

## SURGICAL PROBLEMS ASSOCIATED WITH CHOLELITHIASIS\*

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The surgical treatment of cholelithiasis naturally includes the management of cholecystitis. The etiologic factors in cholecystic disease can only be mentioned here. A vast amount of experimental work has been done on the etiology of gall stones, but this has not greatly altered the conception that there are three main factors, infection, stasis and cholesterol metabolism, which function in their causation.

In discussing this problem, Twiss and Green<sup>1</sup> have contributed a very excellent article on the dietary and medical management of the disease. They made the pertinent statement that a tremendous amount of work has been done on different phases of cholesterol metabolism but so far there is no final agreement as to the origin, function or fate of this material. They feel that if medical therapy is ever to supplant surgery in this field of medicine, it will be necessary to recognize and to correct disturbances in the biliary tract before the calculi are formed.

One question which almost always arises in the surgeon's mind concerns the rate of formation of these stones, and it is possible that cholecystography may lead to more complete information about this phase of the problem. I was very much interested last year while visiting a clinic of Dr. John Finney, Sr., to hear him cite the case of an elderly woman who had acute suppurative cholecystitis with stones. Her condition was such that he did not feel justified in performing cholecystectomy, but did do a cholecystostomy and removed a large number of stones which had packed the gallbladder. This patient made a good recovery, but one year later returned with recurrent acute cholecystitis, and to his surprise he found that the gallbladder again was completely filled with stones.

I have felt for some time that since the advent of cholecystography many of the points which the radiologists formerly taught about gall stones have been overlooked. Often shadows are seen in the gallbladder area which might be mistaken for gall stones unless a differential diagnosis is made. In a comparison of 100 consecutive gall stones with 100 consecutive kidney stones, it has been found that approximately 85 per cent of the gall stones show faint shadows while 85 per cent of the kidney stones show dense shadows. It is also more or less generally forgotten that if the patient is turned on the abdomen when the roentgenogram is made, there is a marked difference in the size of the stones. They appear much smaller when the patient is in the posterior-anterior position than when he is in the anterior-posterior position. The reverse is true of renal calculi. Less emphasis has also

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been placed upon the typical defect, an elliptical, sharply defined concavity, which the gallbladder can produce in the duodenal cap. It is to be pointed out, however, that unless the defect persists in all positions, it may not be of importance, as the duodenum may empty completely if the picture is taken with the patient on the abdomen. With barium in the stomach it is perfectly easy to demonstrate this defect. It is surprising how often gall stones are noted also by the radiologist in the taking of routine roentgenograms of the spine and the kidneys, ureters and bladder. Although the radiologist objects to making barium injections into a colon without a complete roentgenologic study of the gastro-intestinal tract, including a cholecystogram, it is also striking that gall stones are found frequently in cases in which barium studies on the colon are being made.

There are a few special points on cholecystography which might be mentioned. It has been of particular aid in the diagnosis of cases of cholelithiasis without colic, showing negative shadows. Kirklin,<sup>2</sup> with his enormous experience, has stated that ordinarily gall stones are not recognized as such by cholecystography in more than 50 per cent of the cases, but in most remaining cases the absence of any shadow of dye will indicate that the gallbladder is not functioning normally, and in his experience 98 per cent of cases of gall stones have given positive cholecystographic data, indicative of disease or malfunction of the gallbladder. Another diagnostic method which may be of help in some of these cases in which the cholecystogram and physical findings are not typical is the searching for cholesterol crystals by means of the Lyon test. Lahey<sup>3</sup> has recently emphasized the importance of this procedure.

### DIFFERENTIAL DIAGNOSIS

In considering the differential diagnosis of cholecystitis with stones, one is familiar with the fact that the lesion has been confused with practically every intra-abdominal lesion, especially those of the upper abdomen, as well as the lesions of the right chest, which can not be discussed here. There is one phase of the problem, however, which merits special emphasis. Within recent years, cardiologists have been continually cautioning us about the similarity which may occur between the atypical coronary occlusions and gallbladder disease. It is true, of course, that in the case of the patient who has a typical gall stone colic with sudden severe, agonizing pain in the right upper quadrant, which is referred through to the right shoulder blade, and is followed by residual tenderness and jaundice, there is little difficulty in making a positive diagnosis of cholecystitis with stones. Likewise, the diagnosis of coronary occlusion is just as evident in the patient who has a sudden retrosternal pain, accompanied by peripheral vascular shock, distant

heart sounds and pain in the left shoulder which is followed by a friction rub over the precordium. It is, however, in the group of patients who have the atypical symptoms of coronary occlusion and gallbladder disease that the confusion arises, and particularly if the patient had epigastric pain as the result of the coronary accident. In some of these cases there may even be splinting of the abdominal wall. These patients may also have symptoms of indigestion similar to those seen in chronic cholecystitis. Cholecystograms and electrocardiograms, of course, are of great value in this group of patients, and it may be necessary to have repeated electrocardiographic studies. Unfortunately, however, there is a group of patients with characteristic findings in which neither the cholecystogram nor the electrocardiogram may be of much help. Then, too, these patients are frequently seen in the home when neither of these laboratory aids is available.

There are certain clinical points that might well be borne in mind during the acute attack. First of all, gallbladder disease is much more frequent in women and coronary occlusion is much more frequent in men more than 50 years of age. In the cases of coronary disease, one of the important clinical points is the marked peripheral vascular shock. The patient becomes very pale and has a weak, thready pulse. Another differentiating point is that the patient with acute attacks of gallbladder colic usually is relieved by one hypodermic injection of morphine, while the patient with coronary occlusion practically always requires from one-half grain ( $1/2$  gr.) to two-thirds grain ( $2/3$  gr.) of morphine for relief. It is perfectly logical to assume that if a patient who has had a coronary accident is subjected to laparotomy, the added burden of the surgical procedure will cause a postoperative catastrophe. Hence the question has arisen in some cases of so-called sudden deaths after gallbladder operations, as to whether coronary disease may have been the cause of death, especially in cases in which very little evidence of gallbladder disease was found.

#### OPERATIVE PROCEDURE

In the preoperative preparation of patients, before cholecystectomy, we have learned from bitter experience that many of them should be as carefully prepared for the operation as the patient with hyperthyroidism or the patient with prostatic hypertrophy. They should not only have complete blood studies for bleeding and clotting time but should be given large quantities of fluids along with calcium intravenously, as advised by Walters,<sup>4</sup> and glucose solution and transfusions. In addition to these measures, we are doing more and more liver function tests on these patients. Graham<sup>5</sup> has combined his phenoltetraiodophthalein which is given for the cholecystogram as a test. Here, we have used the glucose tolerance test, in addition to the van den

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Bergh and icterus index test, and we feel that these findings add a great deal to the information about the operative risk.

The question has long since been decided that cholecystectomy is, of course, the procedure of choice for cholecystitis with stones. However, that does not mean that the fine operative procedure of cholecystostomy should be completely abandoned, and certainly there are cases, especially in severely ill, elderly patients and in deeply jaundiced patients, in which it is a life-saving measure.

For many years, one of my associates, Dr. W. E. Lower, has done a so-called modified cholecystectomy which is a valuable procedure in selected cases. One is always struck by the very marked edema which occurs in all the layers of the gallbladder in acute cholecystitis with obstruction of the cystic duct, and Dr. Lower, after evacuating the contents of the gallbladder and removing the stones, shells out the mucosa and leaves the serosa intact. Oftentimes, the line of cleavage is very sharply delineated, and the procedure can be very quickly accomplished by blunt dissection. These patients have progressed extremely well after operation. It has the advantage that the mucosa is entirely removed and can not regenerate, and, in addition, the liver bed has not been exposed and contamination of the general peritoneal cavity is reduced to a minimum.

The general technical problems in cholecystectomy are well known and recognizable. There are a few points, however, which are always of interest. One of these is the position of the patient on the table. In my own experience, I have found that it is much easier to expose the gallbladder with the patient flat on the table, rather than to have a kidney support or sand bag under the back. Certainly the recti muscles are much more relaxed, and on the whole, the exposure is easier. The importance of the high incision has been emphasized by many men and is of great help. Whether a gallbladder is removed from above downward or from below upward is, I feel, a matter of the operator's choice. However, I feel quite strongly that too much emphasis has been placed upon the possible pouching of a cystic duct, after it has been ligated, and I have no hesitancy in leaving all of the cystic duct. I feel that there is very little danger of any difficulty in the duct itself, while the danger of injuring the common duct is much greater if it is tied close to the duct. Preferably, the artery should be ligated separately if possible.

After the gallbladder has been removed, and the cystic artery and cystic duct have been tied, the important consideration arises as to whether or not the common duct is to be explored. This old question has recently been emphasized by Lahey,<sup>3</sup> who states that he is exploring the common duct in 46 per cent of his cases. This is, of course, a much higher

percentage than is generally carried out by most surgeons. In this regard, I have been most conservative in exploring the common ducts and fortunately have had little postoperative difficulty. I have, however, followed Moynihan's dictum about carefully palpating the common duct between the index finger and the thumb. In many cases this can be done readily and in the absence of definite indications for opening of the duct, I have used this as a guide. If a patient has (1) a palpable mass, (2) jaundice, (3) a dilatation of the duct or (4) repeated attacks of cholelithiasis with jaundice, the duct should, of course, be opened and carefully explored, and a small catheter, which is directed toward the liver and carefully sutured afterwards, should be inserted.

Without entering into any lengthy discussion on the controversy as to whether or not the wound should be drained, I think there are two important facts that should be mentioned. First of all, I have known some eminent surgeons who have closed the abdomen without drainage following cholecystectomy, and almost without exception these men have discontinued the practice. While the common statement is made that bile peritonitis develops when drainage is not used after cholecystectomy, emphasis has not been placed on the fact that this is a most difficult postoperative complication to recognize. The patient apparently will be progressing satisfactorily after his operation and then suddenly may become severely ill and by the time the complication is recognized it is too late to save the patient's life. Apparently the severity of the patient's illness is dependent upon the factors of the quantity of bile in the abdominal cavity and the time element.

#### RELATIONSHIP TO CARCINOMA

In a discussion of cholelithiasis, the relationship of stones to carcinoma of the gallbladder should be mentioned. In our own series of cases, 79 per cent of the cases of carcinoma of the gallbladder have been associated with gall stones. Graham has pointed out that primary carcinoma of the gallbladder is much more frequent than is generally supposed, and that it constitutes between 5 and 6 per cent of all cases of carcinoma. The history of these patients is that a fairly high proportion of them report attacks of typical gall stone colic, and in the case cited here, the patient had a typical attack of gall stone colic a few weeks prior to the operation, at which time the cancer was discovered. The prognosis in these cases of malignant disease of the gallbladder is, of course, extremely poor, and in our own experience these patients have lived for only a few months after the operation.

In Graham's very excellent resumé of the subject, he points out some very pertinent statistics. In the reported series, from 69 per cent (Musser) to 100 per cent (Janowski) gall stones have been found

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accompanying carcinoma of the gallbladder. From the evidence cited by other writers, it would seem that the carcinoma has developed after the formation of the stones. Graham further states that  $8\frac{1}{2}$  per cent of all cases of stones in the gallbladder have been associated with carcinomas, and he points out that it brings up one phase of cancer prevention which must be emphasized, and the surprising statement that one person in twenty-five with gall stones will have a carcinoma of the gallbladder.

This brings up the question as to the significance of the so-called silent gall stones and how these patients should be advised by the surgeon. It is always interesting that patients who have so-called silent gall stones have been subjected to roentgen examination for vague gastro-intestinal symptoms of some kind, and the whole question about the operability of these patients depends entirely upon the degree of discomfort which they are suffering. A certain number of these patients do obtain relief by medical measures after the correction of other gastro-intestinal complaints.

With the enthusiasm about foci of infection, the gallbladder has naturally come in for a great deal of consideration. I think it is only fair to state that the results have not been in any way comparable to the results obtained from removing foci of infection in the teeth, tonsils and sinuses, and that, after all, the chief benefit from removing the gallbladder has been for the relief of epigastric pain and associated gastro-intestinal symptoms.

Another question that a surgeon very frequently has to answer is concerning the prevention of attacks of gall stone colic. I have seen a good many patients who have had typical gall stone colic and have advised immediate operation, but they, for one reason or another, wanted to delay the operation. This whole subject is covered most admirably by Twiss and Green.<sup>1</sup>

It is well known that many patients have an attack of pain after the ingestion of a large meal, particularly at night. Dr. John Phillips used to advise these patients to take frequent feedings, following a modified Sippy routine. Although theoretically the ingestion of large quantities of milk and cream would be contraindicated, these patients obtained relief. These dietary measures would probably be of little value in patients who have gall stones, inasmuch as it has been shown that the cholesterol content of the blood is very difficult to reduce by dietary measures. The foods which are rich in cholesterol, of course, are eggs, brain, butter, goose, duck and liver. I have had some patients who insist that they get relief from some of the proprietary bile salts tablets. These may be objected to on the ground that so many of them contain



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mild laxatives such as phenolphthalein and cascara, and patients object to the cathartic action.

When one analyzes the accepted contributing factors in cholelithiasis including (1) biliary stasis, (2) infection, (3) disturbances in biliary excretion, (4) cholesterol metabolism, (5) obesity, (6) pregnancy, one is struck by the fact that the problem is complex and that the solution must be worked out separately in each individual case.

### CONCLUSIONS

The variety and complexity of the etiologic factors, together with the fragmentary knowledge concerning them, makes the medical treatment of cholecystic disease difficult, if not impossible. Hence, at present, the emphasis must be placed on the surgical management of the disease, which can only be improved by more careful attention to the details, such as individualization of each case, extreme skill in the differential diagnosis, which includes accurate interpretation of clinical, laboratory and roentgenologic findings, careful preoperative management and scrupulous care in the surgical technique.

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