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**GALL STONE ILEUS: REPORT OF FIVE CASES
WITH DISCUSSION**

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**Submitted in Partial Fulfillment for the Degree of
Doctor of Medicine**

College of Medicine, University of Nebraska

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INTRODUCTION

The term gall stone ileus is actually a misnomer. The intestinal obstruction caused by a gall stone is a simple mechanical obturation obstruction due to blockage of the intestinal lumen by the gall stone, and therefore, in the strictest sense is not a true ileus.

The purpose of this paper is to review the more recent literature concerning the subject. Various aspects of this condition, including the diagnosis and management, will be discussed. Five case reports from three Omaha hospitals and one Lincoln hospital will be presented. The author has had personal contact with one of the cases presented. "Gall stone ileus" has, in the past, rarely been diagnosed preoperatively, and has had a rather high mortality rate.

INCIDENCE

The frequency with which stones formed in the gall bladder migrate into the intestinal tract is not known. That this may be more common than is supposed is suggested by a report in 1939 by Wakefield et al.(1) of 176 cases of nonsurgical cholecystenteric fistulas. The fact that an occasional cholelith may find its way into the duodenum via normal biliary channels is particularly noted. The majority of stones thus migrating into the

intestine are passed rectally without difficulty. However, Brewer (2) reports a case of intestinal obstruction due to a gall stone in which the stone presumably entered the intestinal tract through the common bile duct and Ampulla of Vater. At autopsy he found no biliary-intestinal fistula and a common duct and papilla of Vater markedly dilated. This is a rare occurrence.

It is uncertain how frequently gall stones dislodged into the intestine are ultimately the cause of intestinal obstruction. The incidence reported by various authors varies from 1.3 per cent to 7.8 per cent of all complete small bowel obstructions, with an average of 1 to 2 per cent. A report in 1943 by Hand and Gilmore (3) found records of 208 instances of obstruction due to gall stones in a total of 12,153 cases of intestinal obstruction. This is an incidence of 1.7 per cent. McLaughlin and Raines (4), in a review of the literature in 1951, report 366 cases caused by gall stones in a total of 19,692 cases of intestinal obstructions (i.e., 1.9 per cent). Routley and Mayo (5) stated that during a 17-year period at the Mayo Clinic gall stones were the cause in 1.2 per cent of all cases of obstruction of the small intestine that were observed.

In the case reports presented in this paper from three Omaha hospitals, the incidence was 3.5 per cent,

which seems rather high. (Table I)

TABLE I
INCIDENCE OF INTESTINAL OBSTRUCTION DUE TO GALL STONES
IN THREE OMAHA HOSPITALS FROM 1951 TO 1956

Etiology of Intestinal Obstruction	Number	Total Number
due to post-op. adhesions	76	76 (65.8%)
due to ulcer	19	19 (17.1%)
due to hernia	10	10 (9.0%)
due to gall stones	4	4 (3.5%)
due to infarction	1	1 (0.9%)
due to foreign bodies	1	1 (0.9%)
		<u>111</u>

All authors have found a much higher incidence in the female patients, even out of proportion to the more common occurrence of gall stones in women. Balch (6) states that women are much more prone to this obstruction than men, in the proportion of 15 to 1, whereas the incidence of gall stones is only about 3 to 1 in favor of women. In the cases reported in this paper all were women.

PATHOGENESIS

In practically all cases gall stone obstruction is preceded by the formation of a fistula between the biliary system and the gastro-intestinal tract (4).

Usually such fistulas result from the erosion of gall stones at the time of an inflammatory process. Sometimes a peptic ulcer is the etiologic factor, and infrequently a malignancy.

Listed below are the routes a gall stone may enter the gastro-intestinal tract:

- (a) A stone which passes through the common bile duct. Rarely causes intestinal obstruction.
- (b) A cholecystoduodenal fistula. (Fig. 1) This is by far the most common portal of entry of large gall stones obstructing the intestine. (7)
- (c) Cholecystogastric, cholecystoenteric, and cholecystocolonic fistulas. These comprise less common channels.
- (d) Choledochoduodenal fistula. This is a rare finding.
- (e) Free perforation of the gall bladder into the peritoneal cavity with subsequent intestinal obstruction by a gall stone. This is a remote possibility. (5)

Cholecystoenteric fistulas are a fairly common complication of long-standing disease of the biliary tract. In the opinion of most authors an attack of acute cholecystitis, subsequent to previous cholelithiasis, is often complicated by the intimate adherence of the gall bladder to an adjacent viscus, usually some portion of the gastro-intestinal tract. This is followed eventually by a fistulous formation. It seems reasonable to assume that obstruction of the common duct is a

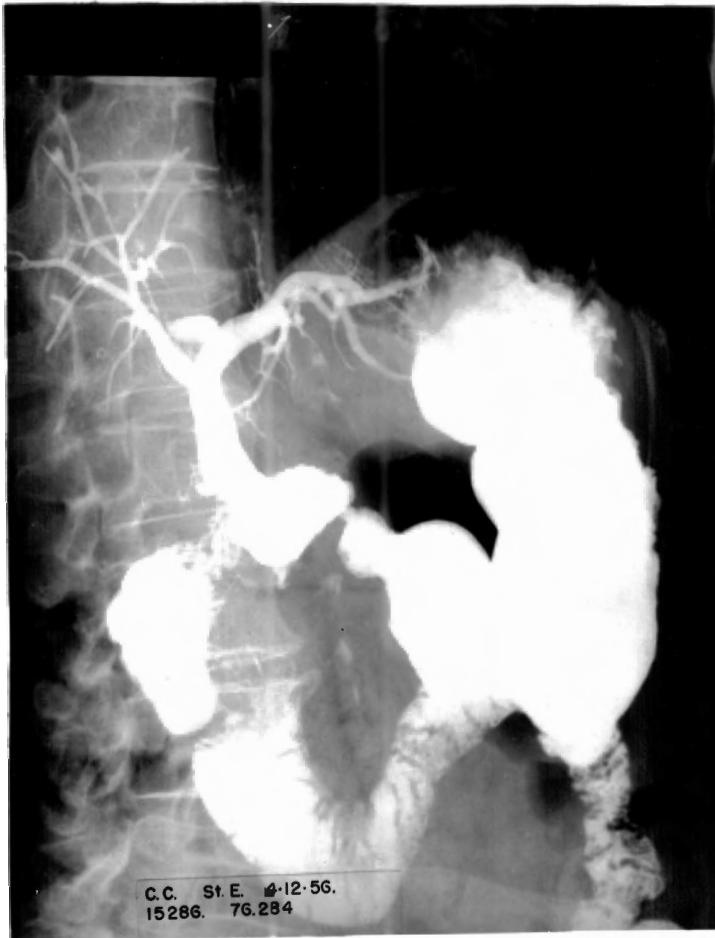


Fig.1.--An upper G.I. series is presented. Barium is seen in the duodenum, gall bladder and biliary radicals, demonstrating the presence of a cholecystoduodenal fistula.



prominent factor in the production of fistulous drainage of the biliary tree. The occurrence of cholecystoenteric fistula may be a life-saving accident, because dilated infected biliary radicles can then be drained into the intestine, despite the obstruction of the common duct.(8)

Whether or not a gall stone causes an obstruction on entering the intestinal tract depends in part on the size and shape of the stone. Small and even moderate-sized gall stones may traverse the intestinal tract without causing obstruction. Morlack et al. (9) have stated that it is probable that a gall stone must be at least 2 cm. in diameter to obstruct the intestinal lumen. A round or irregular stone will more likely lodge in an intestinal fold than will a smooth ovoid one. On entering the intestine, a stone need not be large enough to cause immediate obstruction; however, once it lodges it may enlarge by additional concretions until it is large enough to cause blockage of the intestinal lumen (9,10). Probably over 50 per cent of gall stones large enough to produce obstructive symptoms pass through the alimentary tract without causing complete obstipation (4).

The stone may lodge anywhere along the intestine, although anatomically the most logical place for this to occur is where the intestinal lumen is narrowest, which is in the terminal portion of the ileum, particularly at

or near the ileocecal valve. The most frequent sites of impaction in the order of frequency are the terminal ileum, ileocecal area, colon, duodenum and jejunum (4).

Gall stones lodged in an inflamed gall bladder tend to be extruded through a fistula when one has formed. Progressive shrinking of the entire gall bladder slowly forces its contents into the lumen of the bowel where free drainage exists. The passage of the stone may at times be signaled by symptoms resembling those of a stone of the common duct or of acute cholecystitis and at times jaundice and biliary colic due to the proximity of the inflammatory mass to the common duct. Further symptoms referable to the fistula may cease once the stones have passed or symptoms of chronic cholecystitis may persist.

If the gall bladder has drained into the colon, symptoms of cholangitis--chills, fever, and loss of weight--are often encountered.

Frequently a temporary halt occurs in the downward passage of the stone accompanied by mild obstructive symptoms. However, because of ball valve action plus the increased peristaltic effort, the standstill may be overcome; symptoms may subside, and downward progress is resumed. When the stone is finally halted, the block is mechanical in nature, and therefore circulation in the bowel is rarely jeopardized until late. The obstruction is not

usually a complete one and hence marked distention is not a characteristic finding.

When a large gall stone passes into the intestine from the biliary tract, the event may be associated with a severe pain in the upper part of the abdomen, and vomiting. As the stone makes its downward progress, it characteristically causes cramps. At times temporary ileus with nausea and vomiting occurs. Even when the stone has come to a final halt, the resultant symptoms are not clear cut as in other forms of obstruction. Colic, nausea, and vomiting may be intermittent because of incomplete obstruction. Distention is not often pronounced and tenderness is not a common finding, as the obstruction is purely mechanical at the onset (8).

DIAGNOSIS

The usual preoperative diagnosis is simply intestinal obstruction on the basis of a history of pain, vomiting and obstipation. The more frequent causes, such as postoperative adhesions, incarcerated hernia, and neoplasm of the large bowel, can frequently be eliminated by the history, physical examination, and X-ray study of the lower bowel. Once eliminating these, the probability of an obstruction due to gallstones ranks high among the remaining more obscure causes.

Morlack et al. (9) suggest that probably the most helpful aid available to the clinician is that offered by

the roentgenologist. They emphasize that several roentgenographic characteristics may be distinctly helpful in reaching the correct clinical diagnosis. These are (a) the demonstration of a cholecystenteric fistula by the virtue of the presence of air in the biliary ducts or the entrance of opaque medium into the biliary ducts during roentgenographic examination of the stomach; (b) the demonstration of intestinal obstruction as evidenced by dilated intestinal loops; and (c) the appearance within the abdomen of an opaque stone demonstrating roentgenographic characteristics of a cholelith. Figure 2 demonstrates all of these characteristics.

Rigler (11) mentions definite preoperative diagnosis by X-ray in only 24 cases reported up to November 1941. Wiley and Henderson (12) found the routine use of the following four film technics helpful in obscure obstructive cases: (a) horizontal ray view with the patient in position of arrival at X-ray department; (b) supine Buckey exposure (or KAB exposure); (c) upright abdomen; and (d) posterior-anterior chest film. They also suggest repeated flat plates of the abdomen as they may reveal a stone not seen on earlier films due to overshadowing bony structures, or they may reveal a biliary tree aerogram not at first evident.

The most helpful aid to the clinician, other than

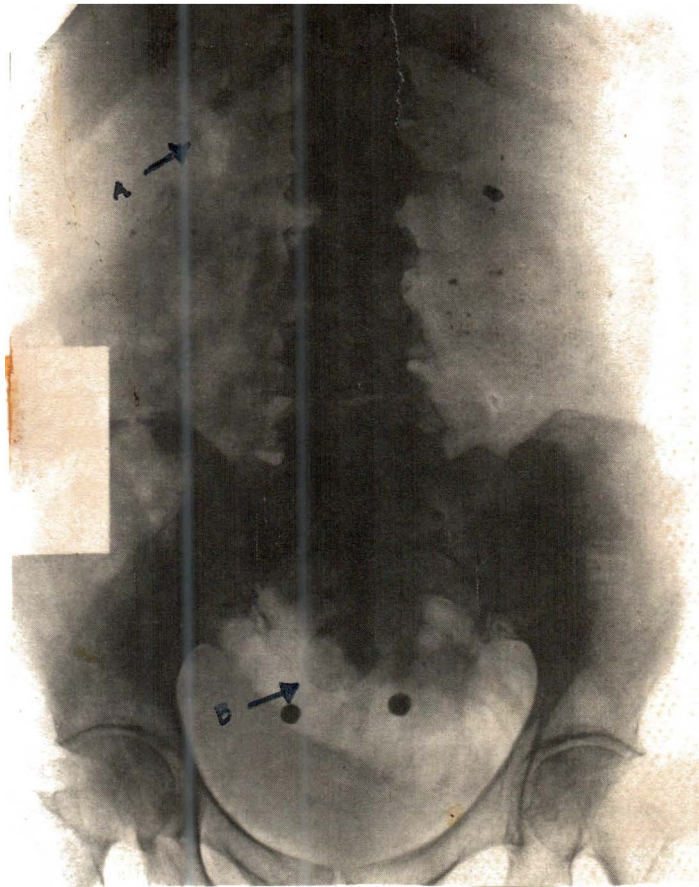


Fig. 2.--(B) A cholelith is seen overlying the sacrum. Arrow (A) points to gas in biliary ducts and a distended loop of small intestine is noted.

roentgenographic evidence which is not always present, is a high degree of suspicion. This is especially true when a patient, usually an elderly female, presents herself to the physician with obstructive symptoms. The symptom complex which should suggest intestinal obstruction due to a gall stone is that of an elderly female patient who has had no previous operations but has had a history of disease

of the gall bladder (repeated attacks of upper abdominal pain or intolerance to fat foods), who develops cramping pain with persistent vomiting, and the occurrence of a nonfulminating recurrent obstructive syndrome, with perhaps a shifting focus of symptoms. In the history, the two commonest features are: (a) the history of chronic disease of the gall bladder, which is obtained in about 50 per cent of the cases, and (b) the recurrent character of the obstructive symptoms, which is also true in about 50 per cent of the cases (8,13).

Physical findings may be inconclusive. There may be moderate tenderness (usually a late sign), distention which may be only moderate as some gas passes by the obstructing stone, rhythmic pain and peristaltic rushes. The possibility of feeling the impacted gall stone as a hard extra-rectal tumor on careful digital examination of the rectum should not be overlooked (9). With these symptoms the condition must be considered acute high intestinal obstruction and treated as such.

TREATMENT

The majority of the authors agree that early surgical intervention with simple removal of the calculus from the intestinal tract is indicated. The early treatment is that of conservative therapy of obstruction of

the small intestine, i.e. supportive fluid therapy to correct fluid and electrolyte imbalance, intestinal intubation and decompression. When adequate intubation and supportive measures fail, after a fair trial period, to relieve the situation in these elderly patients, they should be prepared as promptly and as effectively as possible for surgical intervention. If operation is delayed too long, two catastrophes may occur with little or no warning. The incarcerated stone may ulcerate through the wall of the bowel, or perforation of the bowel proximal to the stone may occur (8).

Various authors agree that enterotomy is the operation of choice. They consider that enterostomy is usually unnecessary, as adequate decompression of the bowel above the stone can be secured by the Miller-Abbott tube, which should have been passed into the duodenum preoperatively.

The distended small intestine may be followed down to the site of impaction of the large gall stone, which is usually firmly lodged in the terminal portion of the ileum. At this point the effects of pressure may make the bowel appear more necrotic than it really is. The stone should then be gently dislodged and "milked up" into the distended proximal part of the ileum where it is safer to do the enterotomy for its removal.

It is advocated that the incision in the ileum

over the stone be made in the longitudinal direction. After delivery of the stone the viability of the involved portion of intestine should be determined. When the condition of the part is in doubt it should be removed; otherwise, the longitudinal incision should be closed transversely in order to prevent narrowing of the lumen.

The possibility of multiple gall stones must be kept in mind. The presence of facets on the obstructing stone indicates the probability of multiple stones (14), and necessitates the need for additional searching provided the patient's condition permits. Additional stones can often be removed from the intestine through a single incision.

The tip of the Miller-Abbott tube should be threaded close to the site of obstruction but not past it, and should be left in place for a few days postoperatively without advancement (5).

The management of the biliary fistula should be regarded as a separate problem. Most authors are opposed to immediate attack on the biliary fistula as the majority of the patients are old, and closure of the fistulous communication with the bowel is considerably hazardous. It is unlikely that subsequent cholecystectomy is necessary for cholelithiasis, since these gall bladders rarely contain residual stones and the fistulae generally close

spontaneously (8).

MORTALITY

The fatality of this condition as recorded in the literature in the past has varied from 44 per cent to 70 per cent, with an average mortality rate of nearly 50 per cent (13).

Most authors agree that the factors responsible for poor results and a fatal outcome in so many cases of gall stone ileus are the advanced age and obesity of the patients, the presence of masking symptoms, water and electrolyte imbalance, and a lack of awareness of this complication (5). A fatalistic approach to this problem is not justified as there are two remedial factors of greatest importance in the high mortality rate: errors in diagnosis and delay in treatment.

The improvement in the management of acute intestinal obstruction during the past ten to fifteen years, together with an appreciation of the peculiarities of this type of obstruction has resulted in lowering of the mortality as demonstrated by Table II.

TABLE II

MORTALITY FROM INTESTINAL OBSTRUCTION DUE TO GALL STONES
IN THE LAST 15 YEARS

Author	Year	Cases	Fatality	Mortality
Hand & Gilmore (3)	1943	3	1	33%
Hinchey (8)	1943	13	6	43%
McLaughlin & Raines (4)	1949	5	0	0
Routley & Mayo (5)	1952	9	0	0
McCune & Salzberg (13)	1955	7	3	46%
Wiley & Henderson (12)	1956	7	0	0
Morlack <u>et al.</u> (9)	1956	6	1	
Author	1957	5	0	0

CASE REPORTS

Case I

A 79-year-old white woman entered the hospital complaining of vomiting and abdominal pain.

The patient's family gave the history that the patient has had recurrent attacks of "gall bladder trouble" with intolerance to fatty and fried foods for many years. About a week and a half ago she started vomiting large amounts of green bile. She complained of pain over her entire abdomen and developed "bloating" of the upper portion of her abdomen. She was hospitalized in an outstate hospital and shortly thereafter became jaundiced. The jaundice disappeared in three days. She remained in this hospital for one week prior to being transferred to the University of Nebraska Hospital receiving I.V. fluids, intestinal intubation and decompression. The patient improved and was able to take fluids by mouth. The patient had one to three loose bowel movements per day.

Physical examination revealed a well-developed rather obese white woman who was lethargic and disoriented. A grade three pitting edema was present. Blood pressure was 170/80. Heart rate was slow and irregular. There was a mid line suprapubic scar extending superiorly to the umbilicus. The liver was palpable three finger

breadths below the right costal margin. There was tenderness to palpation in the right upper quadrant and moderate abdominal distention with hyperactive bowel sounds.

Clinical course. Intestinal intubation and decompression was accomplished. During the diagnostic evaluation of the patient X-rays revealed a possible gall stone in the region of the ileocecal valve. A preoperative diagnosis of gall stone ileus was made and a laparotomy was performed.

Examination of the small bowel revealed a 3x4 cm. calculus approximately 10 cm. from the ileocecal valve. There was an inflammatory mass involving the ileum and gall bladder. The calculus was dislodged and gently moved more proximally where the ileum was opened and the stone removed. The ileum was closed with a double layer of sutures, the wound drained and the abdomen closed in layers. The patient's postoperative course was rather stormy as there was a moderate amount of wound infection. This drained for a considerable period of time and finally the entire skin and subcutaneous tissues were opened and allowed to granulate in. Her condition was otherwise satisfactory and she was shortly discharged.

Case II

This 86-year-old white woman entered the hospital complaining of a sharp pain in her abdomen (right upper quadrant) of about one week duration. She became ill one week ago with a temperature of 100°, right upper quadrant pain, nausea and vomiting. The pain had changed from an aching to a colicky nature which was relieved by vomiting. Abdominal distention was noted two days prior to admission and had become progressively worse. The patient had had no bowel movements since four days prior to admission. There was a history of a similar attack one year ago which was attributed to gall bladder disease. A similar episode occurred in 1954 at which time it was stated that the patient was jaundiced.

Physical examination revealed a well-developed rather emaciated aged white woman who was rather slow to respond to stimuli. The abdomen was moderately distended with the bowel pattern easily visualized on it. There were no areas of tenderness or masses palpated. Auscultation revealed hyperactive bowel sounds. Cardiac rhythm was irregularly irregular and the blood pressure was 130/80.

Clinical Course. X-rays of the abdomen revealed the small intestine to be distended with fluid levels present. No definite obstructing mass could be visualized. The patient was given supportive measures with maintenance of fluids and electrolytes. A Miller-Abbott tube was passed and decompression begun. As the patient did not improve a laparotomy was performed on the third hospital day.

Laparotomy revealed an acute complete mechanical obstruction due to impaction of large gall stone (3x5 cm.) in the distal ileum just proximal to the ileo-cecal valve. A longitudinal incision was made over the stone which was subsequently removed. A Witzel enterostomy was then performed just proximal to the enterotomy as it was impossible to place the Miller-Abbott tube beyond the first portion of the duodenum. This, undoubtedly, was due to duodenal distortion secondary to a cholecystoduodenal fistula.

Convalescence was complicated by a pulmonary embolus on the fourth postoperative day. The patient slowly responded and finally discharged in a much improved condition.

Case III

This 87-year-old white woman entered the hospital complaining of nausea, vomiting, abdominal pain and distention of one day duration. The patient developed the above suddenly the evening before admission while she was home eating dinner. The pain and vomiting have been persistent but not too severe in nature. She had no bowel movements nor passed gas per rectum since the onset. There was no previous history of gall bladder or bowel disturbances.

Physical examination revealed a well-developed obese white woman. She complained of pain in her upper abdomen radiating from the right upper quadrant to left upper quadrant. The abdomen was obese with moderate distention and tenderness in the right lower quadrant. Only occasional bowel sounds were heard. No masses were palpated.

Clinical Course. Flat and upright X-rays of the abdomen revealed a generalized over-all fluid density obscuring soft tissue details with a few bubbles of gas seen in the right upper quadrant. No opaque calculi were seen. The patient was maintained on I.V. fluids and as

the patient's abdomen became more and more distended a Cantor tube was passed and continuous suction applied.

Because of the obstructive process and the gas seen in the right upper quadrant the diagnosis of a possible gall stone ileus was made and a laparotomy was performed. The abdomen was opened through a right rectus incision. The loops of bowel were moderately distended and the Cantor tube was down well into the upper jejunum. The terminal ileum was seen to be collapsed. A gall stone was encountered within the ileum about two feet above the ileo-cecal valve. The stone was approximately 3-4 cm. in length and about 2.5 cm. wide, being ovoid in shape. The stone was pushed upward into the distended portion of bowel and removed through a longitudinal incision. The incision was closed in a transverse manner and the remaining small bowel was carefully inspected for a second stone. There was an inflammatory mass palpated in the right upper quadrant. The abdomen was closed in layers.

The patient's convalescence was prolonged by the development of a cerebral vascular accident with a left hemiparesis on the eighth postoperative day. The patient responded and improved slowly but was finally discharged much improved approximately one month after the development of the left hemiparesis.

Case IV

This 72-year-old white woman entered the hospital complaining of nausea and vomiting for six days, no bowel movement for seven days, generalized abdominal pain for six or seven days and abdominal distention for five days. Patient stated she was always in good health except for occasional "indigestion" caused by "fried foods." Six days ago she became nauseated and vomited being only able to keep fluids down. She also developed generalized abdominal pain which had persisted usually being dull and aching in nature but occasionally becoming colicky. She also stated that she had no bowel movements since the onset. She had noted that there was gradually more and more abdominal distention.

Examination revealed the patient to be rather obese with a blood pressure of 152/90 and a grade II systolic murmur heard at the apex. The abdomen was slightly distended and there was generalized tenderness to palpation.

No muscle spasm or masses were present, there was no hyperperistalsis.

X-ray examination of the abdomen revealed multiple gas and fluid filled loops of small bowel. No gas was seen in the colon. The impression was that of a small bowel obstruction in the region of the terminal ileum.

Clinical Course. A Cantor tube was passed and the patient was supported by I.V. fluids and electrolytes. The abdomen became progressively more distended, bowel sounds were quiet but tended to be "tinkling" in nature. On the sixth hospital day as the patient had not improved an exploratory laparotomy was performed. The preoperative diagnosis being that of a small bowel obstruction probably due to postoperative adhesions.

The abdomen was opened through a right para median incision. Exploration revealed loops of dilated small bowel. The terminal ileum was collapsed for some 10 cm. with a 3 cm. gall stone impacted at that point. An ileotomy was performed by a longitudinal incision, the stone delivered and the incision closed transversely. There was an acute inflammatory mass in the right upper quadrant with edema and hyperemia of the tissues and the gall bladder was seen to be involved in this mass and adherent to the duodenum.

Convalescence was uncomplicated and the patient was discharged on the fifteenth postoperative day in good condition.

Case V

This 75-year-old white woman entered the hospital complaining of vomiting, abdominal pain and distention of one week duration. The patient was in fairly good health till a week ago when the patient had several episodes of vomiting. This persisted along with complaints of abdominal pain and "bloating." The patient told her daughter that eight weeks previously her "stomach did not feel right" and that she had had some upper abdominal pain at that time. There was no previous history of gall bladder disease, jaundice or fatty food intolerance.

Physical examination revealed a rather obese white woman with arteriosclerotic heart disease with an enlarged heart and auricular fibrillation. Auscultation of lungs

revealed basilar rales. The abdomen was slightly distended, there was no tenderness or masses to palpation. Bowel sounds were hyperactive. There was a 4-plus pitting edema of the lower extremities.

Clinical Course. The patient was maintained on I.V. fluids and electrolytes. A Cantor tube was passed and decompression began. The patient's cardiac status was watched closely. X-rays of the abdomen revealed an oval dense shadow of calcium density seen over the right ilium with considerable gaseous distention of the small bowel. The impression of the radiologist was "gall stone ileus."

Because of the patient's cardiac status a laparotomy was performed under local infiltration of the anterior abdominal wall. A 3x5 cm. fecal covered gall stone was removed through a longitudinal incision from the terminal ileum. The incision was closed transversely and the abdomen closed in layers.

The patient recovered from the operation without complication. Convalescence was not complicated and the patient was discharged on the twentieth postoperative day very much improved.

COMMENT

These five cases of obturation of the intestine due to gall stones were encountered within a four-year period in three Omaha hospitals and one Lincoln hospital. The diagnosis was made clinically in three of the cases, whereas in the remaining two it was not suspected prior to surgical exploration. (Table III)

It is not a new observation that infrequently the diagnosis of obstruction of the small intestine is made prior to surgical exploration. The histories of these

TABLE III

CLINICAL DATA IN INTESTINAL OBSTRUCTION DUE TO GALL STONES
5 CASES

Case	Age (yrs) & Sex	Symptoms		Site of Obstruc- tion	Diagno- sis made	Criteria by which diag.was made clinically
		Chole- cystic disease	Intesti- nal Ob- struction			
I	79 F	Yes	Yes	Terminal ileum	Clini- cally	History of prior cholecystic dis- ease; cholelith visualized on scout film of abdomen
II	86 F	Yes	Yes	Distal ileum	At op- eration	---
III	87 F	None	Yes	Distal ileum	Clini- cally	Gas noted in biliary tree by X-ray
IV	72 F	Indefi- nite	Yes	Terminal ileum	At op- eration	---
V	75 F	None	Yes	Terminal ileum	Clini- cally	Radiographic evidence of cholelith on scout film of abdomen

cases further emphasize observations previously made by Wakefield et al. (1), namely that a history of prior cholecystic disease is not so helpful as one might expect. Three of the five cases presented had none or indefinite symptoms of prior

cholecystic disease.

Earlier recognition and earlier surgical correction of this condition has undoubtedly been the prime factor behind the fact that there were no fatalities in the five cases reported, even though the patients were elderly and poor surgical risks.

ACKNOWLEDGMENTS

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