefully the degree of nutritional disturbance present. Most of these patients have had, just prior to the perforation, a period of increased indigestion, during which time they have been on a very inadequate diet. Many reach the hospital in a definitely dehydrated condition.

The second question—"Why is an emergency operation ever necessary?"—must be answered by stating that to delay operation unduly, jeopardizes the likelihood of the patient's recovery.

This supplies the answer to the third question regarding the surgeon's responsibility during such an operation. It is only to save life, not to cure the patient of the disease from which he suffered before the emergency arose.

Regarding the fourth question, we must depend upon the formation of fibrin to close all perforations in the gastro-intestinal tract. During all intestinal anastomoses, while theoretically one is not supposed to enter the lumen of the gut in doing the outer row of an anastomosis,
I am sure that microscopically this must occur very frequently, but the patient's delightful convalescence is due to sealing of such perforation with fibrin. An oft-quoted aphorism that—"The sun must never rise and the sun must never set on a patient suffering from an acute perforation of a duodenal ulcer without such a person being operated on," has been responsible, we believe, for many deaths. We believe that the peritonitis is largely the result of a chemical irritation, and that some delay in preparing the patient for operation may not be disastrous because of an extension of the peritonitis. We do feel, however, that to delay operation sufficiently long to correct the dehydration, the hypochloraemia and the hypoproteinaemia by the parenteral administration of fluid, salt, glucose, blood, plasma and amino acids is of inestimable value. This is best illustrated by the following case report:

A man, aged 53 years, was admitted to the department of medicine for the investigation of an indigestion where previous studies had failed to show evidence of organic disease. He had complained bitterly on many occasions of abdominal pain, and had had many previous operations. At 6 a.m. he suffered a sudden epigastric pain with diffuse tenderness and rigidity. He was seen in consultation six hours later. Screening showed no free air under the diaphragm. He appeared to be desperately ill, his blood pressure being 70/50. The diagnosis of a perforated viscus presented little difficulty. The condition of the man, however, was so poor that immediate operation was considered unwise. He was put in an oxygen tent, was given sufficient sedative to relieve the pain, and was given an intravenous injection of saline solution with 5% glucose, as well as 500 c.c. of plasma and 500 c.c. of whole blood. All intravenous medication was by the drip method. His condition improved and at the end of ten hours his blood pressure was 110/76 and pulse was 80. His appearance and general condition were in marked contrast to his clinical state when first seen. Interestingly enough at operation, which revealed a perforated duodenal ulcer, cultures from the intra-peritoneal exudate were sterile. Despite the fact that operation was not undertaken until sixteen hours following the perforation, ten hours being consumed in preoperative preparation, he made an uninterrupted recovery. We are convinced that in this case an immediate operation would have resulted in a fatality.

Thus when a patient is admitted and a diagnosis of an acute perforation of a duodenal ulcer is made, we must assess the patient’s general nutrition, the degree of dehydration, the blood pressure, pulse rate and temperature, and degree of distress. The time consumed in the pre-operative preparation of the desperately ill patient we have never regretted. This statement is based on an analysis of 114 consecutive cases of acute perforation which were admitted to the First Surgical Division of the Toronto General Hospital.
Table I

<table>
<thead>
<tr>
<th>Description</th>
<th>Total Cases</th>
<th>Deaths</th>
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<tbody>
<tr>
<td>Perforated Duodenal Ulcer</td>
<td>114</td>
<td>10</td>
</tr>
<tr>
<td>Operated Upon</td>
<td>111</td>
<td>7 (6.3%)</td>
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Causes of death in three non-operated patients:
- 2 refused operation
- 1 undiagnosed (perforated a subphrenic abscess into bronchus)

Causes of death in 111 patients operated upon:
- 1 pulmonary embolus
- 1 pneumonia
- 1 pneumonia with senility
- 1 pneumonia with mild peritonitis
- 1 uraemia
- 1 pelvic abscess which perforated into the general peritoneal cavity—found at autopsy
- 1 subphrenic abscess ruptured into bronchus—found at autopsy.

It will be noted in the analysis which is presented in Table I that there were only 7 operative deaths, and of these there were only three instances in which a peritoneal infection was a contributing factor to the fatality, and unfortunately two of these were undiagnosed, one a pelvic abscess ruptured into the general peritoneal cavity, and the other a subphrenic abscess ruptured into a bronchus.

Having decided that operation must be undertaken, and with our above responsibility enunciated, we therefore should perform the most simple operation which will close the perforation, utilizing fibrin as the seal. This is accomplished by the use of a free or detached omental graft held in place with three interrupted sutures placed one above, one across, and one below the perforation, and tied just sufficiently tightly to hold the graft in position. This produces an abundant formation of fibrin, which seals the perforation. This is the technique which has been carried out in the group of cases reported who are prepared in the way suggested. The results presented in Table I, in which there is an operative mortality of only 6.3% justify, we believe, this method of dealing with a patient suffering from an acute perforation of a duodenal ulcer.

Pyloric stenosis as a complication demands operation. One must realize, however, that the physiological changes in gastric secretion are different, depending upon whether the obstruction is due to scar or oedema. If the obstruction be due to scar it is chronic, if due to oedema it is sub-acute. If the obstruction be due to scar it is chronic, if due to oedema it is sub-acute. If the obstruction be due to scar it is chronic, if due to oedema it is sub-acute. If the obstruction be due to scar it is chronic, if due to oedema it is sub-acute. If the obstruction be due to scar it is chronic, if due to oedema it is sub-acute. If the obstruction be due to scar it is chronic, if due to oedema it is sub-acute. If the obstruction be due to scar it is chronic, if due to oedema it is sub-acute.
he will be usually over forty years of age. He will have an atrophy of the gastric mucosa resulting in a very low free hydrochloric acid content in the stomach. In such a case one is really not operating upon the patient for duodenal ulcer, but for mechanical obstruction at the pylorus. In many such cases the ulcer has been entirely replaced by the scar. On the other hand, oedema as a complication of a penetrating ulcer may produce obstruction. This often will be present in a young individual who is at the peak of his physiological efficiency. Because of the oedema which is, in addition, present in the gastric wall, whether the obstruction be due to scar or oedema, there is an interference with the normal physiological secretion and a low incidence of free hydrochloric acid in the stomach contents. When the obstruction is due to oedema, continued gastric lavage over a period of ten to fourteen days will result in a disappearance of the oedema, and one will, on gastric analysis, find that the units of free hydrochloric acid are very much greater than was demonstrated by gastric analysis when the oedema was present. Because of the obstructive lesion, such patients suffer from a nutritional imbalance, and require careful pre-operative preparation, in which daily gastric lavage, and adequate diet with high protein and vitamin content are essential.

Penetration of the ulcer into the adjacent structures is the third complication which demands surgical intervention. The diagnosis of penetration is made when the patient no longer experiences major periods in which he is entirely free from symptoms, nor is there the same minor relief from the ingestion of food. The symptoms become continuous. Often the abdominal distress is accompanied by pain in the back in the right lower thoracic area. Because of the involvement of adjacent tissues, the pain is often relieved by recumbancy. In our experience the pancreas, liver and bile ducts are the structures most frequently involved, and in this order of frequency. Such a patient really is not suffering from a duodenal ulcer, but from a local peritonitis, the result of a duodenal ulcer, and therefore one cannot expect relief from dietetic and medicinal means.

Massive haemorrhage as an indication for operation is clinically a most frequent determining factor. One must be on guard, however, to exclude other sources, such as cirrhosis of the liver with oesophageal varices as the source of the haematemesis, or a carcinoma of the colon as the cause of the melena. However, granting that we have diagnosed a duodenal ulcer as the source of the haemorrhage, we realize that such an ulcer must be on the posterior wall of the duodenum, because there are no vessels large enough elsewhere in the duodenum to escape thrombosis from the peri-ulcer inflammatory reaction.

In assessing the role of haemorrhage as an indication for operation, an analysis of patients admitted to the Toronto General Hospital over
a ten-year period was carried out. The only patients selected for study suffered a haemorrhage of such severity that the haemoglobin was depressed to 50% or less. There were 156 cases accepted for study, with 20 deaths, a mortality of 14%. However, if one separates the gastric from the duodenal ulcers, emphasizing the fallacy of speaking of "peptic ulcers," we find there were 136 duodenal ulcers, with 10 deaths, or 7% mortality, and 33 gastric ulcers, with 13 deaths, a 36.3% mortality. 70% of the fatal duodenal ulcer cases were over 50 years of age, and 60% of the gastric ulcer cases were over 50 years of age. The mortality in massive haemorrhage from a gastric ulcer is over five times as great as that from a duodenal ulcer. As a result, it is our practice that, when a patient over 50 years of age suffers a massive haematemesis from a duodenal ulcer which will depress the haemoglobin to 50% or less, operation is advised. If the patient be under 50 years of age, operation is not advised after the first haemorrhage. Unless the second haemorrhage has occurred many years after the first, we always advise operation after the second haemorrhage.

We believe that emergency operation for haemorrhage from a duodenal ulcer is very rarely necessary. We doubt whether it is possible to do a large series of emergency operations for this type of massive haemorrhage with the mortality less than 7%. We are dealing with a patient who, as a rule, is in nutritional imbalance, many of whom have a vitamin deficit and a very marked hypoproteinaemia, and are therefore not good risks for a major operation. We believe that in the duodenal ulcer group, any operation less than a partial gastrectomy will fail too frequently to control the haemorrhage.

In the preparation of patients for an elective operation following a massive haemorrhage, it is imperative that they be given a diet high in proteins. Our first recognition of this fact was in 1931, when a patient was admitted with recurring haemorrhage from a duodenal ulcer, and from September 6th until November 1st was given eighteen transfusions, with recurring massive haemorrhages. It appeared that this patient was to die as a result of this disease, and he was pleading for food to such an extent that we gave him the ordinary Ward diet, except that the vegetables were pureed and the meats were put through a mincer. The patient's response to this therapy was nothing short of amazing. He had no further haemorrhages, his haemoglobin rose, and a resection was carried out. Since that time, such patients who suffer massive haemorrhages from a duodenal ulcer have, within four or five days of their admission to hospital, been given a very liberal and varied diet containing a high protein content. This diet now is accepted by all, and following its advocacy by Muelengracht it has become known by his name.

Duodenal Ulcer Occulta is a term we have applied to an ulcer which
occurs on the posterior wall of the duodenum in the neighbourhood of
the opening of the common bile duct. Because of the anatomical site
of these ulcers, it is often extremely difficult to show them by X-Ray
studies. Because of the fact that they are lying in close proximity to
the common bile duct they will produce symptoms which may be
erroneously interpreted rather than mistaken as being due to primary
biliary disease. Indeed, because of the extension of oedema into the bile
duct, jaundice may be a symptom. Many of the cases which we have seen
had undergone a previous operation on the biliary tract. Unless one
accepts this clinical entity as a possibility, and definitely looks for it, it
is incredible how large an ulcer can readily be overlooked. We would
suggest that should one undertake an exploratory operation for indefinite
and undiagnosed abdominal pain, that the second part of the descending
duodenum should be specifically examined to exclude a “duodenal ulcer
occulta”.

Having decided that surgical therapy is a necessary addition to the
patient’s management, we have two distinct types of operative procedure:
(1) the indirect approach, as exemplified by pyloroplasties or gastro-
type; (2) the direct approach, as exemplified by a radical sub-
total gastric resection. An adequate surgical procedure should achieve
a restoration of economic efficiency; freedom from symptoms and
distress; security from recurrence; and should be carried out with a
low mortality. This ideal can be achieved by an operation which will
decrease or preferably abolish the free hydrochloric acid content of the
stomach, permit adequate gastric emptying, and abolish gastro-duodenal
spasm. It becomes obvious that an individual who was a high free
hydrochloric acid content pre-operatively should never be submitted to
any form of indirect operation, but should be treated by radical sub-total
gastrectomy. The indirect operation is reserved for the group of patients,
usually over 50 years of age, who because of age or prolonged scar
stenosis have a minimal or no free HCL in the gastric contents. Such
a patient can be relieved of symptoms by either a gastro-enterostomy
or a Finney pyloroplasty. Our preference is for the latter operation.
In doing this pyloroplasty, we carry the limb of the incision in the
duodenum to a point distal to the opening of the bile papillae. We have
done 46 pyloroplasties with one death, and this patient died from a
peritonitis, the operation being done with about fifty visitors in the
operating room. One cannot help but feel that the infection was intro-
duced at the time of the operation. In none of these cases has there ever
been a recurrence of ulceration, and all have experienced a relief of
symptoms. We believe that if this operative procedure is confined to
the indicated group of patients, it will solve their problems.

Having decided which operation offers the greatest likelihood of
relief for the individual patient, the preparation of the patient then
becomes of great importance. If bed rest and careful dietetic control have been carried out in an effort to obviate the need for operative interference, but without success, we believe that such a patient should not be sent directly from this regimen to the operating room. Rather should he be up and about on a generous and varied diet for at least three weeks, in order to regain his general muscle tone. Since we have adopted this as a fundamental principle, we have avoided many of the distresses which had previously accompanied operations carried out on patients recently treated by bed rest and a restricted diet.

A patient who requires surgical therapy has an ulcer which is almost invariably accompanied by oedema of the first part of the duodenum. For this reason during the preparation of these patients we carry out nightly gastric lavage, in order that the patient may sleep without a gastric residue. The relief of pain, even when it appeared to be intractable, which has followed five to ten days' nightly lavage, has been most convincing in regard to the efficacy of this often-disregarded and frequently-neglected therapeutic procedure.

It is important also to recognize that many of these patients have nutritional defects. These are the result of inadequate diet, which may be due to (1) improper advice regarding a well-balanced diet, (2) the inability of the patient to tolerate an adequate diet, or (3) the lack of self-discipline on the part of the patient which will enable him to carry out a planned regimen. The most common nutritional defects is a hypoproteinaemia, which is accompanied by greater handicaps than are often recognized. For this reason in the pre-operative diet of such patients it is essential that there be a high protein, a high fat and a high carbohydrate content, with a total adequate caloric value. We give in addition 100 mgms. of ascorbic acid three times a day.

It is important for the patient to realize that the indicated operative procedure is, because of our ignorance of the cause of ulcer, but a physiological make-shift. Thus, he must observe in his post-operative period the same principles in guiding his life as would be advised were the physician dealing with an uncomplicated ulcer. We believe that the complete avoidance of tobacco and alcohol is of tremendous importance to the permanency of the relief from symptoms. The patient should avoid undue fatigue, and should treat any infection more seriously than an ordinary individual. Particularly is this true in regard to the common cold and tracheitis, when the patient should immediately go to bed and not try to carry on. The diet should have an adequate caloric value, and have a high protein content.

In our last series of cases prepared by following those principles, the operation performed being determined by the enunciated indications, we have 179 cases operated upon with 5 deaths—a mortality of 2.7%.
It is interesting to note that in this group 59, or 32% suffered from massive haemorrhage, which was the indication for operation. There were 29 patients who suffered from duodenal ulcer occulta. 46 Pyloroplasties were carried out, with one death.

An analysis of the five deaths is as follows:

#13876—pulmonary embolus, proven by autopsy. Operative site satisfactory. #13641—a duodenal leak, proven by autopsy. This was an elderly man with a good deal of arteriosclerosis, not a high acid content, but a high degree of scar stenosis. A gastric resection was carried out. This was an error in judgement. This man could have been relieved of his symptoms with an indirect operation. #013976—aortic valve incompetence, proven by autopsy. In this last case the patient had a duodenal ulcer which had penetrated into the common bile duct, and this fistulous communication leaked following our resection. In subsequent cases, when we have had a fistula between the duodenum and the common bile duct we have carried out the Bancroft procedure of dividing the pylorus about one inch proximal to the sphincter and removing the mucous membrane, and then closing the stump. In this way we are less likely to disturb the fistulous communication between the ulcer and the common bile duct. We are so impressed with the necessity of removing the mucous membrane that we will not accept any operative procedure for gastric resection which leaves pyloric mucosa in situ.

In our follow-up clinic of the cases in which we have had the opportunity to do the first operation in a patient suffering from duodenal ulcer, we have, so far, not found a single proven recurrent ulceration. For this we are grateful, but also conscious of the fact that it is unlikely that the future will not bring us a disappointment. We realize that this is not the final solution of the problem confronting patients with duodenal ulcer.

**IN CONCLUSION**

(1) Duodenal Ulcer is not primarily a surgical disease.

(2) Surgical procedures are applicable only to the complications.

(3) Such complications are:
   a.—Acute Perforation
   b.—Penetration
   c.—Pyloric Stenosis
   d.—Massive Haemorrhage
   e.—Duodenal Ulcer Occulta.

(4) Indirect approach by means of gastro-enterostomy or Finney Pyloroplasty is satisfactory only in the group with a high degree of
scar stenosis in the pylorus and a low free hydrochloric acid in the stomach.

(5) Direct approach by means of a radical sub-total gastrectomy is the operative procedure to be carried out on all other patients. There is no handicap from a small stomach.

(6) A patient following such an operation can be economically efficient and symptom-free with the diet, work, worry and environment of an unskilled labourer.

(7) The selection of operation for the particular patient, based on the above criteria, will result in restoration of economic efficiency, freedom from symptoms, and a mortality which is not forbidding.

We eagerly await the release of “Sir Frederick Banting”, a biography by Dr. Lloyd Stevenson, Meds ’44. Its publication culminates a period of energetic research which was inaugurated while the author was still a student at Western. The inspiration for the project dates from a commentary on Sir Frederick given by Dr. W. P. Tew (a classmate of Banting’s) in one of Dr. Macklin’s seminars.

Understandably, the academic schedule of the medical student limited the amount of time that could be spent in compiling and securing data but, as Dr. Stevenson confessed, he “fortunately caught chicken pox while interning, and the two weeks quarantine gave me a real start in the book”. The material has been obtained from first hand sources, including diaries and letters of Sir Fredericks as well as written and verbal comments of his associates and friends. Dr. G. E. Hall, Dean of the Faculty of Medicine, has written the foreword. Dr. Hall and Mr. A. Y. Jackson typify those who have been in association with Banting professionally and personally, and who have aided the author in his quest by placing relevant correspondence at his disposal.

The book, now being printed by the Ryerson Press, is to be 450 pages long. It promises to be a well authenticated product of intensive research woven into the living story of a man whose vitality is with us yet.

MARY PURDY,’48
The Evolution of Surgical Procedures in Biliary Disease

By Roscoe R. Graham, M.B.

Toronto

At the turn of the century, operative therapy directed towards the relief of biliary disease was carried out only when the patients were desperately ill. The disease was far advanced, usually with jaundice or infection, and the patients' nutritional disturbances, in the light of our present knowledge, were very great, but no efforts of course were made to combat it. In this era the mortality was high and the morbidity in the patients who recovered from the operation was great.

The next phase of gall bladder disease centred around the debate as to whether drainage of the gall bladder or excision of this organ was the optimum surgical procedure. Following a long period of discussion, and with an increasing tendency to remove the gall bladder, it was soon realized that removal of a gall bladder containing stones resulted in a most delightful relief of symptoms, and was accompanied by a low mortality. This phase, because of the brilliant results following removal of the gall bladder, was succeeded by an era in which there was wholesale removal of the gall bladder for many and varied types of indigestion. Indeed, if the patient suffering from indigestion had already parted with his appendix, and had no evidence of a duodenal or gastric ulcer, he was in grave danger of losing his gall bladder. Obviously there were many gall bladders removed which did not contain stones, and which were not the cause of the patient's gastro-intestinal distress. While the mortality from operation at this stage was very low, the morbidity was great. Because of the high percentage of erroneous diagnosis, many patients were not only unrelieved of their symptoms, but suffered further distress from the psychological trauma resulting from the operative procedure.

The next phase was introduced by the development of cholecystography by Graham and Cole. This made a tremendous advance in the diagnosis of biliary disease. However, it also had its drawbacks. Superficially it appeared so obvious that if we had X-Ray evidence of the inability of the gall bladder to concentrate the dye within its lumen, we must as a result be dealing with a patient who harboured a diseased gall bladder. The failure to use standard technique to control the various other factors, such as the activity of the patient prior to the X-Ray which had a definite effect on the rate of emptying of the gall bladder, led to inaccurate conclusions. Many patients were explored solely on X-Ray evidence of disease, only to find on opening the abdomen that the gall bladder was perfectly innocent. With the passage of time, however, the
value of cholecystography has assumed its rightful place. A committee was appointed from the surgical, pathological and radiological staffs of the Toronto General Hospital to attempt to correlate and assess the value of cholecystography in the diagnosis of biliary disease. 201 cases were studied. These patients were accepted as clinically and pathologically proven to be suffering from cholecystitis. The X-Ray report revealed mal-function in 95.5% of this group, and further revealed stones in 61.1% of the instances in which stones were found at operation.

Table 1

<table>
<thead>
<tr>
<th>Value of Cholecystography</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases studied</td>
</tr>
<tr>
<td>Mal-function with X-Ray</td>
</tr>
<tr>
<td>Stones shown by X-Ray</td>
</tr>
</tbody>
</table>

Superficially this would lead one to conclude that the X-Ray diagnosis of gall bladder was final, complete and adequate, providing one used a definite and constant technique. However, one must know the basis upon which the patients were advised to be operated upon, before this conclusion can be evaluated. The members of the surgical staff of the Toronto General Hospital are still clinicians, and the diagnosis of biliary disease is based on the laborious and time-consuming procedure of taking and analyzing a clinical history. If a clinical diagnosis of biliary disease is supported by X-Ray evidence of a mal-functioning gall bladder with or without stones, the patient is advised to be operated upon. On the other hand if the clinical investigation does not reach the diagnosis of biliary disease, but in the course of the routine investigation there is reported a mal-functioning gall bladder without the presence of stone in the gall bladder, the clinician does not accept the diagnosis of biliary disease. In other words, X-Ray studies of patients with biliary disease form but an adjunct to the diagnosis, and in no way will replace the laborious and time-consuming procedure of history-taking, with the analysis of symptoms, which is the most important and essential part of the clinical investigation of such patients, the X-Ray studies being simply confirmatory. This explains the high percentage of agreement in X-Ray and clinico-pathological diagnoses.

Upon what does one base the diagnosis of biliary disease? We believe that a continuous, as opposed to an intermittent, indigestion is the most constant type of indigestion found in a patient who suffers from biliary disease. An indigestion in which the patient is perfectly miserable for a period of days or weeks, followed by a period in which he is perfectly well for a relatively long time, is due to either duodenal ulcer, gastric ulcer, or a recurring acute or sub-acute appendicitis. As a corollary, a patient who is suffering from cholecystic indigestion has a continuous indigestion, varying in its intensity and severity, but never completely disappearing, except on rare occasions when one
encounters a chemical cholelithiasis, with very little cholecystitis, the
patient having bouts of biliary colic and no indigestion. Such biliary
calculi are the result of metabolic upset, accompanied by a high blood
cholesterol. Such a condition may be the result of many factors; the
stones may result from an excessive pigment production, as one sees
in haemolytic jaundice. This continuous type of cholecystic indigestion
is accompanied by flatulence and an intolerance of excessive fatty foods
and certain raw fruits. If, with this type of story, one can support the
diagnosis of cholecystic disease by showing a mal-functioning gall
bladder with or without stones, we are justified in the diagnosis of
biliary disease.

In the analysis of a group (Table II) of 83 patients with regard to
the incidence of gall stones in relation to sex, we found:

Table II

<table>
<thead>
<tr>
<th>SEX</th>
<th>CALCULI</th>
</tr>
</thead>
<tbody>
<tr>
<td>83 Cases</td>
<td></td>
</tr>
<tr>
<td>12 Males</td>
<td></td>
</tr>
<tr>
<td>71 Females</td>
<td>70 married</td>
</tr>
</tbody>
</table>

It was interesting to find that only 12 were males and 71 were
females, and of the 71 females in this group, 70 were married. While
this seems an unusually high incidence of married vs. unmarried women,
it serves as a very useful clinical point in the diagnosis of biliary disease.
One should hesitate, and exclude all other lesions, before making a
diagnosis of biliary disease, particularly with gall stones, as the cause
of the indigestion in a nulliparous, unmarried female.

It thus becomes essential to establish the criteria necessary to
warrant advising the patient to be operated upon for biliary disease.
In an analysis of a large group of patients, we find that only 1.1% had
carcinoma of the gall bladder. All of these patients had stones, with
previous attacks of colic. Indeed, we found that in analyzing the patients
who were operated upon for biliary disease and who had stones in their
common duct, or who suffered an acute infection in the gall bladder or
biliary tree, that there was always a previous history of repeated gall
stone colic. As a result we have now come to regard repeated biliary colic
as an indication for operation which cannot be disregarded.

Should a patient be advised to have the gall bladder operated upon
when stones are found incidentally while being investigated for other
reasons, if such a patient has not given a definite history of biliary
coli or cholecystic indigestion, While many surgeons would not agree
we believe that unless this patient is going to a remote area, where
surgical therapy is not available, we are not justified in advising such
a patient to have the gall bladder and stones removed. If a patient has
cholecystic indigestion without colic, and no X-Ray evidence of stone,
but evidence of a mal-functioning gall bladder, should such a patient be advised to be operated upon? We would advise operation if the indigestion is such as to make the patient continuously conscious of epigastric distress, and where we would expect to find, not only gross evidence of biliary disease, but in most instances stones in the gall bladder.

If a patient has clinical and radiological evidence of cholecystitis, and suffers jaundice present or past, such a patient should be advised to be operated upon. If such jaundice should be accompanied by chills and fever, we conclude that the patient, in addition to suffering from cholecystitis, is also suffering from cholangitis, and this we regard as a very grave clinical state, which demands operation at the earliest moment that the patient can be adequately prepared for it.

In cases of acute cholecystitis, the time at which operation should be undertaken has been a subject for debate by many surgeons. As a result of conflicting opinions, there has been a good deal of confusion. The advocates of early operation suggest that it be undertaken within forty-eight hours of the onset of the distress: if the patient is seen later than this, operation should be deferred. We would suggest that all the difficulty and confusion in deciding upon the proper treatment for a patient who is believed to be suffering from acute cholecystitis results, from inaccurate and ill-defined terminology. Acute cholecystitis accompanied by fever and leucocytosis can result, without infection, from repeated efforts of the gall bladder to empty itself of a stone, as well as from a gall bladder which has become infected. Almost without exception acute cholecystitis develops subsequent to obstruction of the cystic duct with stone. During the first forty-eight hours the temperature may read 101°F. and the leucocytes may rise to 18,000, and yet aerobic and anerobic cultures of a gall bladder removed at this time will fail to show the growth of any organisms. In other words, this patient is suffering from a persistent biliary colic. If, however, this biliary colic persists beyond forty-eight hours, with resultant spread of oedema to surrounding structures, particularly the hepatic flexure of the colon, bacterial inflammation is added to the inflammation resulting from obstruction of the cystic duct. Operation at this time, when bacterial infection is unlocalized, and before the protective pericholecystic reaction has occurred, is inadvisable.

We carried out a study of 273 cases of acute cholecystitis admitted to the Toronto General Hospital:

<table>
<thead>
<tr>
<th>Table III</th>
<th>ACUTE CHOLECYSTITIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cases studied</td>
<td>273</td>
</tr>
<tr>
<td>Not operated</td>
<td>90</td>
</tr>
<tr>
<td>Refused</td>
<td>26</td>
</tr>
<tr>
<td>Not advised</td>
<td>64</td>
</tr>
</tbody>
</table>
180 RECENT ACCESSIONS TO THE MEDICAL SCHOOL LIBRARY

Total cases operated .......... 183 10 deaths = 5.4%  
Delayed operation .......... 164 7 deaths = 4.2%  
Immediate operation .......... 19 3 deaths = 15.7%  

Of these, 90 were not operated upon. 26 refused operation when it was advised, and 64 were not operated on for various reasons, leaving a total of 183 cases in which operation was carried out. There were 10 deaths in this group, giving a mortality over all of 5.4%. Of these 183 cases, 164 were operated on after the acute process had subsided and an elective operation could be carried out. Seven, or 4.2% of these patients died. Nineteen of the group had an immediate operation either because of the uncertainty of diagnosis or because it was felt wise in view of the state of the patient to carry out an emergency procedure. Of these 3, 15.7% died. Thus it would appear that, while there is no great harm done by doing an emergency operation at two o'clock in the morning on a patient suffering from persistent biliary colic for less than forty-eight hours, it could be done the following morning with as great safety to the patient, because we are simply operating on a non-bacterial inflammation. But if the illness is, as it was in our group, present for an average of 5.9 days before the patient was admitted to hospital, then emergency operation is not wise. We are dealing with an acute bacterial inflammation. Conservative treatment results in a subsidence of the acute process and an elective operation can then be carried out. The mortality of 4.2% in the group of cases of acute cholecystitis so managed supports this type of treatment.

In the chronic group, in which jaundice is the factor determining the need for operation, one must confirm that the jaundice is directly due to biliary disease. One of the major pitfalls occurs in haemolytic jaundice. As we all know, in this group of cases there is a very marked increase in the reticulocytes of the blood, the skin is not itchy, there is no bile in the urine and the stools are filled with pigment; yet because of this high concentration of bile pigment in the portal vein, pigment stones are formed in the gall bladder in 80% of the patients upon whom we have carried out a splenectomy for this disease. Such stones may produce an obstructive jaundice which can be added to the haemolytic jaundice: indeed the author has seen a case in which the gall bladder was operated upon and removed, with its stones, in a patient who suffered from repeated biliary colic, and it was some weeks after the operation before the proper diagnosis of calculous cholecystitis secondary to haemolytic jaundice was arrived at.

The differentiation of a toxic hepatic jaundice from obstructive jaundice occasionally presents great difficulties. While all the tests for liver function leave something to be desired, the galactose tolerance test has proven itself to be of inestimable value to the surgeon in differentiating the toxic hepatic jaundice from the obstructive jaundice.
In this test 40 grams of galactose are given the patient by mouth, and the output of glucose in the urine is estimated for the following three hours. If the patient excretes during the three-hour period more than 3.5 grams of glucose in the urine, we accept the diagnosis of toxic hepatic jaundice, rather than obstructive jaundice. We place great reliance on the course of the VDB reaction in determining the progression or regression of the jaundice. If it is at all possible to avoid operation during the increase of jaundice, it is wise to do so.

It is interesting to determine the relationship between the presence of jaundice and the presence of stone in the common bile duct. Two series were studied (Table IV):

**Table IV**

**JAUNDICE IN COMMON DUCT STONES**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cases studied with stone in duct</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>Jaundice or history of jaundice</td>
<td>44</td>
<td>82.9%</td>
</tr>
<tr>
<td>No Jaundice or history of jaundice</td>
<td>9</td>
<td>16.7%</td>
</tr>
<tr>
<td>Group of jaundiced patients studied</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal common duct</td>
<td>34</td>
<td>53.1%</td>
</tr>
<tr>
<td>Stone in common duct</td>
<td>30</td>
<td>46.9%</td>
</tr>
</tbody>
</table>

In less than half of the patients is jaundice due to stone in common duct: 17% of patients with stone in common duct were never jaundiced. In 23 cases with common bile duct stones, jaundice or the history of jaundice was present in 19, or 82.6% of the cases, but in 4, or 17.4% of patients with stone in the common bile duct, jaundice was not present, nor was there any history of it having previously been present. In a further series of 30 cases of stone in the common bile duct 5, or 16% were never jaundiced, while 25, or 83.3% showed jaundice. This is of tremendous moment, to realize that 17% of the patients who have stones in the common bile duct never show jaundice. It was also interesting to note in studying a group of 64 patients who were jaundiced that 34, or 53.1% had perfectly normal common bile ducts. In other words, of jaundiced patients, only 46.9% have a stone in the common bile duct, and 17% of the patients with a stone in the common bile duct never have jaundice.

It may be necessary to operate upon a patient in the presence of jaundice. The hazard of such a procedure has been reduced to almost the same level as an elective operation in the absence of jaundice, providing that before the operation adequate preparation is carried out. We believe this should include a correction of the nutritional defects. In the past such patients have been given a high carbohydrate and a low fat diet, with very little regard to their protein intake. We now know the tremendous importance of adequate protein intake. We now know the tremendous importance of adequate protein in protecting...
such patients during operation, and particularly, as shown by Cannon, the value of protein in combatting infection. In order to attain this nutritional balance the patient may be given an adequate diet by mouth, supplemented by intravenous saline, glucose and amino acids. Vitamin K., however, has made the greatest contribution. This, now given orally, can restore the prothrombin to normal levels, and has completely banished the "bete noire" of post-operative haemorrhage in jaundiced patients.

Despite the careful investigation, accurate diagnosis and pre-operative preparation of patients suffering from biliary disease, there was in former years a percentage of unsatisfactory results which it was difficult to explain. An analysis of our cases who suffered such unhappy residual symptoms led us to realize that the most common cause of unsatisfactory results following operation on the gall bladder and bile passages was an error in diagnosis. This error in diagnosis resulted from a carelessly-taken history, inaccurately interpreted, or by accepting X-Ray evidence of biliary disease as the sole indication for operation. The next most important factor was the procrastination of the patient, resulting in prolonged and repeated biliary colic, with recurring bouts of infection, which resulted in permanent damage to the biliary tree and produced chronic pancreatitis. The next important factor was the failure to realize that because of the prolonged physiological upset resulting from a diseased gall bladder, the patient suffered from imbalance of the autonomic nervous system, resulting in a reflex pylorospasm, and with an accompanying constipation. We believe that patients who have been operated upon for biliary disease should be supervised by the physician for at least six months, during which time they need definite encouragement, psycho-therapy, a diet which will correct their constipation, and mild sedatives and Belladona to control the pylorospasm. Yet despite our efforts to avoid the above pitfalls, we have found that in our own cases there was still a residuum of patients who, following operation, had symptoms of gastro-intestinal distress. This led us to assess the possibility of our failure to remove stones from the common bile duct. We began to realize that we were not opening the common bile duct as frequently as were some of our surgical friends.

Table V

| INCIDENCE OF COMMON DUCT STONE PRIOR TO JANUARY 1, 1933 |
|-------------|----------------|----------------|
| Explored ........ 8.0% : Stones found....... 4.5% |
| Last ten years—Explored ..........42.3% : Stones found.......23.4% |

We took a group of 200 cases prior to January 1, 1933, and found that we had explored the common duct only sixteen times, or eight per cent, and found stones in the common duct only nine times, or four and a half per cent. We felt that this probably was indicative of the fact
that we were missing stones in the common bile duct, so we enunciated five indications for opening the common bile duct:

1. Jaundice or a history of jaundice
2. A dilated Common Bile Duct
3. A thick wall to the Common Bile Duct
4. Chronic Pancreatitis, i.e., a thick or enlarged head of pancreas
5. Multiple small stones in the gall bladder, with a large cystic duct.

This was immediately followed by the increased incidence of exploration of the common bile duct and the more frequent finding of stones in the common bile duct, until during the last ten years we have explored the common bile duct in 42.3% of all cases of calculous cholecystitis upon which we have operated, and have removed stones from 23.4% of such cases.

With this tremendous increase in the exploration of the common bile duct, it became imperative that we satisfy ourselves that this operative procedure did not of itself cause a fatality or a morbidity, because in approximately 48% of instances in which the common bile duct was explored, no stone was found. We analyzed 166 cases in which the common duct had been explored, and found there were ten deaths, or 6%.

Table VI

<table>
<thead>
<tr>
<th>Cause of Deaths</th>
<th>Number of Cases</th>
<th>Deaths 10—6%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cardiovascular—old rheumatic heart disease</td>
<td>166</td>
<td>10—6%</td>
</tr>
<tr>
<td>2. Ancient pyelonephritis—developed uraemia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operative site normal at autopsy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Clinical diagnosis Pulmonary Embolus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At autopsy no cause found</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Died during operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At autopsy no cause found</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Acute Yellow Atrophy after 6 months’ jaundice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Jaundiced intermittently for a year—Liver death</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Jaundiced intermittently for a year—Liver death</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Sudden post-operative coronary occlusion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Explored patient with chills and fever and gall stones</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excluded cholangitis. Cause of infection and death was Pyelonephritis with uraemia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No death attributable to Choledochotomy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No stricture followed draining with T. tube</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Of these, one died from a cardiovascular decompensation, the result of serious organic heart disease which existed pre-operatively. One patient died of a flare-up of an old pyelo-nephritis, and at autopsy the
operative site was normal. One died with a clinical diagnosis of pulmonary embolus, but at the autopsy no cause could be found for death. Another patient died during the operation, and at autopsy no adequate explanation could be found. We had three liver deaths, one of which was a definite acute yellow atrophy. The other two had recurring colic and jaundice, with serious liver damage for one year in one case, and for two years in another case. On patient died of a sudden coronary occlusion. One patient, who suffered from chills and fever, had known gall stones, and exploration was carried out in the hope that she might have a cholangitis, which we were unable to diagnose. This proved to be erroneous, and the patient died from uraemia. In this group no case died in which a stone was not removed from the common bile duct, and no patient had a stricture of the common bile duct following its drainage by use of a T tube.

This 6% mortality in the patients who had the common duct explored simply serves to show the increased mortality which accompanies operation which is carried out at this stage in the disease, in contrast to that carried out when the disease is limited to the gall bladder. We analyzed 246 cases that we operated upon and who had stones in the gall bladder and (or) common duct. (Table VII).

Table VII

<table>
<thead>
<tr>
<th>CALCULOUS BILIARY DISEASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cases studied ...............246</td>
</tr>
<tr>
<td>Duct explored ..................141 cases=38.7%</td>
</tr>
<tr>
<td>Stones removed ..................82 cases=22.4%</td>
</tr>
</tbody>
</table>

Of 4 deaths, 3 due to complications with stone in common duct.
1 death when disease only in gall bladder due to pulmonary embolus.
Mortality if disease only in gall bladder—0.4%.

There were 4 deaths, a gross mortality of 1.6%. Three of these deaths were the result of complications resulting from stone in the common bile duct, enunciated in the choledochotomy group. Only one patient died who had the disease limited to the gall bladder, and she died from a pulmonary embolus. Thus in 246 cases operated upon, there was only one death when operation was carried out at a time when the disease was limited to the gall bladder, giving a mortality of 0.4%, as compared to 6% if operation was delayed until the common bile duct was involved by stone. Yet despite this care in searching for stones in the common bile duct, in a series of 365 calculous cases the common duct was explored in 141, or 38.7% of instances, and stones removed from the common bile duct in 82, or 22.4%, we still failed to remove all the stones in five cases. Three were removed at a second operation, with one death. One patient died of an acute haemorrhage pancreatitis, and at autopsy a small stone was found to be lodged in the Ampulla of Vater.
One patient had the stone cleared by washing the common duct with ether and alcohol.

We are thus tremendously impressed with the necessity of taking every precaution to determine whether stones are present in the common bile duct, and to remove them. We are also conscious of the fact that in the cases where the common bile duct is tremendously dilated, that despite most painstaking care, it is not impossible to leave a stone in position, and that should the patient have a recurrence of chills and fever, with or without jaundice, that this possibility must be borne in mind as a possible explanation.

How long should a T tube be left in the common duct? This can only be answered if one knows the condition of the biliary tree and the efficiency of the drainage of the common bile duct into the duodenum. This can be determined by means of a cholangiogram taken after the injection of iodized oil into the common duct through the T tube. If there is free drainage so that at the end of an hour all the iodized oil has gone into the duodenum, we can remove the tube with safety. If, however, there has been definite infection in the bile ducts, or a marked enlargement of the head of the pancreas due to chronic pancreatitis, we believe that a minimum of six weeks should elapse before removal of the T tube, even though adequate drainage of the duct into the duodenum is demonstrated by the use of the cholangiogram and iodized oil.

**Summary**

1. We must exhaust all our means to obtain an accurate diagnosis. The eliciting and proper interpretation of a clinical history, together with a complete physical examination, should form the sheet-anchor and basis of this diagnosis.
2. Physical aids in the diagnosis of biliary disease should be used only as confirmatory evidence.
3. Repeated biliary colic is an indication for operation which should never be ignored.
4. An adequate incision in the abdominal wall, with exposure of the junction of the common and cystic ducts, will avoid technical accidents.
5. Cholecystic disease demanding operation is extremely rare in unmarried nulliparous females.
6. Five indications are presented demanding exploration of the common bile duct.
7. Negative exploration of the common bile duct does not of itself increase operative mortality or morbidity.
8. Operation in late cases of acute cholecystitis rarely needs to be carried out as an emergency procedure.
9. Post-operative supervision by the physician, with encouragement and reassurance for six months, is essential.
Symposium on Heart Disease

By PAUL D. WHITE, M.D.
Boston, Mass.

ADVANCES IN OUR KNOWLEDGE AND TREATMENT OF CONGENITAL
HEART DISEASE

ONE of the greatest advances in medical science during the last
decade has been in the field of congenital cardiovascular defects.
The first real light on etiology has come from Australia where Gregg
and Swan have shown that German measles during the first two months
of pregnancy is very likely to lead to the triad of congenital cataracts,
microcephaly, and congenital heart disease.

Concentrated study of congenital heart disease has made it possible
at the present time to diagnose, in ages above infancy, the majority
of cases of the chief types, which comprise, in the noncyanotic group,
auricular septal defects, ventricular septal defects, patency of the
ductus arteriosus, and coarctation of the aorta, and in the cyanotic

group the tetralogy of Fallot. Another of the rarer conditions giving
rise to cyanosis, namely tricuspid atresia, has also been added to the
recognizable lesions. Often every method of examination at one's
disposal (history, physical examination, electrocardiography, fluoros-
scopy, diodrast X-Ray study, and cardiac catheterization), may be
needed for diagnosis, but at times the diagnosis is easy as in cases
with a continuous murmur in the pulmonary valve area or with the
Roger murmur.

Accurate diagnosis has become all the more vital of late ever since
Gross first successfully ligated the patent ductus arteriosus in 1938;
it should no longer be possible to confuse, as however is still done, an
auricular septal defect with a patent ductus arteriosus. Finally, quite
recently, further surgical procedures have been developed to shunt blood
into the relatively bloodless lungs by arterial anastomosis in certain
cyanotic cases, especially those with the tetralogy of Fallot (Blalock)
and to perform plastic operations on the aorta to relieve coarctation
(Gross, Craasford).

THE TREATMENT OF SUBACUTE BACTERIAL ENDOCARDITIS

The most dramatic advance in cardiac treatment that has developed
in the past few years has been the chemotherapy of subacute bacterial
(Streptococcus viridans) endocarditis. Only a few years ago this
disease, implanted on rheumatic valvular or congenital heart defects,
was almost invariably fatal (in over 99 per cent). With the introduction
of the sulfonamides there were a few years of slight but promising
reduction of mortality (to 94 per cent). Then penicillin came abruptly
into the picture. The first reports with this drug in 1943 were unfavor-
able due to the relatively small dosage used, but early in 1944 it became evident that if enough were given, penicillin could apparently cure the majority of cases (66 to 75 per cent) and this early promise has held to date. The reasons why it has been impossible to cure all the cases are several: (1) in some instances, either the organism is penicillin-resistant to start with, or it becomes so; (2) not enough of the drug has been given (in a few cases it has been found to be necessary to give several million units daily for weeks); (3) heart failure has developed even though the infection may be controlled; (4) serious or fatal peripheral embolism has supervened; and (5) acute rheumatic myocarditis may complicate or follow the penicillin therapy. The method of administration found most satisfactory has been the intramuscular injection of 50,000 to 100,000 units every three hours for 3 to 6 weeks. Penicillin X, which is the variety most effective in subacute bacterial endocarditis, has of late been hard to obtain, but work is now underway to produce it in quantity again.

HYPERTENSIVE HEART DISEASE AND ITS REVERSIBILITY BY LUMBODORSAL SYMPATHECTOMY

Until the last few years it has been the experience of the speaker that once clear cut evidence of hypertensive heart disease has developed there has been little or no amelioration of the condition but rather a slow development of increasing effect of the hypertension on the heart until in the course of years, barring other less common events, death has come from myocardial failure or coronary heart complications. The difficulty had been the ineradicable strain of the high blood pressure itself, although temporary effect on the hypertension could be achieved now and then by medical measures with a delay of progress. All we could do in the main was to treat the heart failure itself when it appeared and thus prolong life a little.

Surgical attempts by lumbar sympathectomy to relieve malignant hypertension began as long ago as 1925 (Rowntree and Adson) but it has been only in the last six years, since Smithwick introduced an adequate degree of lumbodorsal splanchnic resection, that a successful control of hypertension has been effected in the majority of cases who are well selected, thereby ameliorating and sometimes completely clearing evidences of hypertensive heart disease when present in such cases. Clear objective proof of reversibility has been frequently demonstrated by electrocardiogram and X-ray film as well as in blood pressure levels and in many cases this improvement has held for years. In general the most suitable patients are those under 45 with relatively high diastolic and low pulse pressures, reacting well to posture, cold, and sedation, and with good renal function.
ADVANCES IN OUR UNDERSTANDING OF CORONARY HEART DISEASE

During the past decade our understanding of coronary heart disease has advanced greatly, due to the fact that its frequency and serious nature have at last and belatedly stimulated an interest in its natural history. No longer regarded as merely an act of God or as an attribute of age, it is now being studied as a disease process that often begins in youth. The significant facts learned are that in young persons (under 40 years of age) it is a disease of males (in the ratio of about 24 to 1), it occurs particularly in robust middle-aged men, it is a very common disease, and in contrast to old ideas it may clear up entirely, perhaps to recur years later, smoulder along indefinitely, in some cases, with no shortening of life. The reason for the great male preponderance in youth has not been discovered but it may be associated with a sex difference in the ability to metabolize cholesterol fats; we have found that many young cases have high blood cholesterol content and low basal metabolic rate. More careful analysis of the symptomatology and more frequent electrocardiograms have uncovered many cases of temporary coronary insufficiency which used to be called indigestion because they were not adequately studied or because they got well again. The reason for recovery has been found in the gradual and natural development of a more adequate collateral coronary circulation (Blumgart and Schlesinger) which throws doubt on many of the claims of all sorts of therapy, radical and otherwise. Nevertheless, the fatalistic viewpoint is unjustified since sudden death can be averted by simple precautions over periods of severe coronary insufficiency.

THE GREAT IMPORTANCE OF THE RECOGNITION OF PULMONARY EMBOLISM IN MEDICAL PATIENTS AND ITS TREATMENT

The most frequent complication of congestive failure in cardiac patients and the commonest precipitating cause of their death is pulmonary embolism, often unrecognized during life or called by another name, most commonly “recurrent pneumonia” or “heart attacks.” In other medical cases, too, it is an occasional complication, and as an an unexpected occurrence in patients with an insidious leg vein thrombosis, either postoperative or postpartum, it may simulate heart disease, and through its effect on the right ventricle by obstructing the pulmonary circulation, it may produce an abnormality in the electrocardiogram (in about 10 per cent of the cases) which has been called the pattern of the acute cor pulmonale. It has been estimated as occurring in 1.6 per cent of cases postoperatively, and in 2.1 per cent of medical ward cases; it is most frequent in cases of leg injury (11.9 per cent) (Bauer).
Any sudden attack of breathlessness, chest oppression, pleural pain, otherwise unexplained tachycardia or fever, faintness with apprehension, or blood spitting in a bedridden or invalid medical patient, especially a cardiac in congestive failure, should make one suspect the possibility of, and search for, pulmonary embolism and phlebothrombosis, though both may be difficult to uncover. The diagnosis is very important because life may be saved or at least prolonged by suitable therapy to prevent another even more serious or fatal attack, by either one of two measures, preferably bilateral common femoral vein ligation (the most dangerous clot may be in the more innocent appearing leg) or by anticoagulant therapy (with heparin or dicoumarol).

**EARLY EVIDENCE OF CONGESTIVE HEART FAILURE AND THE USE OF LOW SODIUM INTAKE IN ITS TREATMENT**

Myocardial insufficiency, which in an advanced form gives rise to congestive failure, has long been known and in general well treated, but there are certain details of diagnosis and therapy which are in need of clarification.

In a patient with left ventricular strain due to hypertension, aortic valve disease, or myocardial infarction, there are early evidences of myocardial weakness and insufficiency that are often neglected with resulting hazard of acute pulmonary edema before treatment is started: such evidence includes apical gallop rhythm, accentuation of the pulmonary second sound, the appearance of a new apical systolic murmur, pulsus alternans (easily demonstrated by sphygmomanometry), the development of dyspnea on effort not previously causing it, unexplained insomnia, decreasing vital capacity, and increased lung hilus X-ray shadows.

In a patient with right ventricular strain due to mitral stenosis, extensive pulmonary fibrosis, congenital heart disease, or left ventricular failure, weakness of the right ventricle may show itself by substernal gallop rhythm, liver engorgement and pain, sometimes paroxysmal, and slight fullness of the neck veins before edema develops.

Limitation of activity and digitalization should be prescribed early, indeed, in patients with considerable cardiac enlargement these measures should be instituted even before these signs (noted above) appear. Mercurial diuretics and limitation of fluid and salt intake have been customarily prescribed as adjuvants to rest and digitalis when edema develops, but it is now established that if the sodium intake can be quantitatively reduced sufficiently (down to 1.75 grams of NaCl daily, for example, by the help of salt-free bread and butter) fluids can be given freely (up to 3 or more liters a day) with good diuretic effect and a complete relief of thirst, and with a marked reduction or even omission of the bothersome and frequently debilitating mercurial diuretics.
CLINICAL ASPECTS OF THE BOWEL OBSTRUCTION PROBLEM
O. H. Wangensteen, M.D.

The present trend in intestinal obstruction is to correct dehydration with saline solution, to attempt conservative decompression by intestinal intubation and, if this is not achieved readily, to resort to surgery. The problem is here discussed under effects, diagnosis, treatment and mortality of bowel obstruction.

The effects of obstruction are vomiting, the effects of fluid and blood loss, and the effects of damage to a section of bowel wall. Fluid loss is the result of vomiting. Blood loss occurs especially in strangulation of a large segment of bowel with blood loss into the affected segment. Damage to the bowel wall, either from pressure necrosis of distension in simple obstruction, or from impaired blood supply in strangulation, may result in perforation of the gut into the peritoneal cavity or, more often, in the absorption of toxic products from the area involved.

Diagnosis is dealt with under five headings. First, is obstruction present? This is indicated by intermittent, crampy, colicky pain (intestinal colic) and the possible concurrence of intestinal gurgling and pain. Secondly, is the obstruction simple or strangulated? In simple obstruction, there is only intestinal colic, no tenderness. In strangulation (when there is interference with the blood supply) there is both intestinal colic and tenderness. It is possible to have strangulation of the blood supply without obstruction of the lumen and difficulties in differentiation arise in inflammatory lesions that give rise to exudate which interrupts the intestinal continuity. Also in simple obstruction, the bowel sometimes "weep," giving rise to peritonitis and its accompanying tenderness. Finally, in late strangulation, there may be an absence of intestinal colic altogether. Thirdly in the diagnosis, is the obstruction in the small or large intestine? In the small intestine there is repeated vomiting, often copious, and there is also considerable gastric retention. In obstruction of the lower ileum there is frequently fecal vomiting. In the colon, there is an absence of vomiting, except for the reflex vomiting of abdominal colic at the onset and there is an absence of gastric retention. Fourthly, what is the value of the roentgen film? The roentgen film indicates the position of the obstruction and whether the obstruction is complete or partial. To ascertain the latter, the size of the distended coil of intestine is measured with a metric rule on the roentgenogram and compared with the normal. Fifthly, what is the value of enemas in diagnosis? Enemas are of no value in diagnosing intestinal obstruction but may indicate whether the obstruction is complete or not. If, after an enema has been given, a roentgenogram shows gas still in the colon, it must have escaped from the upper bowel through an incomplete obstruction.

Therapy in intestinal obstruction is considered under conservative and operative therapy. The conservative therapy consists of administering saline solution, transfusing with blood and plasma, giving oxygen and using conservative depression. Saline solution is used to restore the electrolyte balance in the body. It relieves, but does not cure, high obstruction. It is not so useful in colonic obstruction. Transfusion of blood is carried out in strangulation of a large segment of bowel with the loss of a large amount of blood into the area as indicated by a fast pulse and failure to improve with
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saline injection. In simple obstruction, transfusion with plasma is used to replace transudate lost into the peritoneal cavity. Oxygen therapy was used to lower the nitrogen content of the blood and so draw nitrogen out of the intestine and relieve the compression. It is not used so much now. Conservative decompression is carried out with a Miller-Abbott tube and offers the lowest mortality. It is absolutely contra-indicated in strangulated obstruction and simple obstruction of the colon with great distension. If the simple distension persists after a reasonable interval of conservative therapy, then surgery must be carried out without delay.

Operative procedure is considered in early and late simple obstruction, in acute colonic obstruction and in strangulated obstruction. In early simple obstruction, operation is usually successful and cuts down the larger mortality from use of the Miller-Abbott tube with failure to obtain decompression. In late simple obstruction, pre-operative preparation should include the administration of water, electrolytes and sufficient calories to satisfy basic caloric requirements. The operation formerly carried out was a simple blind enterostomy to relieve the distension with a later operation to relieve the obstruction if necessary. At present, an aseptic decompression enterostomy is used. In acute colonic obstruction, a decompression vent is placed in the transverse colon for obstruction distally; but for obstruction in the colon proximal to the transverse colon, an opening into the caecum is necessary. In strangulating obstruction, an early operation is imperative with excision of necrotic areas of intestine.

There are, in general, six causes of mortality in bowel obstruction. Firstly, late diagnosis. Secondly, delay in hospital due to failure of diagnosis, failure to identify the type of obstruction and using suction too long when it will not work. Thirdly, failure to prepare patients adequately for operation with water and electrolyte replacement; inadequate replacement of blood volume in strangulation; and failure to supply caloric and nitrogen requirements. Fourthly, improper choice of therapeutic procedure, either in conservative or operative therapy. Fifthly, technical failure in surgical procedure, especially in failure to perform an aseptic operation. Sixthly, uncontrollable factors as congenital intestinal atresia, strangulated incisional hernias in obese patients with poor hearts, old age and its physical infirmities, great intestinal distension when first seen and strangulating obstructions when first seen. Except for uncontrollable factors, the mortality in bowel obstruction could be greatly lowered if more care was taken to eliminate these factors.

BILL COOK, '47

EARLY DIAGNOSIS OF SMALL INTESTINAL OBSTRUCTION

CLAUSE J. HUNT, M.D.

Kansas City, Mo.

Surgery 19:237, February, 1946

Obstructions of the small bowel are divided into external and those hidden within the abdominal cavity. Those on the surface are of the strangulated hernia type and are easily diagnosed. Those within the abdomen often have the diagnosis delayed as the symptom complex is not appreciated by the physician. Often the patient believes the pain to be due to an insignificant cause and delay occurs again, allowing serious complications to develop.

Intra-abdominal bowel obstructions are of two types:

(1) viability not in jeopardy
(2) volvulus type in which the bowel has its blood supply cut off.

Following are some points of differential diagnostic value. In the simple type, rigidity and localized tenderness are not present, whereas both are present in the second type. Early in intestinal obstruction, there are very few physical signs present. Pain comes in paroxysms and peristaltic waves can be seen during the spasm of pain. Also, the passage of gas and/or of bowels does not eliminate the possibility of obstruction. Remember it is not necessary to have the typical transverse x-ray pattern before diagnosing small bowel obstruction. Collections of gas in small bowel in an adult may be considered synonymous with obstruction. This is of no diagnostic value in children. This gas may be noted within five hours of the onset of the obstruction.

The differential diagnosis between mechanical obstruction and paralytic ileus in post-operative distension is discussed. In the former, the small bowel
only is distended while both large and small are distended in the latter.

Other causes of internal obstruction and their treatment are also discussed.

The indications for intubation are:

1. simple adhesive obstruction with proximal dilation
2. early post-operative dilation
3. volvulus
4. strangulation where viability is in doubt
5. loop obstruction as a post-operative measure.

Summary

Classification of small bowel obstruction into strangulated herniae and those hidden in the abdominal cavity is discussed. The diagnosis of strangulated herniae and reasons for immediate operation are well covered.

Other aspects which are also discussed are:

1. types of intra-abdominal obstruction of the small intestine with their immediate and remote effects.
2. indications for early operation and for delay
3. value of x-ray
4. intestinal intubation — use and method of using Miller-Abbott tube.

NEIL BOYD, '47

THE SIGNIFICANCE OF THE SEDIMENTATION RATE TO THE GENERAL PRACTITIONER

ALEX. A. NUMBERS, M.D.


The sedimentation test is a simple one and may be done in any office. The author uses the Westergren method and finds that micro methods done at the same time and compared are inconsistent.

Many external factors influence the sedimentation rate—(1) the anti-coagulant, (2) the temperature, (3) the position of the tube, (4) the length of time the blood has stood, (5) the length of time the tourniquet was on the arm, and (6) the amount of oxygen taken up by the blood as it is mixed with the anti-coagulant.

The mechanism and factors governing the settling of the red cells is not completely understood. The most important factor appears to be the shape and concentration of the colloidal molecules of the blood plasma, albumin, globulin, and fibrinogen. The most marked increases in the sedimentation rate are seen when there is a great increase in the fibrinogen proteins together with an increased or normal globulin and a considerable decrease in albumin.

Cutler considers the increased settling out of the erythrocyte as representing a change in plasma composition which has resulted from the absorption of products of tissue destruction. The rate of sedimentation serves as an indirect measure of tissue breakdown, regardless of etiology.

The value of the sedimentation rate in diagnosis may be confirmatory. When a patient is found to have an increased sedimentation rate with no physical findings, he is followed carefully until the rate is again normal or some condition develops.

Following the sedimentation rate in treatment is of greater value. The rate becomes normal on recovery from an acute infectious process. In acute rheumatic fever and infective arthritis, the temperature and white count come down before the sedimentation rate and the patient should be kept in bed until the sedimentation rate is normal. After removal of malignancies, if the rate does not return to normal, metastases should be suspected.

This test can be of considerable value as an aid in diagnosis by indicating the presence of disease which may or may not be evident from general examination and in following treatment. The author looks forward to the day when the sedimentation rate will be as common an office test as a urinalysis or white blood count.

M. MURPHY, '47

CORONARY ARTERIOSCLEROSIS, CORONARY ANASTOMOSES AND MYOCARDIAL INFARCTION

RAVIN, A. AND GEEVER, E. F., Denver, Col.

Archives of Internal Medicine 78:2, August, 1946

A series of 166 unselected post-mortem hearts were studied by the Schlesinger injection method, using cannulae inserted directly into the right and
left coronary arteries. By using a mixture of agar and lead salt (opaque to x-ray), accurate coronary patterns could be derived and in this series it was concluded, provisionally, that there were three main patterns:

1. Right coronary preponderant pattern 52%.
2. Balanced 35%.
3. Left coronary preponderant pattern 13%.

Schlesinger's experiments seemed to indicate that the third group suffered most from coronary sclerosis; the second group least.

The masses injected into the arteries were colored, one red, one blue. If the arterioles were less than 20 microns in diameter, there was no admixture, i.e., a purple mass. Normally, there is no admixture but when the coronaries became sclerosed, anastomoses developed. When the post-mortem heart was examined, the arteries were found to contain a purple mass.

It was similarly deduced that of the three main branches—left anterior, circumflex and right posterior—two of the three could maintain adequate circulation if the other were thrombosed without having caused myocardial infarction. This seemed to be borne out by clinical material and post-mortem injections.

If, on the other hand, there should be infarction causing sudden death, anastomoses were minimal.

A group of hearts with congenitally small vessels were believed to be more subject to dangerous sequelae.

If these results are accurate and non-assumptive, it is clinically significant that there is normally a balance between sclerosing of a vessel and the subsequent development of anastomoses. Some day control of the factors favouring arteriosclerosis (e.g., age, anoxemia, fat metabolism, hypertension and mechanical wear) may open a new field in cardiac therapeutics.

If sclerosis can be slowed and thrombosis delayed, adequate collateral circulation may form to maintain normal healthy nutrition for years otherwise impossible.

Possibly those destined to benefit most from this research are those with preliminary signs of angina pectoris. The principles outlined are, in part, being accomplished at present by rest and vasodilating drugs.

P. E. Crozier, '47

THE USE OF ANTHALLAN IN DERMATOLOGY

EREUX, L. P. AND CRAIG, G. E.

The authors present and describe a relatively new weapon against allergic phenomena—anthallan. This drug is an organic compound with an extremely complicated chemical terminology which has previously had favorable reports from other workers who have used it in the treatment for vaso-motor rhinitis and allergic dermatoses. The authors have used the drug in a series of cases belonging to the latter group.

This material is soluble only in organic solvents and biological fluids. It is absorbed from the intestine, is excreted rapidly and has a wide margin of safety. Its mode of action is not completely understood. Similarly to benadryl, it has an anti-histamine mechanism but this is slight and does not seem to fully explain its therapeutic effectiveness. Capsules of 0.085 gm. of the powdered drug are available. This powdered form makes it convenient for administration to children. They require little change from the dosage given to adults.

Four to six capsules are given per day. This is increased to twelve to fifteen in twenty-four hours. During the second and third weeks, doses range from six for infants to eight to fifteen for children and adults. A smaller maintenance dosage is then continued for several weeks. No marked change can be expected during the first ten days of treatment.

Twelve cases of infantile exzema were followed during treatment. At least nine of these cases were relieved of itching—the lesions themselves did not clear up but secondary infection was reduced due to the cessation of scratching. Ten out of twelve cases of atopic eczema and two cases of toxic eruption (one due to sulfathiazole, the other to penicillin) showed marked symptomatic relief similar to that of the preceding group. Cases of chronic urticaria, urticaria pigmentosa, pruritus vulvae and seborrhoeic dermatitis were uninfluenced by the drug.
The authors feel that anthallan is a safe drug and is useful in the control of pruritus on an allergic basis but suggest that it shows its greatest efficiency when it is administered in conjunction with other forms of recognized therapy, such as topical applications, physical agents and, occasionally, sedatives.

—Alf. Crabb, '47

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**PENETRATION OF PENICILLIN INTO FOCI OF INFECTION**

*By I. E. Gerber, Gregory Schwartzman, and G. Baehr*(Mount Sinai Hospital, N.Y.C.)

*J.A.M.A.*, 130:761-764, 1946

The authors are of the opinion, after studying a series of cases, that intermittent intramuscular injections of large doses of penicillin 3-hourly are more effective in the control of local infections and bacteraemia than giving the same total daily dose continuously, by intramuscular or intravenous routes. High peaks in the blood penicillin level seem to favor the penetration of penicillin into vegetations of acute or subacute bacterial endocarditis, and suppurative thrombophlebitis, or other primary sites of bacteraemia. Several times daily, booster doses of five to six times the level required to sterilize the blood, were given to aid this. Based on these data the treatment of bacterial endocarditis, for a minimum of five weeks was as follows: for infecting organisms with coefficients of resistance 1 to 3, 25,000-50,000 units 3-hourly and 50,000-100,000 several times daily; for organisms with coefficients of resistance 5 to 20, 50,000-100,000 units 3-hourly and 100,000-200,000 units given at 12 hour intervals as booster dose. However, for organisms with higher coefficients, e.g., Enterococci (resistance 150), doses of 1,000,000 units given 3-hourly and booster doses of 1,000,000 units given at 12 hour intervals, may not be completely effective. The coefficient of resistance is the ratio of the concentration of penicillin to which the organism is resistant, to the concentration to which standard strain staphylococcus aureus H is resistant. The authors state, that a case of actinomyces of the chest, with organism of coefficient of resistance 50, responded to 200,000 units 12-hourly intramuscular injection, and 100,000 units injected daily into the chest wall for a period of four weeks.

—Harry Schlang, '49
YOU AND HEREDITY
By AMRAM SCHEINFELD
Garden City Publishing Co., New York, N.Y., 1945, pp. 434

"Consider the miracle of you." Why were your eyes green instead of blue, or brown, or grey? Why were you 6 feet tall when your brothers were 5 feet 5 inches? And what are the chances that you could ever be born again? All these questions, and many more, are answered in Scheinfeld's "You and Heredity." In terms simple enough for the laity to understand, he has unfolded as much as is yet known of the fascinating mystery of heredity. He writes in a style at once fluent and amusing.

All our characteristics, physical and mental (except those developed by our environment), we inherited from our parents who inherited them from their parents, ad infinitum. Yet, all the factors that make us individual are incorporated in tiny particles of matter called genes. These genes compose the 48 chromosomes of every cell in our bodies, including the sex cells, and via the latter are transmitted from generation to generation. Since each parent possesses sex cells carrying innumerable combinations of genes, it can be easily understood why no two people are exactly alike, not even brothers and sisters. In fact, the chances of your being duplicated (barring identical twins) are about one in thirty million.

Some of the characteristics you bear may seem to have sprung from nowhere, since neither your parents nor your grandparents show them. The secret of this lies in the fact that one parent carries traits recessive in his own genes but which, supported by similar or opposing genes from the other parent, become dominant in you.

Aldous Huxley deals cynically with the subject in his "The Fifth Philosophy."

"A million, million spermatozoa, All of them alive:
Out of their cataclysm but one poor Noah
Dare hope to survive.

"And among that billion minus one
Might have chanced to be
Shakespeare, another Newton, a new
Donne—
But the One was Me.

"Shame to have ousted your betters thus,
Taking ark while the others remained outside!
Better for all of us, forward Homunculus,
If you had quietly died."

Heredity is a subject which fascinates doctor and layman. In medical practice we will encounter patients with a keen interest in the subject and it behooves us to have a ready, easily-understood explanation. This book provides excellent information for the doctor, for the doctor to pass on to his patients, and for the patient himself. As such, I highly recommend it.


MEDICINE IN INDUSTRY
By BERNHARD J. STERN
Published by The Commonwealth Fund, 1946, pp 209

Here is a monograph designed to provide the framework for an understanding of the current medical situation and its trends in relation to industry. Both contemporary medicine and in-
dusty are treated as the products of evolution.

Beginning with a historical survey of scientific developments in industrial medicine, and a review of the social and legislative backgrounds of industry and industrial medicine, Dr. Stern continues with a consideration of the extent of industrial disability and of the role and problems of the handicapped worker in relation to industry. This is followed by an analysis of the present status of preventive services in industry. A survey of the medical care prepayment plans set up in industry and of recent developments in the other existent forms of health insurance indicates their merits and their limitations. There is a consideration of the role and status of industrial physicians in their relations to management and labor and the community.

To quote Dr. Stern in part: “This book has traced in broad perspectives the social, economic, legal and professional setting within which industrial medicine has matured.” He has presented an objective and lucid exposition in a difficult field.

—Howard W. Hostetler, '48.

**CLIO MEDICA**

Published by Paul B. Hoeber, M.C.,
New York, under the general editorship of E. B. K rumbhaar, M.D.

The Clio Medica is a series of books, each volume of which deals with the historical background of one aspect of Medicine.

In format, they are pocket-sized and average 100-200 pages in length. Though uniform in binding and type, each volume is written by a recognized specialist in the history of its particular topic, e.g., Edwin Jameson is the author of volume IV—“Gynecology and Obstetrics” and W. B. Howell, the author of volume IX—“Canadian Medicine.”

The first book of the series is entitled “The Beginning of Things—Egypt and Assyria,” and contains a fascinating account of the earliest medical writings known and their interesting though often incredibly primitive content. It sets the stage admirably for the “acts” to follow: “Psychiatry,” “Indian Medicine,” “Orthopedies,” “Medicine in the Middle Ages,” “Chinese Medicine,” etc.

These “primers on the History of Medicine” as they are styled are effectively designed for easy, pleasurable and informative reading. They provide a well compiled and well written review of a given subdivision of Medical History and are highly recommended by your reviewer for reading at once enjoyable, authoritative and interesting.

—Mary Purdy, '48.

**PENCILLIN**

Under the general editorship of
Professor Sir Alexander Fleming, M.B.,
B.S., F.R.C.P., F.R.C.S., F.R.S.

“Penicillin” by Sir Alexander Fleming and other prominent men is not only a guide for the practitioner but also the dentist and veterinary surgeon. The book, itself, is divided into two distinct sections—a general section explaining the history, development, chemistry, manufacture, properties and methods of administration, and a clinical section of interest in the practice of medicine and surgery.

Penicillin is not a “cure all.” Many of our most common ailments, upon which it has no effect, are those caused mainly by gram negative organisms. Yet, there is a host of diseases that have been conquered and are no longer to be feared if treated properly and in time. Unlike other powerful antibacterial agents, penicillin has an almost complete lack of toxicity. With the intensive research that this drug has stimulated, other agents may be discovered which may prove to be even better than that used at present.

In the section of the book dealing with specific infections and the effect which penicillin has upon them, case histories are listed. The dose, method of administration and final outcome are given for each. Much of the early work was done first in the Army so that its primary use was in the treatment of the wounded. It was not until an ample supply of penicillin was produced that civilians could be given the benefit of the drug. Penicillin is most effective when the treatment is begun at an early stage and continued until the general and local conditions have returned to normal. A short chapter is given for the benefit...
of the general practitioner, concerning its use in some of the more common diseases along with the method of treatment.

Anyone who is interested in penicillin, and everyone is, will find this a very practical and worthwhile book. It would not be wasted time to become thoroughly acquainted with one of the greatest antibiotics ever discovered.

—Lee Fraser, '48.

**THE DOCTOR'S JOB**

*By Carl Binger, M.D.*

*W. W. Norton Co., Ltd., New York, 1945, pp. 241*

This well-written little book stresses the modern psychosomatic approach to the general practice of medicine. It covers the subject so capably and completely that it should be read by every medical student and practitioner. In its eighteen chapters it deals with many of the common ailments with which patients come to the doctor's office, e.g., tuberculosis, diabetes, stomach ulcers, cancer, tetanus, asthma and other allergies, in a language that the layman can understand.

Dr. Binger begins with a short criticism of the history of medical training and recounts the numerous improvements that followed Dr. Abraham Flexner's "exposure" in 1910.

In the next chapter he discusses the necessity and evils of specialties and specialists.

Then he deals with the more elusive subject of medical fees and etiquette and the social implications of maintaining the undeniable freedom of choice of physician by patient and vice versa, even though it is so often injudiciously exercised.

In Chapter Four, the patient-doctor relationship is elaborated upon and the physician warned of the disturbing effect of some well-meaning but rather off-hand remarks. The secret of the success in practice depends upon the care of the patient as a whole, not just the cure of the disease. He stresses the importance of a deep objective interest without subjective sympathy and undue concern.

The importance and practicability of psychoanalysis in certain types of disorders is discussed. The role of anxiety and fear in psychosomatic conditions are also elucidated. Then he deals with the ignorance of the fundamental principles of psychiatry and psychotherapy on the part of the general practitioner and the changes in the attitude of the general public toward the mentally ill. He explains some of the factors underlying the horror and stigma that have always been attached to mental disorders. He discusses some of the common psychiatric problems and explains the body-mind relationships involved. New light is thrown on the theories of Freud and Cannon, particularly on the relation of the emotions to the progress of disease and convalescence. The revolution in treatment from palliative to curative to preventive measures is described.

One chapter is devoted to the controversial subject of social medicine, especially as it pertains to the United States.

The final note is a reflection upon the past, a survey of the present and a suggestion of the future progress of medicine.


**PRINCIPLES OF DYNAMIC PSYCHIATRY**

*By Jules H. Masserman, M.D.*

*W. B. Saunders Co., Philadelphia, 1946, pp. 303*

Dr. Masserman proposes to provide an introduction to the principles of modern psychiatry, to outline their application to the techniques of clinical diagnosis and to demonstrate the rationale of effective therapy. With these fundamentals in print, he hopes that he and his colleagues at the University of Chicago can divert certain of their perennial efforts from lecturing to clinical teaching. (A companion text, "Practice of Dynamic Psychiatry," is in preparation. It will contain a description of clinical syndromes and the methods of influencing neurotic and psychotic behaviour.)

Relatively simple mental mechanisms are illustrated both by the results of typical laboratory experiments and the teaching of motion picture films. These latter are 16 mm. films obtainable from his department on experimental neuroses, group relationships, neurophysiology of emotion and the effects of drugs or trauma on behaviour. More complex concepts are exemplified by case histories which vary in length from thumb-
nail sketches of specific symptoms to a full length description of a psychoanalysis.

Since this is a book for students, the Appendix contains a glossary of 1,200 of the more obscure terms in psychiatric literature and a bibliography of some sixty score articles from recent journals. An analysis of wartime propaganda is also included because the professor feels that psychiatrists should be concerned with mechanisms of group communication which can be used to release, or perhaps prevent, social holocausts.

This volume is packed with valuable material but, as an elementary text, it suffers from the author's partiality for psychoanalytic concepts and from a ponderous style.

M. M. McQuade, '48
RECENT ACCESSIONS TO THE MEDICAL SCHOOL LIBRARY

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