THE POSTCHOLECYSTECTOMY SYNDROME*

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THE PERSISTENCE of symptoms referable to the biliary tract following removal of the gallbladder has been variously designated by such terms as biliary dyssynergia, biliary dyskinesia and postcholecystectomy syndrome. According to Whipple,[23] Judd,[13] Macdonald,[15] Weir and Snell[22] and Bettman and Lichtenstein,[2] cholecystectomy, performed for cholelithiasis, is followed by relief of symptoms in all but 10 to 15 per cent of cases. On the other hand, extirpation for the so-called noncalculus gallbladder gave unsatisfactory results in over 20 per cent of Whipple's cases.

Many reasons have been advanced for this apparent high percentage of unsatisfactory results after cholecystectomy. Some are related to obvious errors of diagnosis, such as unrecognized malignancy, residual cholangitis, hepatitis and pancreatitis; others implicate a number of conditions which are amenable to surgery.

Dilatation of the common bile duct is one such cause for the syndrome. Weir and Snell[22] have suggested that there are instances in which an abnormality of the parasympathetic or the sympathetic innervation can produce spasm or increase in tone of the sphincter of Oddi which could conceivably produce sufficient back pressure and distention of the common bile duct to cause pain. Benson[1] and others agree that in the majority of cases cholecystectomy is followed by a considerable increase in the diameter of the choledochus. The most common cause for this distention is the loss of the water absorbing mechanism that exists in the gallbladder. This results in a larger volume which the bile ducts must accommodate. These observations agree with the experiments of Schrager and Ivy,[20] Butsch *et al.*[4, 5] and Davis, Hart and Crain.[6]

The third frequent cause of the postcholecystectomy syndrome according to Beye,[3] Gray and Sharpe,[11] Peterson[17] and others,[12, 17] is the reformation of the gallbladder from a persistent large portion of the cystic duct, the so-called "reformed gallbladder," or the "cystic duct stump syndrome." The syndrome may or may not be associated with inflammation of the wall of the cystic duct. Garlock and Hurwitt[10] found chronic inflammation in every case in their series. This dilatation of the cystic duct stump is clearly the result of obstruction in most cases. In Peterson's latest series,[18] 23 of the 42 cases were accompanied by stones. Edema, traction distortion, or enlarged lymph node masses were given as other causes for the obstruction. Calculi were found in the stump alone in six cases, and in both the stump and the duct in two cases among the patients studied by Garlock and Hurwitt.[10]

Another common cause of postcholecystectomy distress is anatomic distortion of the common and cystic duct by aberrant vessels, or by adhesions of the duodenum to the ventral surface of the liver, and cicatricial shortening.

Womack and Crider[24] have stated that the persistence of symptoms of biliary tract

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disease can be caused by the inclusion of nerve fiber bundles in the scarred walls of the cystic duct. The nerves, chiefly sympathetic in type, become intimately associated with proliferating fibrous tissue and form nodules closely resembling the neuromas seen in amputation stumps. Such neuromas about the cystic duct may show evidence of acute or chronic inflammation. The scar tissue around the nerve trunks may stretch or strangulate the fibers, and thereby produce symptoms. The cases reported here lend support to the importance of neuroma formation in the "postcholecystectomy syndrome."

Detailed anatomical studies by Dogiel[8] in 1895, de Takats[7] in 1927, Raigorodsky[19] in 1928, Kuntz[14] in 1929 and many others,[8, 9] have adequately demonstrated the various anatomical relationships which the sympathetic, the vagus, and the phrenic nerves often bear to the bile ducts. Womack and Crider[24] in an excellent review have recently summarized the neuroanatomy of this region. The nerve supply to the gallbladder and to its ductal system is composed of sympathetic and parasympathetic nerve fibers derived from the celiac plexus, and forming the anterior and posterior hepatic plexuses.[19] The anterior hepatic portion always follows the course of the hepatic artery. The posterior hepatic plexus passes along the portal vein and common bile duct. The medial nerve of the gallbladder is derived from the anterior plexus, crosses the anterior portion of the common hepatic ducts and anastomoses with the posterior hepatic plexus in the triangle of the cystic and hepatic ducts. It then passes to the medial superior surface of the gallbladder. The lateral nerve of the gallbladder, from the posterior plexus, passes along the lateral surface of the common and cystic bile ducts to the lateral inferior surface of the gallbladder. The common duct is surrounded by a delicate net of nerve fibers throughout most of its extent. One of the points of maximum concentration of nerve fibers along the biliary ducts is in the triangle formed by the cystic and hepatic ducts. Moore[16] has demonstrated experimentally that the pain fibers supplying the biliary tract accompany the hepatic and cystic arteries to the gallbladder. It has been established that stimulation of the sympathetic fibers will primarily produce epigastric pain, whereas vagostimulation will chiefly bring about dyspepsia and vomiting.[25]

Since this syndrome has been attributed to such a number of different causes, we believe that illustrative cases should be reported in an attempt to clarify the etiology of this condition. For this reason we are reporting two additional cases in which traumatic neuromas were the only etiological factors.

CASE REPORTS

Case 1.—Mrs. T. P., a 45-year-old housewife, was first admitted to the hospital on April 6, 1951, with the chief complaint of severe epigastric pain radiating to the right side of her back of several weeks' duration. The patient had had cholecystectomy performed several years earlier for "gallstones." Since the time of her operation the patient has had many attacks similar to those which she experienced prior to surgery.

Past History: The patient had a cholecystectomy, hysterectomy and appendectomy several years ago at a different hospital. The pathological report could not be obtained.

Examination revealed an obese, white woman complaining of considerable tenderness in the right upper quadrant of the abdomen. The blood pressure was 170/100. No masses were felt in the abdomen.

Laboratory examination showed hemoglobin concentration of 82 per cent, with 57 per cent polymorphonuclear leucocytes and 41 per cent lymphocytes. The white blood count was 6,810. The urine was negative. Fasting blood sugar was 94 mg. per cent; urea nitrogen, 13.4 mg. per cent and cholesterol was 200 mg. per cent. The Hinton test was negative. Prothrombin activity was 95 per cent of normal. Alkaline phosphatase was 3.0 K. A. units and the icteric index was 8.5 units.

At operation many adhesions were found in the right upper quadrant. The common bile duct was

not dilated, and there was a small nodule, about 1.3 cm. in diameter, attached to the tip of a very short cystic duct stump. The stump was dissected free of all scar tissue at its junction with the common duct. The cystic duct remnant was ligated at its junction with the common bile duct and was excised. The common duct was opened; no stones were found. The duodenum was entered readily by the probe. A long T tube was inserted.

Cholangiogram taken 10 days postoperatively revealed a normal common duct, not dilated and without stones. The patient's postoperative course was thereafter uneventful.

patient had first developed postprandial belching, nausea, anorexia and acute episodes of right upper quadrant pain. She was told at that time that she had gallbladder disease. Over the period of years she averaged approximately 8 to 10 attacks per year. On October 31, 1946, the patient had her gallbladder removed. The gross diagnosis was chronic cholecystitis and cholesterolosis of the gallbladder.

Since removal of her gallbladder, the attacks continued with increased severity. The most recent attack lasted approximately 7 days and was characterized again by nausea, anorexia, vomiting and

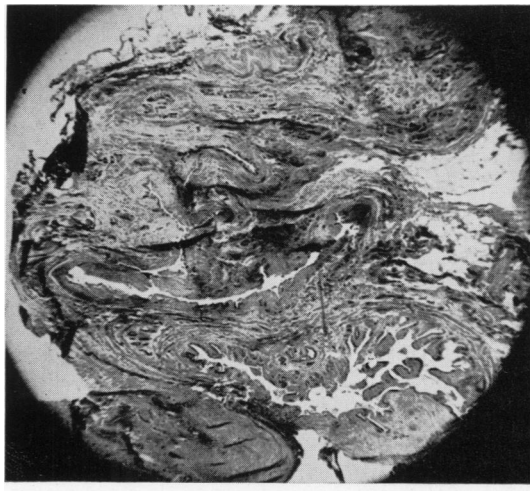

FIG. 1

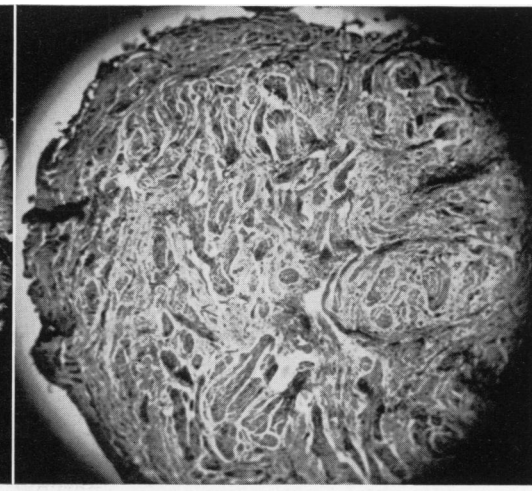

FIG. 2

FIG. 1.—Photomicrograph showing distortion of the usual nerve bundle arrangement.
FIG. 2.—Photomicrograph showing disorganization and atypical nerve proliferation.

Pathologic examination revealed a nodule of resected tissue measuring 1.3 x 0.9 x 0.8 cm. One end was covered with thin, yellow-gray membrane and the remainder was made up of dark tissue. The microscopic preparation revealed portions of fibrofatty tissue containing zones of dense, collagenous fibrous tissue of scar-tissue type, some of which was related to elements of bile duct type. Many sections showed very prominent nerve bundles which, in the area of scarring, showed massive distortion of the usual bundle arrangement with zones that demonstrated nerve proliferation (Fig. 1). There were a few scattered small round cells that had no definite or constant relationship to the surrounding structures. The picture was consistent with a postoperative scar in the region of the cystic duct with traumatic neuroma formation.

Case 2.—A 49-year-old white woman, Mrs. C. D. F., entered the hospital for the fourth time. Approximately 25 years prior to admission the abdominal pain which radiated along the right flank to the back.

Physical examination showed no abnormality in the abdomen, except for a very slight amount of residual spasm in the right upper quadrant.

Laboratory examination revealed a urine urobilinogen of .05 mg. per cent; urine was negative for bile; hemoglobin concentration was 12.3 Gms.; white blood count was 7,000, with 70 per cent polymorphonuclear leucocytes and 30 per cent lymphocytes; the icteric index was 4 units; thymol turbidity was 2 units; urea nitrogen was 9 mg. per cent; glucose 90 mg. per cent and prothrombin activity was 100 per cent of normal. The Hinton test was negative, and an electrocardiogram was taken which proved normal.

At operation on May 2, 1951, the stump of the cystic duct was found adherent to the stump of the cystic artery and involved in a dense, nodular scar tissue. This was separated and excised. The stump

was dissected free of all scar tissue and fibers at its junction with the common bile duct and again ligated flush with the duct. The common duct was opened and explored. No stones were found. Both hepatic and common ducts were irrigated with saline instilled through a catheter. The catheter entered the duodenum readily. A T tube was sutured in place and brought out through the stab wound. The patient made an excellent postoperative recovery. A cholangiogram postoperatively showed a normal common duct without calculi.

Gross description of the pathologic specimen revealed a small, irregularly-shaped piece of pinkish-gray tissue measuring 1 cm. in greatest diameter. Microscopic examination revealed small nodular portions of dense collagenous fibrous tissue of scar-tissue type which supported small nerve fibers and many epithelial cells arranged in glandular or duct-like fashion (Fig. 2). At many points there was disorganization and apparent nerve proliferation of atypical fashion. Histologically this constituted a traumatic neuroma.

The patient's postoperative course was entirely benign.

Both patients are asymptomatic to date.

COMMENT

In view of the large number of nerve fibers and bundles demonstrated anatomically about the biliary tract, it is not surprising that they should have important clinical significance. Stimulation of these nerves experimentally has demonstrated that afferent impulses from them can produce symptoms identical with those of biliary tract disease. Such stimuli may arise naturally in neuromas complicating the healing after cholecystectomy. In order to prevent the formation of traumatic neuroma, it is suggested that the nerve trunks be carefully separated mesial to the common bile duct at the junction with the cystic duct. Not only is it essential that all nerve fibers be stripped from the cystic duct at its junction with the hepatic duct before it is ligated, but the nerve fibers must also be stripped from the cystic artery, since it has been shown that the pain fibers of the sympathetics follow the course of the artery.[21, 24]

It is our feeling that if this is done in every case, the incidence of the postcholecystectomy syndrome will decrease.

SUMMARY

1. The various etiological factors causing the postcholecystectomy syndrome are discussed.

2. Two cases in which traumatic neuromas were the only etiological factors are presented.

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