INTERNAL BILIARY FISTULA

Report of 18 Cases

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INTERNAL biliary fistula is an abnormal communication between a portion of the extrahepatic bilary tract and any other viscus. The fistula may result from trauma, inflammatory disease, calculi, or malignant disease of the biliary tree per se, or from traumatic, inflammatory or neoplastic disease of adjacent organs.

Our study is based on the findings in 18 patients who had internal biliary fistulas; one case of spontaneous cholecystocolic fistula is included which previously had been reported by Michels and Hoerr.[1]

Incidence

Although internal biliary fistula is an uncommon complication of chronic cholecystitis and cholelithiasis, the incidence of the lesion frequently is underestimated. In one large series[2] of patients undergoing biliary surgery at the Mayo Clinic, the incidence of internal biliary fistulas was 0.86 per cent, while in a somewhat smaller recent series here, the incidence was 0.5 per cent.

The sex ratio in the 18 patients of this report, 13 women and 5 men, approximates that which generally has been reported for the condition, and is comparable to the sex ratio for patients having cholelithiasis. The range of ages was 43 to 72 years, with an average of 57.6 years (Table 1).

Table 1.—*Age and sex distribution*

Age range (yr.)	No. of women	No. of men	Total no. of patients
40-50	3	2	5
51-60	5	2	7
61-70	2	1	3
71-80	3	0	3
TOTAL	13	5	18

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In the order of their frequency, the most common of the internal biliary fistulas are the cholecystoduodenal, cholecystocolic, and choledochoduodenal. Waggoner and LeMone,[3] who summarized 819 reported cases of internal biliary fistulas, found that 50 per cent were of the cholecystoduodenal type, 21 per cent of the cholecystocolic, 19 per cent of the choledochoduodenal, and 9 per cent of other types. In that group of 9 per cent were included those rare biliary fistulous communications with the bronchial tree, the pericardium, the portal vein, the hepatic artery, the renal pelvis, the uterus, the vagina, the bladder, the small intestine, and stomach; an ovarian cyst, an echinococcus cyst, and those between the gallbladder and the common bile duct.[2,4-9]

Bennett and Hewko[10] observed the passage of gallstones from a sinus that had been established for drainage of a right empyema. Berens, Hallenbeck, and Cain[11] reported an unusual case of a cholecystoduodenal fistula associated with a spontaneous rupture of the abdominal wall by a chronic abscess containing a gallstone. Epperson and Walters[2] refer to a case of an 87-year-old woman who had had a gallstone ileus as a result of a fistulous communication between the gallbladder and the small bowel.

In the 18 cases of biliary fistula presented here, nine fistulas were cholecystoduodenal, five were choledochoduodenal, three were cholecystocolic, and one involved a communication between the stump of the cystic duct and the first portion of the duodenum. In one case of the cholecystocolic type, three fistulous communications were identified.

Etiology and Pathogenesis

The relatively high incidence of cholecystoduodenal fistula is attributable to the normal proximity of the gallbladder and the duodenum, to the mobility of the duodenum and, in some instances, to the adherence of the duodenum to the gallbladder as a result of inflammatory disease of the gallbladder. Similarly, the frequency of cholecystocolic fistula results from the normal proximity of the gallbladder and the colon. The rarity of the cholecystocholedochal fistula probably is attributable to the fixed position of the common bile duct and the relative immobility of the gallbladder.

The majority of cases of biliary fistula are associated with chronic cholecystitis and cholelithiasis. Noskin, Strauss, and Strauss[12] estimated that in 90 per cent of the cases a gallstone is the provocative agent; in approximately 6 per cent perforating ulcer is the offending factor; and in the remaining 4 per cent the etiologic sources are carcinoma of the gallbladder or of the biliary tree, abscesses in the biliary tree, and such rarities as echinococcus cysts.

Chronic cholecystitis and cholelithiasis with an inflammatory and ulcerative process in the gallbladder wall may lead to erosion and penetration of the wall by a stone and eventually to formation of an abnormal communication with an adherent viscus. During an acute episode, a localized abscess may be formed which subsequently ruptures into a nearby viscus or even into a distant pelvic or thoracic viscus.

Gallstones impacted in the cystic duct may produce empyema of the gallbladder, causing gangrene of the cholecystic wall and perforation into an adjacent viscus. Behrend and Cullen[4] have pointed out that obliteration of the cystic duct probably plays an important part in the formation of a fistula between the gallbladder and the common bile duct by producing increased pressure of the contents of the gallbladder.

Choledochoduodenal fistula may result either from perforation of a duodenal ulcer into the common bile duct, or from erosion of the wall of the common bile duct by a stone and the subsequent perforation of the stone into the duodenum. Obstruction of the common bile duct is an important factor in maintaining a fistula: the fistula remains patent as long as the common bile duct remains obstructed.

Of the 18 patients having internal biliary fistula, 12 had chronic cholecystitis and cholelithiasis, three had duodenal ulcer, and three, respectively, had carcinoma of gallbladder, colon, and pancreas. Of the 12 patients having cholecystitis and cholelithiasis, five had only remnants of the gallbladder. In all 18 patients, dense adhesions to the adjacent organs were present. In six patients, stones and dilatation of the common bile duct were identified.

Signs and Symptoms

There are no characteristic clinical symptoms other than those that usually are associated with nonfistulous biliary disease. Of the 18 patients, 10 had had symptoms of biliary disease for 10 years or longer; the longest duration of symptoms was 34 years. The symptoms, in order of frequency, are presented in Table 2.

Table 2.—*Frequency of leading symptoms*

Symptoms	No. of patients
Pain—recurrent in right upper quadrant, radiating through to the back	17
Indigestion	17
Nausea or vomiting	12
Jaundice	7
Mass in right upper quadrant	4
Constipation	2
Diarrhea	2
Anemia	1

Acute intestinal obstruction resulting from gallstones, the passage of a stone via the rectum, or the passage of gallstones into an abscess cavity in vomitus, or through a sinus, is evidence of the formation of a biliary fistula. An internal biliary fistula may produce cholangitis, hepatitis, intestinal obstruction, hemorrhage due to erosion of a nearby vessel, and localized peritonitis. In cases of cholecystocholedochal fistula, a stricture or complete obliteration of the common bile duct may occur, resulting in jaundice and other signs of obstruction. Despite the variety of the above-mentioned complications, many patients are symptom-free for years, and occasionally the fistula will close spontaneously.

Table 3. — *Diagnostic accuracy of preoperative roentgen findings*

Findings		No. of cases
Correct		15
Presence of barium in biliary tract	10	
Presence of air in biliary tract	5	
Incorrect		3
Absence of air or barium in biliary tract	3	
TOTAL		18

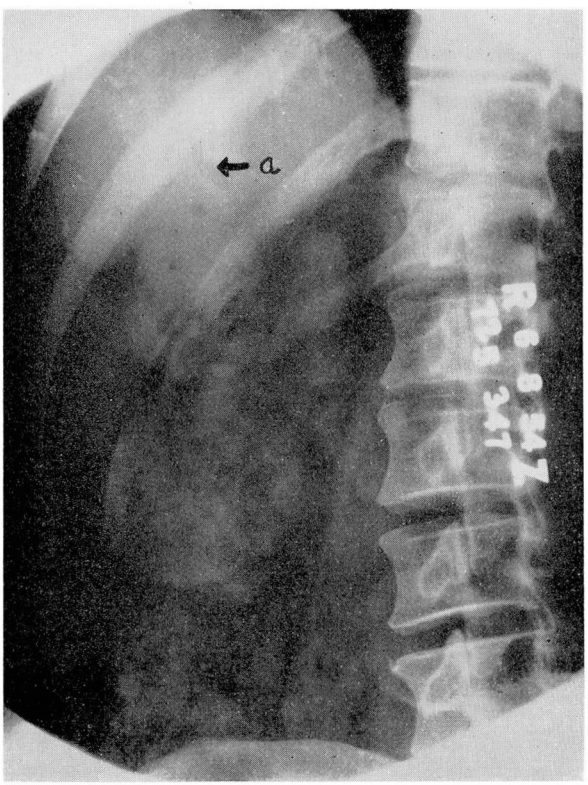

Fig. 1. Plain film. Gas in distended hepatic radicles demonstrates abnormal communication between duodenum and biliary tree, shown by arrow at **a.**

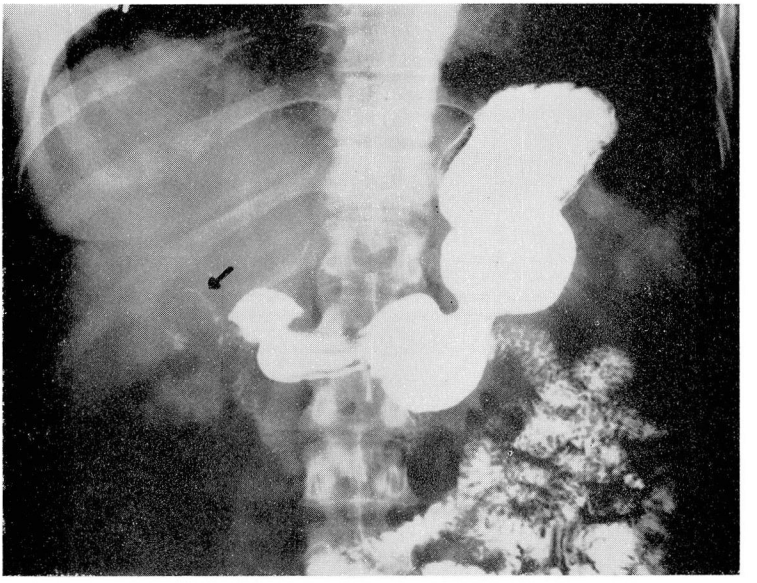

Fig. 2. Upper gastrointestinal tract, showing deformity of duodenal bulb with a fistulous communication between the duodenum and the biliary tree.

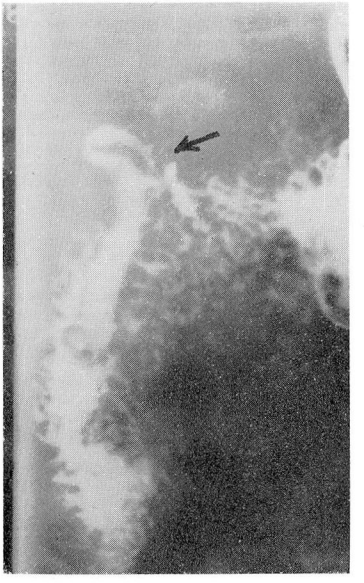

Fig. 3. Spot film taken at time of gastrointestinal examination. Note that barium has entered the common bile duct via a fistula from the duodenum, and fills the common duct to the ampulla of Vater.

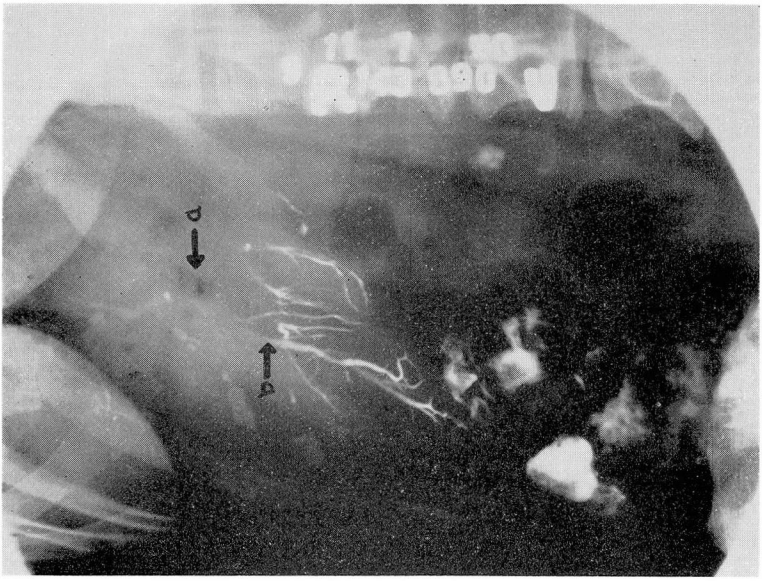

Fig. 5. Cholecystogram of upper gastrointestinal tract showing no evidence of cholecystic function. Air is visible in the hepatic radicles at **a** and barium at **b**.

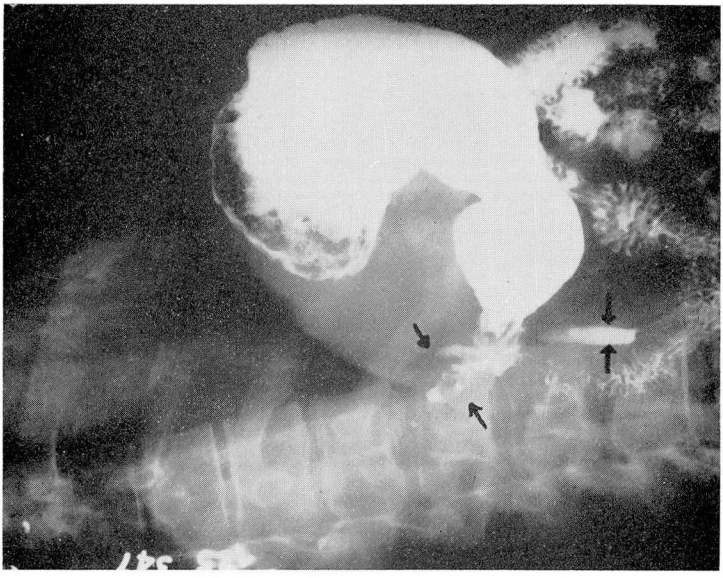

Fig. 4. Right anterior oblique film, showing barium in the common bile duct; it has entered via a duodenal fistula.

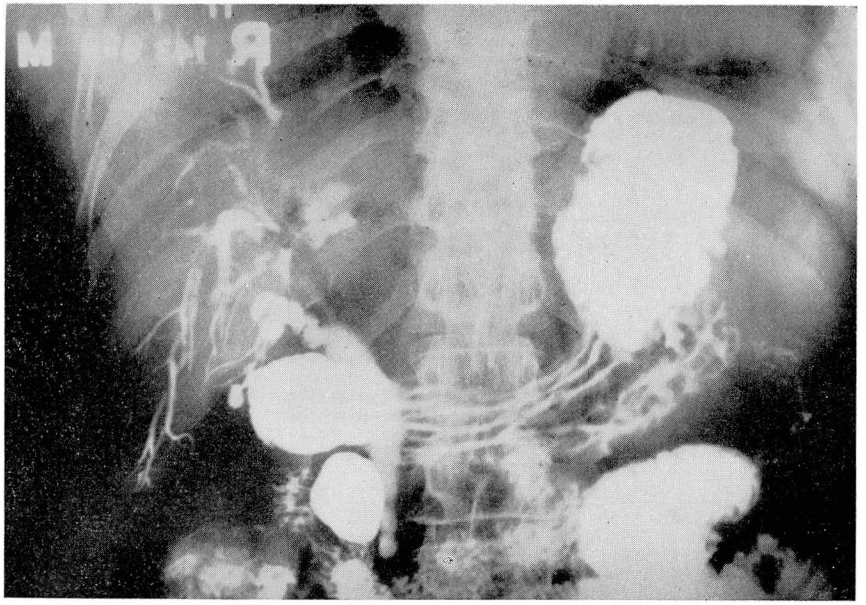

Fig. 6. Barium is in the biliary tree; it has entered via a fistula from a duodenal ulcer, and barium is in the diverticulum of the third portion of the duodenum.

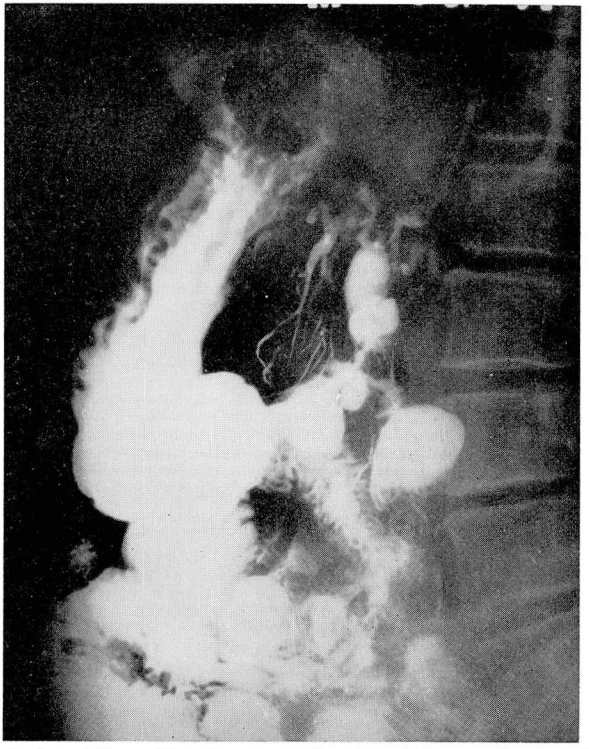

Fig. 7. Right anterior oblique film showing deformity of the duodenal bulb with fistulous communication between the duodenum and the common bile duct.

Diagnosis

Before the development of roentgenography, the diagnosis of internal biliary fistula usually was made only during surgery or at postmortem examination. Today, if the communication is with the gastrointestinal tract, roentgenograms in most instances will reveal the abnormal fistulous communication, following the administration of barium orally or by rectum. Scout films of the abdomen may reveal air in the region of the gallbladder or of the hepatic radicles—a diagnostic sign that indicates regurgitation of the intestinal contents into the biliary tract. Michels and Hoerr[1] mentioned the diagnostic value of the presence of air in the biliary tree and especially in the interlobar ducts, and also noted that occasionally bacillary infection of the cholecystic wall will produce gas that outlines the billiary tree.

The correct diagnosis was made by roentgen examination in 15 of our 18 cases (Table 3). Figures 1 through 7 are examples of the diagnostic value of the roentgenograms.

Operative cholangiography has proved useful; it not only serves to confirm the diagnosis but also to detect the presence of remaining calculi or other abnormalities of the biliary tract.

Treatment

When the fistula produces complications that cause clinical symptoms and signs, ordinarily the treatment is surgical. Cholecystectomy and closure of the abnormal duodenal or colic opening is the preferred procedure for the cholecystoduodenal and cholecystocolic fistulas. Subtotal gastrectomy with vagotomy and gastrojejunostomy is the preferred procedure for the choledochoduodenal type of duodenal ulcer, because the biliary tract will be protected from the reflux of gastrointestinal contents. The exclusion-type subtotal gastrectomy and vagotomy promote the healing of the offending duodenal ulcer. When stones are present in the common bile duct, operative cholangiography, removal of stones, and T-tube drainage, are indicated.

In 14 of our cases the treatment was surgical (Table 4). The four other patients refused surgery.

Table 4. — *Types of surgical treatment in 14 cases*

Procedure	No. of cases	Recovery, no. of cases	Death, no. of cases
Cholecystectomy, excision of fistula and closure of duodenal or colic opening	11	9	2
Exclusion-type subtotal gastrectomy	1	1	—
Ileotransverse colostomy	1	1	—
Biopsy and drainage of pancreas	1	—	1
TOTAL	14	11	3

Results

Of the four patients who did not undergo surgery, two were lost to follow-up; one died one year after the examination, from carcinoma of the gallbladder and metastasis to the liver; and one was asymptomatic five years after the initial examination.

Of the 14 patients who underwent surgery, 11 have done well for one month to six years since operation. Three died: one from hepatorenal failure on the second postoperative day; one from carcinoma of the pancreas on the sixty-seventh postoperative day; and the third from an undetermined cause (autopsy was not performed) on the fourth postoperative day.

Summary

Eighteen cases of internal biliary fistula are reported and discussed in relation to etiology, diagnosis, and treatment. Although the disease presents no characteristic clinical picture, the roentgen findings offer a reliable means of diagnosis. When the fistula produces complications that cause clinical symptoms and signs, and the patient's general condition permits, surgical treatment is indicated.

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