

# Gallstone ileus

by *W. Low Chwee Ann*

Department of Surgery  
University of Malaya

## Summary:

*Gallstone ileus should be no longer be considered as a rare syndrome, but should be included in the differential diagnosis of all cases of intestinal obstruction. The lack of familiarity with its mode of presentation have contributed significantly to its high mortality and morbidity. The syndrome is reviewed and two new cases are presented illustrating the difficulties in diagnosis and management.*

## Introduction:

GALLSTONE ILEUS (Bernard's syndrome) is best defined as a mechanical intestinal obstruction caused by impaction of one or more gallstones within the bowel lumen. Although it has long been a recognised entity, it still remains an infrequent cause of intestinal obstruction, being responsible for only 2-3% of all cases. The average general surgeon may, therefore, reasonably expect to see one case in every 8500 major operations (Raiford 1962). This lack of familiarity with the condition, together with its frequently insidious presentation, is responsible for the failure, more often than not, to make a correct diagnosis, thus leading to a morbidity and mortality entirely out of proportion to that of the more common types of obstructive diseases.

The appearance of two cases of gallstone ileus in our department, within a few months of each other, together with the problems we encountered because of the lack of familiarity with the syndrome, have stimulated a review of the literature to emphasize the clinical picture and management of the disease.

## Incidence:

The total number of reported cases probably number about 1000. Large series have been collected by Raiford, Deckoff, Moore, Fjermeros and Foss and Summers. With increasing life expectancy and therefore an increasing incidence of gallstone disease, the syndrome should no longer be considered as a rarity, of academic interest only, but should routinely form part of the differential diagnosis of intestinal obstruction.

The figures in Table 1 show the relative frequency of gallstones as a cause of intestinal obstruction. However, if only patients of 70 years or more are considered, gallstone ileus accounts for 24% of the cases of non-strangulating intestinal obstruction seen in this age group (Brockis and Gilbert 1959). It is essentially a disease of the elderly, with the

**Table 1**  
**Relative Incidence of Gallstones as a Cause of Intestinal Obstruction**

Source	Denominator of Comparative Incidence	Percentage
Foss and Summers (12)	All cases of gallstones	0.3 to 0.4%
Cooperman, et al (6)	All cases of spontaneous biliary fistulas	14%
Raiford (21)	All cases of intestinal obstruction	3.0%
Dulin and Peterson (9)	All cases of intestinal obstruction	5.3%

majority of patients being in the seventh and eighth decades. Since it is dependent upon a basis of gallbladder disease, the sex distribution parallels that of cholecystitis and is found 8–9 times more commonly in women than in men. In his series, Day (1975) noted that the syndrome was three times more common in Caucasians than in American Negroes.

### Pathogenesis:

The basic disease is a chronic inflammation of the gallbladder with concomitant cholelithiasis. Secondary to the cholecystitis, pericholecystitis occurs, resulting in adhesions between the gallbladder and bowel. The offending stone then erodes by pressure to form a cholecystoenteric fistula, through which the stone passes. In a large series of 176 cases, Wakefield (1939) noted that the commonest point of exit of the stone was through the duodenal wall in 101 cases and transverse colon in 33 cases. However, not all fistulas empty into the gastrointestinal tract. Reports of gallstones being found in the bronchus, the pleural and peritoneal cavities, portal vein, renal pelvis, bladder and pregnant uterus have been reported.

When a gallstone enters the digestive tract, there are several possible results:

1. Passage spontaneously via the rectum without causing symptoms. It has been estimated that less than 10% of gallstones entering the gastrointestinal tract result in obstruction (Raiford 1962).
2. Entrance into the stomach, causing intermittent pyloric obstruction and vomiting (Hudspeth, et al 1970).
3. Intermittent, low grade obstructive symptoms as the stone traverses the bowel to be expelled or removed manually per rectum.
4. Impaction with obstruction. The most common site of impaction is the terminal ileum where the stone is held up by the ileo-caecal valve (Foss and Summers 1942). The other common locations are in the upper ileum and distal jejunum where irritative spasm or simple diameter disproportions are the causes of obstruction. Generally, stones less than 2.5 cm. in greatest diameter, traverse the bowel without any difficulty. However, spontaneous enlargement of the stone can occur during migration, especially if it is delayed in its course by being trapped in a diverticulum or any abnormal sacculation (Raiford 1962). In only 3–5% of

cases is the site of obstruction the large bowel (Horowitz, 1963; Holmnielson 1954). The sigmoid colon is the most common site as this is the narrowest segment of the large bowel. It is also frequently associated with diverticulitis, neoplasia and adhesions, all of which favour blockage.

Residual stones remaining in the gallbladder may or may not use the fistula as a means of egress, depending on the extrusive force of the organ, or, more specifically, upon the patency of the cystic and common bile ducts. The importance of residual stones, whether they are in the gallbladder or proximal intestinal tract, is demonstrated by the increasing frequency of reported cases of recurrent obstructions following closely the first episode which have been relieved by laparotomy.

The fate of the fistula after relief of the obstruction is still in doubt. Most authors believe that the fistula closes spontaneously and the gallbladder cavity becomes obliterated if the cystic and common bile ducts remain patent. If, however, obstruction of either duct is present, it is likely that the fistula will remain open, acting as a physiological bypass to permit passage of bile from the biliary tree into the intestine.

### Symptoms:

Although many authors have stressed the classical triad of small bowel obstruction, aerobilia and presence of a laminated gallstone in the bowel on X-rays, the majority of cases do not present with this picture. Early symptoms may simulate that of cholecystitis and late presentations resemble that of any full blown intestinal obstruction.

A typical history of biliary tract disease is obtainable only in 60% of cases (Day 1975). There is usually no distinct symptoms that can be related to the time of perforation of the gallbladder. The duration of illness may vary from 24 hours to several weeks. During this relatively long period, the symptoms, in a strikingly large proportion of cases, are characteristically intermittent. The most common complaints are abdominal pain and distension associated with vomiting. This protracted remitting course is more typical of intestinal obstruction by gallstones than any other forms of intestinal obstruction. The periodicity of symptoms have been attributed to passage of the stone distally as well as to recurring spastic intestinal contraction around the stone. The progressive nature of the symptoms and shifting of the primary site of pain has led Raiford to coin the term 'migrating obstruction' as descriptive of the condition. Fjermeros (1964)

noted that 40% of the cases which he reviewed presented with such a clinical picture.

With repeated episodes, oedema and inflammatory changes supervene, making the occlusion complete and permanent.

### **Clinical Findings:**

Physical examination rarely contribute significantly to the diagnosis as one sees only signs of intestinal obstruction. Palpation of a large gallstone through the abdominal wall have been reported to be diagnostic. However, there is nothing to indicate the nature of the mass and it is of little significance in the absence of other confirmatory findings. The patients are usually in poor condition with dehydration, low urine output and electrolyte imbalance. Laboratory studies are usually non-specific, with evidence of hemoconcentration and electrolyte imbalance. A white cell differential count will show some degree of leucocytosis with moderate shift to the left. A correct diagnosis must depend, therefore, on a combination of clinical findings. As successful treatment of the disease depends on an early diagnosis, a high index of suspicion is necessary.

### **Radiological Findings:**

The more common radiological signs associated with gallstone ileus have been enumerated by Rigler and his colleagues (1941):

1. Air shadow in the biliary tree due to reflux of air through the fistula (93%). This, however, is not pathognomonic.
2. Dilated loops of small bowel. A single film is not diagnostic, but when successive films show advancement of the level of obstruction, this finding gains in diagnostic significance.
3. Demonstration of a radio-opaque stone, sometimes laminated, especially if it can be localised in the small bowel at the approximate level of obstruction. However, because of other possible causes of calcific densities as well as the fact that the majority of gallstones are radiolucent, this does not form a dependable finding.
4. Disappearance of a previously observed large gallstone (Fjermeros 1964).

### **Treatment:**

Like any other forms of intestinal obstruction, the primary objective in the treatment of gallstone ileus is the relief of the obstruction at the earliest

optimal time. Although unnecessary delay is to be condemned, time should be taken for adequate hydration, electrolyte replacement, gastrointestinal decompression and treatment of concomitant pathological findings such as diabetes and associated cardiovascular diseases.

At laparotomy, the point of impaction is located. The stone is then displaced proximally to a normal segment of bowel and removed by an antimesenteric enterotomy which is opened longitudinally and closed transversely. If the stone cannot be dislodged or if the bowel segment is not viable, then a segmental resection and a primary end to end anastomosis should be carried out. Although some surgeons have proposed crushing the stone through the intestinal wall, this is not advisable as it entails the risk of further injury to an already devitalised segment. Likewise, manual propulsion of the stone into the colon, where it might be passed on by peristalsis (Troell 1954), is not advocated as the procedure may lead to an undetected subserous rupture of the bowel wall (Fjermeros 1964). In critically ill cases, simple exteriorization of the diseased portion of the intestine can be a life saving measure.

Once the obstruction has been relieved, it is mandatory to search the bowel and the gallbladder for other stones, especially if the obstructing stone is faceted. The incidence of recurrent gallstone ileus had been reported by Buestow (1963) to be between 5 and 9% and by Kirkland (1961) to be as high as 16%.

There is still varying opinion regarding the management of the cholecystoenteric fistula. In the past, the majority of surgeons believed that no attempt should be made to repair the fistula or remove the gallbladder at the time of the acute obstruction unless there was obvious leakage, abscess formation or impending gangrene of the gallbladder. This policy was instituted because the majority of patients were in a poor physiological status at the time of the initial operation. Furthermore, the prevailing belief was that most of these fistulas will close spontaneously. Interval cholecystectomy and repair of the fistula as a second elective operation was, therefore, indicated only if:

1. Symptoms of gallbladder disease persisted.
2. Residual stones were demonstrated in the gallbladder.
3. Recurrent attacks of cholecystitis or cholangitis occur.

4. If the fistulous communication is between the gallbladder and the colon as these cases have a high incidence of post-operative malabsorption syndromes and ascending infection.

However, while a fair number of patients who had only an enterotomy as the primary mode of therapy were asymptomatic in the post-operative period, recent reports on the long-term follow up of these cases have revealed that a significant proportion of them (11 – 30%) had recurrent attacks of cholecystitis and cholangitis (Warshaw and Bartlett 1966). Also, in 1962, Bossart and his colleagues reported that there is a much higher incidence of carcinoma of the gallbladder developing in cases of biliary-enteric fistulas (15%) as compared to a 0.8% incidence for all cases of cholecystitis in general. These factors, together with the increasing incidence of recurrent gallstone ileus and the increased morbidity accompanying a second procedure have prompted a more aggressive and complete repair at the time of the initial operation. This one-stage procedure consisting of enterotomy, cholecystectomy and fistula repair have been advocated by Cooperman and others. They have based their opinion on the premise that the one-stage repair does not carry a significantly higher operative mortality than enterotomy alone. It has the advantage of removing the sources of further morbidity. The procedure is therefore feasible in selected patients and should be considered when the situation permits.

**Prognosis:**

Prior to 1940, the mortality rate due to gallstone ileus was well over 60% (Table 2). This was reduced to 30% during the period 1940-1960, probably due to a better understanding of the pre-

and post-operative management of the geriatric patient. Recent reports, within the last decade, have indicated mortality rates of less than 15%, which, however, is still unduly high. The factors which contribute to the high mortality rates in gallstones ileus are:

1. Incorrect diagnosis and delay in treatment. In his series, Cooperman and his colleagues (1968) have shown that the average duration between onset of symptoms and admission to hospital was 7 days. The lack of familiarity with the syndrome, and its remittent course may easily lead to a mistaken diagnosis and therefore an expectant attitude on the part of the attending surgeon. Thus the patient is allowed to become markedly affected with pronounced deterioration of the general condition before surgical relief is instituted.
2. Age and associated diseases. Gallstone ileus is essentially a disease of the elderly, the average age of the patient being 65 years. Tolerance to acute illnesses and major surgery in this group of patients is low. In his series of 78 cases, Deckoff (1965) noted that serious concomitant diseases were present in 83% of the cases, of which, obesity and cardiovascular disorders accounted for 58% and diabetes for 50%.

The most common complication noted was wound infection. Other common complications were localised peritonitis, respiratory problems, phlebitis and biliary tract infections.

**Table 2**  
**Changing Mortality Rate in Gallstone Ileus**

Period	Source	Number of Cases	Mortality %
Prior to 1925	Moore	134*	75
1884 – 1942	Fjermeros	74	62
1920 – 1940	Brockis and Gilbert	94*	51
1925 – 1940	Foss and Summers	150*	57.4
1940 – 1955	Brockis and Gilbert	72*	33
1943 – 1962	Fjermeros	104	34
1955 – 1960	Faiford	149*	26.1
1955 – 1966	Cooperman	15	13

\* Collected from literature

### Case Report 1:

A 59 year old Chinese man was admitted to the hospital with complains of pain in the right hypochondrium for 5 days associated with vomiting. He had no bowel movements since the pains started. The patient gave a history of recurrent colicky pains in the same area which was brought on by meals. Clinical examination at the time of admission showed the patient to be a thin elderly man with moderate dehydration. There was distension and tenderness of the upper abdomen with a positive succussion splash. Laboratory studies showed the following values:

Hb. 14.5 g/100 ml; blood urea nitrogen 134 mg/100 ml; serum creatinine 1.6mg/100 ml; serum sodium 139 mEq/litre, serum potassium 4.7 mEq/litre and serum chloride 93 mEq/litre. Urine examination showed mild proteinuria, 9 Rbc and 5 Wbc per microlitre together with the presence of hyaline and granular casts.

The patient was diagnosed as a case of pyloric stenosis probably due to chronic duodenal ulcer and was treated by nasogastric suction and intravenous fluid therapy. The BUN values came down with rehydration and his abdominal signs subsided. A barium meal examination done on the 4th hospital day showed no evidence of gastric outlet obstruction but deformity of the duodenal cap was noted together with leakage of some contrast medium from the first part of the duodenum. Attempts to wean the patient off nasogastric suction on the twelfth post-operative day was not successful as the patient re-developed abdominal pains and distension. Repeat abdominal X-rays at that time showed dilated loops of small bowel with multiple air-fluid levels. A palpable mass in the left paraumbilical region was also felt at that time. Decision to operate was made on a provisional diagnosis of small bowel obstruction due to an ileal tumour.

At laparotomy, the small bowel was found to be grossly dilated with a large gallstone (5 cm × 7 cm) impacted 90 cm from the ileo-caecal valve. The gallbladder was found to be fibrosed with marked adhesions and a fistulous communication between it and the first part of the duodenum. In view of the poor condition of the patient, only an enterotomy was performed and the obstructing calculus removed. Post-operative convalescence was satisfactory except for infection of the abdominal incision. The patient was discharged two weeks after surgery.

### Case Report 2:

A 67 year old Chinese woman was well until 24 hours before admission when she experienced severe generalised colicky abdominal pains associated



**Fig. 1 Shows dilated loops of small bowel with a large faintly opacified mass in the left upper abdomen (black arrow).**

with vomiting. Two days before that, she noticed that she had passed some melanic stools. There was no history of biliary tract disease. The patient was dehydrated and in a poor general condition, with bilateral basal lung creps and generalised abdominal distension. There was tenderness and guarding all over the abdomen with absent bowel sounds. The abdominal X-ray showed the presence of a large opacity in the (L) abdomen, but because of lack of familiarity with the syndrome, the significance of this opacity was overlooked. The patient was diagnosed as a case of generalised peritonitis due to a perforated viscus and was operated on 4 hours after admission. At operation, she was found to have generalised peritonitis due to a gangrenous perforation of the jejunum at the site of impaction of a gallstone (4 × 5 cm), located about 20 cm distal to the duodenal-jejunal flexure. The gallbladder was fibrotic and contained multiple small gallstones. The common bile duct was dilated and two stones could be palpated within its lumen. There was a fistulous communication between the gallbladder and the first part of the duodenum. A segmental resection of the involved bowel was carried out together with a cholecystectomy, choledocholithotomy and repair of the duodenal fistula. Post-operatively, however, the patient developed gram negative septicaemia and died 28 hours after operation.

### Comments:

Both cases point to some of the factors responsible for the high mortality and morbidity of this syndrome, particularly delay in seeking treatment and delayed surgical relief because of lack of specific diagnosis due to lack of familiarity with the condition. The extent of the surgical procedure performed during the acute phase of the illness should be decided by a careful evaluation of the physiological status of the patient in conjunction with the findings at operation.

### Conclusion:

The best prophylaxis against the high mortality rate of gallstone ileus is the removal of these gallstones at the earliest possible date before the creation of a biliary-enteric fistula. An earlier diagnosis, earlier surgical attack, adequate pre and post-operative preparation as well as tailoring of the surgical procedure to the condition of the patient will to a significant reduction in the mortality and morbidity.

### Acknowledgements:

My grateful thanks to: Dr. Devinder Singh for permission to use his case, Cik Rohana for typing the manuscript and The M.I. Department, Faculty of Medicine.

### References:

1. Balsaro, N.A.: Cholecystocolic fistula with colonic obstruction. *Dis. Colon Rectum*, 17: 776, 1974.
2. Berliner, S.D. and Burson, L.C.: One stage repair for cholecystoduodenal fistula and gallstone ileus. *Arch. Surg.*, 90: 313, 1965.
3. Bossart, P.A., Patterson, A.H., Zintel, A.A.: Carcinoma of the Gallbladder. *Amer. J. Surg.*, 103: 361, 1962.
4. Brockis, J.G. and Gilbert, M.C.: Intestinal obstruction by gallstones: A review of 179 cases. *Brit. J. Surg.*, 44: 461, 1957.
5. Buetow, G.W. and Crampton, R.S.: Gallstone ileus: A report of 23 cases. *Arch. Surg.*, 86: 504, 1963.
6. Cooperman, A.M., Dickson, E.R. and Remine, W.H.: Changing concepts in the surgical treatment of gallstone ileus: A review of 15 cases with emphasis on diagnosis and treatment. *Ann. Surg.*, 167: 377, 1968.
7. Day, E.A. et al. Gallstone ileus: A review of the literature and presentation of 34 new cases. *Amer. J. Surg.*, 129: 552, 1975.
8. Deckoff, S.L.: Gallstone ileus. *Ann. Surg.*, 142: 52, 1965.
9. Dulin, J.W. and Peterson, F.R. Intestinal obstruction due to gallstones. *Arch. Surg.*, 38: 351, 1939.
10. Elsas, L.J. and Gilat, T.: Cholecystocolonic fistula with malabsorption. *Ann. Intern. Med.*, 63: 481, 1965.
11. Fjermeros, H.: Gallstone ileus: Case reports and review of 178 cases from Scandinavia and Finland. *Acta Chir. Scand.*, 128: 186, 1964.
12. Foss, H.L. and Summers, J.D.: Intestinal obstruction from gallstones. *Ann. Surg.*, 115: 721, 1942.
13. Gleen, F. and Manpax, J. Jr.: Biliary enteric fistula. *Surg. Gynec. & Obstet.*, 105: 693, 1957.
14. Holm-Nielson, P. and Linnert-Jepsen, P.: Colonic obstruction caused by gallstones. *Acta Chir. Scand.*, 107: 19, 1954.
15. Horowitz, J.J. and Hodges, W.T.: Roengenographic diagnosis of obstruction of the colon caused by gallstones. *J. Int. Coll. Surg.*, 43: 296, 1963.
16. Hudspeth, A.S. and McGuirt, W.F.: Gallstone ileus: A continuing surgical problem. *Arch. Surg.*, 100: 668, 1970.
17. Kirkland, K.C. and Croel, E.J.: Gallstone intestinal obstruction. *JAMA*, 176: 494, 1961.
18. Lindsay, T.M., et al. Gallstone ileus in the absence of a gallbladder. *Arch. Surg.*, 110: 448, 1965.
19. Malt, R.A.: Experience with recurrent gallstone ileus applied to the first attack. *Amer. J. Surg.*, 108: 92, 1964.
20. Moore, G.A.: Gallstone ileus. *Boston M & S.J.* 192: 1051, 1925.
21. Raiford, T.S.: Intestinal obstruction caused by gallstones. *Amer. J. Surg.*, 104: 383, 1962.
22. Thomas, H.S., Cherry, J.K. and Averbook, B.D.: Gallstone ileus. *JAMA*, 179: 625, 1962.
23. Troell, L.: The treatment of acute intestinal obstruction. *Acta Chir. Scand.*, Supp. 89 p. 79, 1954.
24. Warshaw, A.L. and Bartlett, M.K.: Choice of operation of gallstone intestinal obstruction. *Ann. Surg.*, 164: 1051, 1966.
25. Wakefield, E.G., Vickers, P.M. and Walters, W.: Cholecystoenteric fistulas. *Surgery*. 5: 674, 1939.