CHOLECYSTECTOMY AND CHOLECYSTIC TOXEMIA *

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According to the mode of invasion, gallbladder infections may be divided into four types:

1. Portal infection, in which bacteria entering the portal circulation, chiefly from the alimentary tract, escape the bactericidal action of the liver and passing out with the bile, colonize in the gallbladder. This method, described years ago by Adami, has been considered as quite common and is supposed to explain the relationship between appendicitis, intestinal ulceration and other inflammations of the alimentary tract and gallbladder disease.

2. Ascending biliary infection, in which bacteria ascend from the ampulla of Vater through the common and cystic ducts and enter the gallbladder. This process is aided by the reversed mucous currents described by Bond, who showed that carmine particles introduced even as low as the rectum would after a time pass upward against the normal peristaltic current, and be discharged on the surface of the skin through a cholecystostomy opening. Although probably less frequent than other methods, ascending biliary infection occurs in certain inflammations and new growths involving the duodenum.

3. Hematogenous infection, in which bacteria circulating in the general blood stream invade the gallbladder. Rosenow has shown the specific manner in which certain streptococci circulating in the blood, attack the gallbladder or produce gastric ulcer, and his experiments suggest that many causes of cholecystitis formerly considered of a portal or ascending biliary type are in reality focal hematogenous infections. The well-recognized metapneumonic cholecystitis of young children apparently occurs in this way, as does the infection of the gallbladder in typhoid fever.

4. Contiguity infection, in which the gallbladder is involved by the spread of infection from adjacent organs, as when an adjacent abscess perforates, or malignant or benign ulcer of the stomach or duodenum invades the gallbladder. This is a relatively rare form of cholecystic infection.

Frequency: Infections of the gallbladder are exceedingly common. Next to appendicitis, cholecystitis is the most frequent of all the chronic intra-abdominal infections. In some classes of people, notably obese, middle-aged multiparas, it is more frequent than appendicitis. It is the second great cause of chronic indigestion. Inflammation of the gallbladder often develops during the first and second decades, but as the local symptoms are unobtrusive, the condition usually escapes recognition. After middle age, as the local symptoms become more predominant, the diagnosis of gallbladder disease is made. Thus we have been accustomed to consider it a disease of middle or advanced life.

Persistence: Infections of the gallbladder are exceedingly chronic. It has long been known that typhoid bacilli may continue to multiply for thirty or forty years in the gallbladder. It is now recognized that

other bacteria likewise may have persistent growth. The bacteria are found in the center of the gallstone, in the bile, and in the mucosa lining the gallbladder wall. Bacteria found in the center of gallstones and within the depths of the mucosa usually represent more or less remote infections and may be associated with bile that is practically sterile. At present, although most of the patients operated on for gallbladder disease have reached the fourth or fifth decade of life, a careful study of the history usually indicates that these same patients acquired their infection in the second or third decade. As yet we have not learned to sterilize the chronically infected gallbladder and the patient once infected may be continuously infected until the gallbladder is removed, or until a violent necrotic form of inflammation destroys the lining of the mucosa and leaves the gallbladder a shrunken, functionless mass of fibro-connective tissue. The temporary relief that follows medical treatment, or a Carlsbad course, prompts the patient and physician to defer operation until advanced pathologic changes have occurred. After a simple drainage operation, the bile clears and the patient is relieved, but the deep infection in the gallbladder wall persists and the symptoms of chronic cholecystitis may later recur. If the symptoms are not of the obstructive type, the patient will usually tolerate them, although not infrequently more radical treatment is demanded.

Symptoms of cholecystitis: Apart from a small area near the neck the gallbladder has no sensory nerves, and distention or inflammation produces no symptoms unless the irritation spreads to adjacent sensitive structures. In operating under local anesthesia, we have repeatedly incised, sutured and crushed the wall of the inflamed gallbladder without pain. Only when traction or pressure affects the ducts, other sensitive organs, or especially the parietal peritoneum, does the patient complain. One should not, therefore, expect local symptoms in inflammations that are limited to the gallbladder proper.

Symptomatically, we would divide chronic cholecystitis into three stages:

First, a stage marked by more or less remote reflex and toxic symptoms and by the absence of local symptoms. This is the stage of cholecystic indigestion and toxemia and represents a period in which the gallbladder factor is usually unrecognized. It usually continues from fifteen to twenty years before the development of the second stage. In this first stage the mortality under operative treatment should be under 1 per cent.

Second, a stage characterized by the movement of calculi, or by recurrent attacks of acute inflammation. Stones cause paroxysms of pain usually by obstructing the outlet of the gallbladder. The attacks are violent, often follow indiscretions in diet, usually require an opiate, frequently occur at night and last but a few hours. To be differentiated are the acute recurrent attacks of cholecystitis in which no calculi are present. The latter are less violent, usually do not require an opiate, last several days instead of a few hours, and have an onset and termination less abrupt than the colic produced by stone. On exposure, these gallbladders are often considered to be normal, the operator, finding no stones or marked evidences of inflammation, concludes he has made an error in diagnosis. The second stage, or stage of acute biliary

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paroxysms, is chiefly observed between the ages of 35 and 55 years. The mortality from operative treatment in this stage is from 3 to 5 per cent.

Third, a final stage characterized by acute and dangerous complications, such as empyema, or gangrene of the gallbladder, obstruction of the common bile duct, acute pancreatitis, rupture or perforation of the gallbladder, malignant disease, acute peritonitis, or intestinal obstruction from stone. These complications marking the third stage of cholecystitis are most frequently observed between the ages of 45 and 75. One of our patients was 80 years of age, seven were over 70. Unfortunately, a large proportion of patients reach the third and dangerous stage of cholecystic infection before coming to operation. That one fourth of all the operated patients of a well-known surgeon should have had associated disease of the pancreas is a sad commentary on medical delay. The occurrence of the third stage of cholecystitis is a reproach to our medical art, and indicates an average procrastination in the effective treatment of cholecystitis of about twenty years. Rather unusually, of course, we meet with exceptions. Thus during the past year I have seen one girl of 14 years with over three hundred gallstones, acute pancreatitis and fat necrosis; and a boy of 15 years with twenty-eight gallstones, localized peritonitis and a gangrenous gallbladder $7\frac{1}{2}$ inches long. The mortality in this stage of cholecystitis probably averages over 20 per cent. The relief from many reflex and secondary symptoms of early biliary infection, the prophylaxis of gallstones and of the dangerous complications of cholecystitis lie in the effective treatment of the first stage of cholecystitis, and therefore the recognition of this stage deserves special consideration.

The evidence of cholecystitis of the first stage is not found in a physical examination of the upper right quadrant of the abdomen, but is to be determined by deductive reasoning. The history of the patient usually reveals a cause of infection which has a relationship to the development of certain reflex toxic, or secondary infectious processes that experience has shown frequently to express cholecystitis. These may be grouped as follows:

(a) Digestive: Most common are the reflex digestive symptoms. Fulness and distress after eating, with sour bitter eructations, belching, and more rarely vomiting are usual. There may be a constant foul taste in the mouth, which at once disappears when the gallbladder is drained or removed. The dyspepsia is of the "qualitative" type, rather than the "quantitative" dyspepsia of ulcer; that is, attacks of indigestion often follow certain articles of diet, such as shellfish, cheese, boiled dinners, fried foods, pastries, corn, and the like, and may not be influenced by the amount of food eaten. The patient will often mention an idiosyncrasy toward certain foods. The inability of a patient to handle certain staple articles of diet should suggest biliary disease. It is perhaps the most common condition that causes a patient to report periodically to a physician for relief from attacks of so-called biliousness or indigestion. The attacks are usually relieved temporarily by fasting, dieting, by alkalies, or by a saline or calomel course.

As to the differential diagnosis, transient, often nocturnal, attacks of indigestion in an obese, middle-aged woman precipitated by a dietetic indiscretion and requiring a hypodermic injection for relief, are rarely

due to other causes than gallstones. With the history of such preceding attacks, a very violent and persistent attack suggests empyema, or gangrene of the gallbladder; while an attack of superlative severity with shock and epigastric distention and tenderness usually means a pancreatitis. As contrasted with gastric or duodenal ulcer an attack of gallstones lasts a few hours, is most abrupt and severe; an acute cholecystitis a few days and is less severe; while an ulcer attack usually lasts for several weeks and is the least severe. Between the paroxysms from stone or acute cholecystitis, which may be months or weeks apart, the patient usually has a greater degree of dyspepsia than is found between the exacerbations of ulcer. In ulcer, feeding may give temporary relief, "food ease"; while distress accompanies an empty stomach "hunger-pain." In cholecystitis and stone, food exacerbates and vomiting relieves the pain.

(b) Intestinal symptoms: The intestinal symptoms of cholecystitis are as yet not fully understood. The continuous discharge of bacteria laden bile into the intestinal tract may give rise to the so-called intestinal indigestion, and in some instances to the symptom of intestinal toxemia, so graphically described by Mr. Lane. It is possible that some of these patients have been given a measure of relief by the removal or elimination of the colon, not because the cause was removed, but because the absorptive surface of the intestine was reduced. There is an association between cholecystitis and appendicitis, the appendix either infecting the portal system and gallbladder, or being coincidentally infected by a common cause. Wohl has reported that in 50 per cent. of our cases in which the removed appendix was also studied, there was evidence of appendicitis.

(c) Peritoneal symptoms: Peritoneal symptoms result from acute inflammation or secondary adhesions. The forms of localized or diffused peritonitis that may result from the later stages of gallbladder infection require little special discussion. Attention should be directed, however, to the frequent error in mistaking cholecystitis for appendicitis. An enlarged inflamed gallbladder, with only a small area of the fundus projecting below a Reidel lobe of the liver, frequently produces recognizable peritoneal inflammation only when the exposed fundus comes in contact with the sensitive parietal peritoneum, and this frequently is directly under McBurney's point. In nearly every such instance which we have seen, the examiner, overlooking the less distinct and less sensitive area of resistance which spreads down from the right costal border, has concluded that acute appendicitis was present.

(d) Arthritic and muscular complications: Subacute or acute metastatic joint infections are frequently observed in chronic cholecystitis. Often these symptoms improve after cholecystectomy. Chronic joint changes of the type of arthritis deformans are also observed. Myalgic pains are exceedingly common.

(e) Cardiovascular symptoms: Few patients pass to the third stage of cholecystitis without some evidence of cardiovascular disease. Endocardial and particularly myocardial changes seriously increase the risk of anesthesia and of operation in long-standing gallbladder disease. To some degree pathologic changes of the arterial wall also have their origin in cholecystic infections. Cardiovascular symptoms may greatly improve after operations on the gallbladder.

(f) Respiratory symptoms: We have been impressed by the surprising relief from paroxysmal cough and asthma that may follow cholecystectomy, or cholecystostomy, and we have operated for these symptoms alone. Two of our patients who had been unable to sleep except in a sitting posture for five and seven years, respectively, found they could recline with comfort after the operation, and the asthma and cough disappeared. After a period of relief for some weeks, however, the symptoms recurred. It would seem that cholecytic toxemia is a factor in some of these cases.

(g) Cerebrospinal symptoms: In cephalalgia, neuritis and some of the neuroses relief may be obtained by operating on the gallbladder. In the so-called bilious sick headaches we have observed relief after cholecystectomy, and in one violent case we operated for this symptom alone, with relief. In this case the symptom was a sequence to typhoid fever. In certain of the prematurely worn women of middle age, who constantly complain of indigestion, bloating, constipation and a multitude of aches, pains and surface paresthesias, there has been something of a mental transformation after the removal of a chronically infected gallbladder.

(h) Fever: Fever without other symptoms may result from cholecytic infection. The bile may be free from pus, the gallbladder bluish and nearly normal in appearance. The fever disappears with the removal of the gallbladder. One of our patients with no local symptoms had been treated in hospitals for months for an apparently causeless continuous fever, that immediately subsided after the excision of what seemed like a normal gallbladder.

(i) Eye symptoms: Eye symptoms are not infrequent with biliary disease. At times we find the oculist promising relief from the digestive symptoms of cholecystitis by the application of glasses, or, again, vainly attempting to control a vacillating series of refractive or muscular abnormalities.

DIAGNOSIS

The diagnosis of cholecystitis after opening the abdomen is not always easy. We depend on one or more of the following abnormal conditions:

1. Alteration in the color, size or consistence of the walls of the gallbladder. A milky or whitish gallbladder is diseased, but many translucent, bluish gallbladders are also diseased.

2. Adhesions or other evidence of pericholecystitis. Often the liver adjacent to the gallbladder shows evidence of chronic perihepatitis by whitish plaques or connective tissue trabeculation.

3. Enlargement of tributary lymph nodes: Attention has been especially directed by W. J. Mayo to the lymph nodes. The palpating finger is introduced into the foramen of Winslow and the nodes near the junction of the cystic and common ducts examined. While such lymph-node enlargements usually indicate cholecytic infection, they may also occur from pancreatic or duodenal disease. Absence of enlargement unfortunately does not negative cholecystitis. At times we have observed the absence of adenopathy in purulent or gangrenous as well as in catarrhal cholecystitis.

4. Alterations in the bile contained within the gallbladder: Normal bile is of a clear golden yellow color; turbid, purulent, dark green, tarry bile, or bile containing crystals, sand or calculi, indicate cholecystitis.

Colorless mucus indicates cystic-duct obstruction and a mucocele. For diagnostic aspiration, to avoid leakage, should the gallbladder not be removed, a fine needle should be introduced into the gallbladder through a thin layer of overlying liver substance.

5. Alterations in the mucosa: Papillary denudations producing the finely speckled or strawberry gallbladder, papillary outgrowths, infiltrations of the mucosa as well as the grayish, greenish or blackish wall, or sloughs seen in empyema or gangrene, indicate varying grades of gallbladder disease.

PROGNOSIS

Cholecystitis may be alleviated by dieting, alkalies, salicylates, vaccines or a saline or Carlsbad course. It is more surely curable by the operative removal or obliteration of the mucous lining of the gallbladder. Most patients who finally come to operation have had some degree of relief from dieting, or various medical measures. In a woman who, for six years, following typhoid fever, had suffered from indigestion, headaches, myalgia, bromidrosis and foul taste, the symptoms almost completely disappeared after a course of typhoid vaccines. Except in the third stage of cholecystitis which brings an immediate danger to life, operation is usually delayed or considered unnecessary. At present, surgery, which is about the only permanently effective therapeutic measure against cholecystitis, is about twenty or thirty years behind the pathology of the disease, usually ignoring the early stages of inflammation and cholecytic toxemia, permitting years of morbidity and crippling tissue changes to supervene, and only intervening when a violent local reaction drives the patient to the surgeon.

OPERATIVE TREATMENT

Anesthesia: An anesthetic may increase the danger of operation on the biliary tract by depressing the cardiac and respiratory systems, adding to the preexistent toxemia, inhibiting elimination, and by producing straining movement, violent respiratory action and rigidity of abdominal muscles, that so embarrass the surgeon as to invite dangerous technical errors. At the Samaritan Hospital during the past three years, one patient with a perforated gallbladder and an upper abdominal peritonitis, was asphyxiated by profuse, regurgitant vomiting, while under spinal and narcotic anesthesia. In a second patient with myocarditis, cholecystitis and acute peritonitis there was a fatal respiratory cardiac failure. A third similar fatality occurred under the administration of ether. We have been able to reduce the mortality by substituting local anesthesia for patients who are bad risks. The local anesthetic solution is used very freely, 1 per cent. of novocain being employed for the skin and subcutaneous tissues, and a 0.25 or 0.5 per cent. solution being employed for the muscular, fascial and peritoneal layers. A free injection of such weak anesthetic solutions seems not only harmless but often beneficial, acting like a hypodermoclysis in assisting elimination. If the patient's general condition permits, a moderate supplemental narcosis produced by morphin-scopolamin is used. Especially in the very old, the very toxic or asthenic with empyema or gangrene of the gallbladder, or perforation and peritonitis, do we prefer local anesthesia. For patients in better physical condition, we prefer spinal anesthesia because it does not interfere with elimination or increase preexisting toxemia, and

at the same time gives far better relaxation than ether does. It is dangerous for operations on the gallbladder in obese elderly patients who are toxic and have serious myocardial change. Rectal anesthesia, from its especially intense action on the liver, should be avoided.

Incision: A simple transverse incision made along a line slightly below the level of the ninth rib is valuable when operating under local anesthesia, especially if the gallbladder is large and there is marked muscular rigidity. In such a case the gallbladder and liver margin may be made to protrude from the opening and retraction and the introduction of pads within the abdomen are unnecessary. It is especially adapted for cholecystostomy, although occasionally a cholecystectomy may very conveniently be done. For the former operation a shorter incision may be employed, the different layers being divided along the same line. To give a better exposure of the ducts, a triangular flap incision, as suggested by Perthes, may be used. A right transrectus incision is made from the ensiform directly downward for 3 or 4 inches, from the lower end of this vertical incision a transverse incision is made to the right to a point just below the right costal margin. The vertical part of the incision is carried through the rectus to the posterior sheath and guided by the finger introduced behind the rectus fibers; two or three sutures of catgut are placed above and below the line of the transverse incision in such a manner as to fix the rectus muscle to the overlying aponeurosis, so that the divided muscle will not retract. The muscular and aponeurotic layers are now divided along the line of the transverse incision and the triangular flap thus formed turned upward and outward over the chest wall. The peritoneum and preperitoneal fascia are now divided along a line parallel with the costal border and about one-half inch distant from it. To avoid the objectionable right-angle incision of the skin, I have modified Perthes operation by substituting a simple oblique skin incision which is made parallel with the costal border after the plan of Kocher.

Alexander Don, to obtain a greater exposure and to avoid injury to the intercostal nerves, extends the vertical portion of the incision down to the level of the navel, and curves the transverse portion of the incision upward and outward toward the right axilla. The rectus muscle is completely freed and divided below and the posterior sheath of the rectus and peritoneum divided along the same lines as is the skin.

In patients with relaxed or thin abdominal walls a simple vertical transrectus incision often serves very well.

Cholecystectomy: In the first stage of cholecystitis, cholecystectomy is the preferred operation. It is the most effective method of treating the protean manifestations of the disease. The patients are usually under middle age, are not very obese and come to the operating table in good physical condition. With a perfect technic the operation in this stage should be a safe and satisfactory one, but unfortunately there are serious technical dangers always present in doing a cholecystectomy; an unfortunate snip of the scissors, a careless needle puncture or an imperfect ligation, is all that is required to place the patient's life in jeopardy, and these accidents have caused many surgeons to resort to ostomy when an ectomy would be the bet-

ter operation. Even so skilful an operator as Moynihan reports three cases in which an hepatic or common duct was wounded. In my first ectomy, a case in which there were extensive intra-abdominal adhesions, the divided cysticus was imperfectly occluded and a secondary fatal leakage of bile into the peritoneal cavity occurred. In a recent case the gallbladder was distorted and displaced by adhesions, and on closing the peritoneal edges over the gallbladder bed, biliary leakage, evidently from a punctured displaced hepatic duct, occurred. The stitches were removed and drainage was instituted, with recovery. We have had three other cases of accidental duct injury or imperfect ligation of the cystic duct during cholecystectomy. These accidents are less frequent when the operation is performed in the first stage of cholecystitis. Since the first case we have now had 114 ectomies during the first stage of cholecystitis without operative mortality. In this stage the gallbladder is usually best removed from within outward, after the method so well illustrated by the Mayos. The cystic duct should be doubly ligated, mass ligatures should be avoided, as should anything which may serve to distort or obstruct the ducts. The cystic artery should be individually tied. Wide flaps of peritoneum should be separated from the gallbladder to cover the denuded area left under the liver. If there is any question as to absolute hemostasis or duct occlusion adequate drainage should be employed, so arranged or anchored by fine catgut that it cannot be displaced. In most of our ectomies we have been able to avoid all drainage. In cases of the second or third stage when the gallbladder is distorted or imbedded in adhesions, it may be safer to remove the gallbladder from without inward. In this way, by hugging the gallbladder very closely, there is less danger of damaging the hepatic or common duct. In case the adhesions are very marked, the method of Kehr of first splitting down the interior surface of the gallbladder at least into the cystic duct, is an advantage in determining the relationships of the parts.

Cholecystostomy: External biliary drainage, considered by the late Dr. Maurice Richardson only ten years ago, the one established therapeutic fact in biliary surgery, has a progressively lessening sphere of usefulness. Its use should be largely restricted to the third stage of cholecystitis for cases of empyema, perforation, gangrene, pancreatitis, advanced peritonitis or duct involvement, associated with such grave systemic changes due to age, toxemia or exhaustion, that only the simplest of operative procedures are warranted. It also should be used when technical limitations indicate that an ectomy will be dangerous. Under certain favorable conditions by performing cholecystectomy, we have been able to avoid drainage even in cases of empyema, gangrene of the gallbladder and acute pancreatitis. As a rule, the virulence of the bacteria found in empyema or gangrene against the skin and subcutaneous tissues is less than that of the bacteria found in purulent forms of appendicitis.

As cholecystectomy is the great measure of prophylaxis, it should be performed more frequently and much earlier and should have a progressively lower mortality than cholecystostomy.

If reasonably safe and feasible the appendix should also be removed in operating for cholecystitis. Despite certain results of animal experimentation, clinical evidence indicates that a patient is better off without than with a chronically infected gallbladder.

MORTALITY

The mortality of cholecystectomy is due to: 1. Poor judgment in selecting patients with acute febrile and septic conditions, or patients greatly debilitated by age, chronic toxemia or complete and continued external drainage of bile. This latter class who have what we may term "cachexia-choleoprivia" bear operation very badly, readily falling into a condition of fatal shock irrespective of the operation or anesthetic employed. For them a simple Witzel enterostomy should first be done under local anesthesia and the bile shunted from the fistula into the bowel by a small rubber tube. The final operation should be delayed until the cachexia, due to the loss of bile, has been overcome.

2. Technical errors: Leakage of bile into the peritoneal cavity may result from the cystic duct having been imperfectly tied, or the common or hepatic duct torn, incised or punctured. In the case of bile leakage, if the general peritoneal cavity is not sufficiently protected by drainage and tamponade, a dangerous or fatal peritonitis may result. I have been impressed by the danger of (a) doing cholecystectomy in a private house where adequate light and sufficient exposure cannot be obtained; (b) separating the overhanging neck of the gallbladder without observing great care in hugging the gallbladder proper to avoid the adjacent communis; (c) puncturing the hepatic duct. The gallbladder may lie obliquely so that the hepatic duct is in the peritoneal fold to the side of the neck of the gallbladder, where it may be damaged in suturing over the gallbladder bed; (d) relying on insufficient tamponade for drainage in the presence of a biliary leak. In all cases, as an indicator, we place the end of a gauze sponge against the stump of the cystic duct, which is not removed until the end of the operation. Should this show staining by bile, we immediately reopen and control or isolate the area.

In a personal experience of 270 operations on the gallbladder and ducts, fifty-seven ectomies were done before 1912 with ten deaths, a mortality slightly over 17 per cent. In thirty-eight ostomies before 1912, there were three deaths, a mortality of 7.8 per cent. In 121 ectomies performed since 1912, there were two deaths, a mortality of 1.6 per cent. In forty-two ostomies since 1912 there were four deaths, or about 9 per cent. mortality. Before 1912, gangrenous and suppurating gallbladders were usually removed; now they are usually drained under local anesthesia. As having even a greater influence on the mortality is the stage in which the operation is done. In 114 cases of ectomy in the first stage of cholecystitis, irrespective of date or technic, the mortality was 0.88 per cent. In 101 operations in the second stage, sixty-seven being ostomies, there were four deaths, a mortality of 3.9 per cent.; while after fifty-four operations in the third stage of cholecystitis, there were eighteen deaths in which the operation or biliary condition was a factor, a mortality of about 32 per cent. Thirty of these patients had acute gangrenous or suppurative cholecystitis, seven an acute pancreatitis with fat necrosis. Twelve had primary or secondary operations for duct obstruction, fistula or duct or intestinal anastomosis. In only one patient was carcinoma observed, and this involved the ducts. In two cases, intestinal obstruction from gallstone existed. In another case an intestinal perforation had been produced. One death was from diabetic coma and one from pulmonary embolism. It is evident that the stage of the disease is more impor-

tant than the type of operation in determining the mortality.

SUMMARY

We consider inflammations of the gallbladder as bacterial infections of childhood or early adult life, as progressing for years, during which time secondary metastatic, toxic or reflex symptoms only are observed; as later having a second stage in which there are attacks of colic due usually to the presence of gallstone; as having usually after twenty or thirty years a third stage of serious complications, such as duct obstruction, pancreatitis, perforation, abscess or gangrene. We consider surgery as working, for the most part, far behind the pathology of the disease, and believe there is wide need for earlier intervention, so that the patient who starts at the age 12 or 15 with cholecystitis and dyspepsia may not at 35 have gallstone colic, and may not at 65 succumb to cholecystic gangrene or pancreatitis. We consider external biliary drainage as a rule undesirable, except in the late or complicated cases, an early cholecystectomy the operation of choice. Unfortunately, technical dangers make uniform success after cholecystectomy uncertain in the hands of the average surgeon. Despite this, the mortality of cholecystectomy in the first stages of cholecystitis is much less than cholecystostomy in the last stages of this disease, so that the results of a surgeon may depend more on *when* he operates than *how* he operates. The morbidity depends on *how* he operates.

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ABSTRACT OF DISCUSSION

DR. ROBERT C. CONFEY, Portland, Ore.: In dealing with third stage, acute stage cases, in which there is an infected gallbladder, I wish to emphasize conservatism. It is often the case that these gallbladders may be enucleated by a simple incision of the peritoneum and peeled out practically without bleeding at all. There are some cases, however, in which this is not advisable. I refer to acute and violent septic cases. The point I wish to emphasize particularly is that this area must be quarantined properly. Expose the field thoroughly and place a large pack of gauze wicks laid straight down around the gallbladder, and around these wicks several layers of rubber tissue. Open the gallbladder, sponge out the fluid and insert a piece of gauze into the gallbladder. That is all that is necessary. It will take approximately five minutes. Many are gangrenous without widespread infection and it is quite safe, in these, to enucleate the gallbladder, which I say is easily done without hemorrhage at all. The gauze wicks of the pack are removed after six days and the rubber tissue in two weeks. In some instances it will be necessary to remove the gallbladder at a later operation.

DR. W. WAYNE BABCOCK, Philadelphia: In the young no drain may be required after ectomy. There is less danger of skin infection from removal of the gangrenous or suppurating gallbladder than from removal of a badly infected appendix, and therefore as far as wound infection goes, less need for wound drainage. When the patient is in good general condition, we may, therefore, in selected cases remove the badly infected gallbladder, close without drainage, obtain primary union, and a remarkably quick recovery. One patient went home a week after the removal of a gangrenous gallbladder. But as a rule, and especially if the patient has reached middle age and the gallbladder is gangrenous, ectomy is dangerous. In these cases we use local anesthesia, make a simple transverse slit, put in a drain, and sometimes even operate without removing the patient from the bed. The sloughs of the gangrenous gallbladder will be expelled with relative safety, while the removal of the gallbladder, by opening many lymph spaces, may be followed by rapid sepsis and overwhelming toxemia.