

# ACUTE PERFORATION OR RUPTURE OF THE GALL-BLADDER\*

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ALTHOUGH acute perforation or rupture of the gall-bladder is not a very common occurrence, it is not so uncommon as is generally supposed. The purpose of this paper is to draw attention to it as a fairly frequent cause of the acute abdomen, as well as to the difficulties of diagnosis and the high mortality. Georg, in 1925, in a study of the literature for the last thirty years found 348 reported cases, with a mortality of 42 per cent.

This study is based on twenty cases of perforation or rupture of the gall-bladder occurring among the last 1000 cases of diseases of the gall-bladder and biliary tract admitted to the surgical wards of the Episcopal Hospital. In most instances the actual perforation was demonstrated at operation, but in a few no attempt was made to locate the perforation, the diagnosis being made on the presence of gall-stones or bile in the walled-off or free peritoneal cavity.

The series falls into two groups: Acute perforation into the free peritoneal cavity; and subacute perforation localized by adhesions. Eight of the series belong to the first group, *i.e.*, acute perforation without any attempt at walling off; and twelve to the second group, *i.e.*, sub-acute perforation well walled off by adhesions or omentum. A few instances of perforation of the gall-bladder into a hollow viscus—chronic perforations—are not included in this study.

*Acute Perforation.*—In the eight cases of this group six were males and two were females, their ages ranging from twelve to sixty-five years; two being under twenty, four between forty and fifty, and two sixty-five years of age. Three of them were suffering from typhoid fever when the perforation took place on the thirty-second, thirty-fourth, and forty-second day of the disease; two recovered and one died; the patients were all males, aged respectively, twelve, twenty-four and forty-two years. Of the eight, four gave a history of previous indigestion and one (the only one in the entire series) was a traumatic case. A brief resumé of the latter may be of interest.

The patient, a female, aged sixty-five years, was admitted to the Episcopal Hospital, service of Dr. Louis H. Mutschler, with a pistol wound of the right side (22 cal. steel-jacketed bullet). At operation, two hours after admission, the findings as reported on the operation sheet were: "Peritoneal cavity full of blood clots and free blood. Perforation of the lower portion of the right lobe of liver one inch from the edge. Bullet had passed through fundus of the gall-bladder, striking and fragmenting a gall-

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stone. Perforation of the ileum, mesentery, transverse colon, etc." In addition to the intestinal repairs a cholecystostomy was done. The patient recovered.

*Diagnosis.*—As already indicated, a correct pre-operative diagnosis of a perforation or rupture of the gall-bladder is not common. In the present series the tentative diagnosis comprised: intestinal (typhoid) perforation, gangrenous cholecystitis, appendiceal peritonitis (one each), perforated duodenal ulcer (three), probable perforation of the gall-bladder (one). In other words, the true lesion was suspected in only 12.5 per cent. of the acute cases.

In the histories of this acute group the outstanding symptom that might lead to a suspicion of gall-bladder trouble was "repeated bilious vomiting"—noted in all but two—the traumatic case and one typhoid case. Some previous digestive trouble is also a common feature, five, *i.e.*, all but the typhoid patients, giving a history of gall-bladder indigestion. Jaundice, on the other hand, does not form part of the syndrome; in fact, it was not present in any of the acute group. The blood count is indicative of severe infection. In the typhoid cases it ranged from 6200 to 24,600, and in the others from 19,800 to 28,000. In the early stage the symptoms are highly suggestive of a perforated duodenal or gastric ulcer, and, as we have seen, that was the most frequent diagnosis in the acute cases. There is the same sudden onset of acute pain, marked abdominal rigidity, together with a previous history of indigestion. A large perforation with flooding of the peritoneal cavity with bile is probably accountable for the cases in the literature that were incorrectly diagnosed as intestinal obstruction or diffuse peritonitis. In the late stage of perforation or rupture, when a diffuse peritonitis has developed, confusion is even more apt to occur, and the most frequent diagnosis then is appendicitis with diffuse peritonitis or perforative peritonitis of unknown origin.

*Duration of Perforation.*—In the acute series the duration of the perforation was from four hours to three days. Of the three typhoid patients, two were operated on within five hours of the first symptoms of perforation, with one recovery and one death, while the third came to operation within twelve hours after perforation and recovered. The traumatic case has already been referred to, and of the four remaining cases two were operated on twenty-four hours after perforation, one recovery; the remaining two were operated on the third day after perforation, both dying. Thus we have a mortality of 50 per cent. (four out of eight cases). The operation consisted of cholecystectomy (two), with one recovery and one death; cholecystostomy (five), three recoveries, two deaths; simple peritoneal drainage (one), death due to peritonitis. Death was due to peritonitis in three and to myocarditis in one of the four fatalities. Stones were present in four of these acute cases, the traumatic and three others.

The bacteriological report on five cases was: Typhoid bacillus, one; bacilli, two; no growth, two.

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*Subacute Perforation.*—The group comprises ten females and two males, twelve in all. The age incidence shows a much higher average than in the acute cases, three being between thirty and forty, two between forty and fifty, two between fifty and sixty, four between sixty and seventy, and one over seventy years of age. Eight of the series gave a previous history of gall-bladder trouble of from two months to several years' duration.

*Diagnosis.*—In this second group it is not so difficult to locate the trouble as in the first one. Vomiting was the clinical symptom common to all, chills were noted twice, while jaundice was present three times, slight in two cases and very deep in the third. In the latter, at operation, a large stone was found impacted in the cystic duct. The white blood count in eight cases ranged from less than 11,000 (three) to more than 20,000 (five). A palpable mass was noted in six (50 per cent.).

Although a clinical diagnosis of perforation or rupture was not made in any of this group, the gall-bladder as the site of the trouble was noted ten times, the diagnosis being calculus or non-calculus cholecystitis; the other two were tentatively labeled high appendiceal abscess. It must be remembered that these subacute cases all came to the hospital several days after the inauguration of the acute onset, and with well-defined and localized symptoms, so that it was comparatively easy to recognize the gall-bladder as the site of the lesion. I believe that if they had been seen in the acute stage many of them would have been listed in a different category. Acute calculus cholecystitis, for example, during the height of the attack may be difficult to differentiate from a perforation. The most common condition producing a mass in the gall-bladder region is a distended, acutely inflamed gall-bladder plastered around with omentum. This is what four of the six cases of this series, with a palpable mass, were thought to be. Besides a high appendiceal abscess, two other conditions, a pericholecystic abscess and a subacute rupture of the gall-bladder, may give a palpable tender mass in this region. The mass of a pericholecystic abscess, however, when palpable, is exquisitely tender and is usually situated higher in the abdomen and nearer the midline than in the other conditions mentioned.

*Duration of Perforation.*—The approximate time elapsing between the symptoms of perforation and admission to the hospital ranged between four days (two cases), seven days (three cases), ten days (two cases), two weeks (three cases), and three weeks (two cases). Operation in this subacute group consisted of cholecystectomy in four cases, with one death; cholecystostomy in eight cases, with two deaths; either procedure thus giving a mortality of 25 per cent. The death after cholecystectomy was due to peritonitis, while following cholecystostomy one death was due to uremia and the other to pulmonary oedema. The bacterial findings in cultures in eight of this group were negative six times and positive for bacilli in two. One of the latter was the fatal case after cholecystectomy. Gall-stones were found in eight and bile only in the other four of this subacute group.

*Etiology.*—The chief etiological factor leading to rupture or perforation of the gall-bladder seems to be ulcerative cholecystitis, usually, but not always associated with the presence of gall-stones. McWilliams, in a collected series of 108 cases of spontaneous perforations of the biliary system, found stones present in 74 per cent., and Fifield found them in twenty-six out of twenty-eight cases reported from the London Hospital. In our series stones were present in 25 per cent. of the acute and in 75 per cent. of the subacute group. According to McWilliams, the mechanism of the perforation may be due to various causes: (1) Rupture from over-stretching, with or without the presence of stones; (2) pressure of a stone upon the wall causing ulceration; (3) gangrene due to (a) thrombosis of the vessels with or without stones; (b) cutting off the circulation due to pressure from a stone; (c) diphtheritic, ulcerative infection of the wall, with or without stone.

Mitman reports a case of chronic pancreatitis and ulcerative cholecystitis in which the gall-bladder ruptured, and attributes the catastrophe to increased abdominal pressure while straining at stool. Torsion of the gall-bladder, together with rupture, was reported to this Academy by Wendell in 1898.

Carcinoma as a cause of rupture of the gall-bladder is very unusual. Although Bonnet reports one case, we failed to find any case in our series in which malignancy was the etiological factor in producing the rupture, although the incidence of carcinoma of the gall-bladder was 1.3 per cent. in the 1000 cases of disease of the gall-bladder and biliary system.

Infection passing through the wall of the gall-bladder and producing a localized pericholecystitis or even a pericholecystic abscess is frequently met with, but it is rare for a diffuse peritonitis to develop in this way. Köerte has reported three such cases, while Richardson, Finsterer and others have observed instances in which bile was found in the free peritoneal cavity, but no perforation was demonstrable.

The cultures taken in both our acute and subacute cases bear out the work of Judd and his associates, and of Rosenow, Brown and others, that the bile does not offer any reliable data as to the presence or absence of infection of the gall-bladder wall and bacterial growth is inhibited by concentrated bile pigment, as shown by the experimental work of Drennan and others.

*Treatment.*—Successful treatment, as in every acute perforation of an abdominal viscus, depends largely upon early diagnosis and early operation. Perforation of the gall-bladder, however, differs from acute perforation of the duodenum, for example, in that it is infective from the beginning. This is well demonstrated in the cases that come to operation within a few hours after onset. Cultures taken from these may show a growth, while it is exceptional to obtain a positive culture from a perforated duodenal ulcer within the first twelve hours.

The question arises whether to do a cholecystostomy or a cholecystectomy.

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The ideal is to remove the gall-bladder, but as there is no time for study or preparation in these emergency cases, the choice will depend upon the duration of the perforation, the age, the general physical condition of the patient, and such laboratory data as can be obtained. Statistics seem to favor cholecystostomy. Our own series is too small to afford any deductions, but the mortality was alike, high, for both operations—fifty per cent.

The subacute cases present more time for study of the kidneys, the blood, the cardio-vascular system, and the little we know of the liver function. In the majority of instances these patients, after they have been carefully studied, can be leisurely prepared for operation so that they come to the operating table in much better condition than the acute ones.

If there is a large palpable mass and the incision is made directly into the same, I believe it is best to establish free drainage and nothing more. If necessary, a cholecystectomy can be done later. But if no mass is palpable, and the perforation is not suspected until the free peritoneal cavity has been opened, the mass having been carefully walled off with gauze packs, and it is found that the adhesions can be easily separated and the ducts exposed without difficulty, a cholecystectomy can be done, but it produces more trauma and opens up new avenues for infection and absorption, so that here also the deciding factors must be the laboratory data, the age of the patient and his general resistance, as far as this can be determined.

The obese patient with acute cholecystitis, especially if a female over fifty-five years of age with marked myocarditis, is the type of case that we know by experience is the more apt to develop acute dilatation of the heart or so-called liver shock. In such instances, therefore, a cholecystostomy, which takes less time and produces less trauma, is the better procedure.

### CONCLUSIONS

From the foregoing, it appears that the incidence of rupture or perforation of the gall-bladder is about two per cent. of the diseases of the gall-bladder and biliary tract. The reason it is not more frequent can be traced to several factors: The musculo-fibrous coat of the organ is quite dense and resistant, its lymph and blood supply is abundant, and finally the action of the bile on any organisms that may invade the gall-bladder wall seems to reduce their virulence.

Although several cases are on record, besides our own case, in which perforation of the gall-bladder resulted from trauma, beyond the fact that such an accident may happen to an organ lying so protected within the abdominal cavity, the chief interest, it seems to me, is the apparently innocuous effect of sterile bile on the peritoneum and the length of time a ruptured gall-bladder may be present without destroying the patient. This is shown by cases reported by Lane, Gare, Hildebrand, Fifield and others, and should be a great comfort to those who routinely close the abdomen in all cases of cholecystectomy.

May their patients' bile always be sterile!

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