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Periampullary Diverticula Causing Pancreaticobiliary Disease

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Our purpose was to determine if the presence of duodenal diverticula predisposes to the development of pancreaticobiliary disease. Between May 1999 and February 2001, 381 patients were examined by endoscopic retrograde cholangiopancreaticography. Of these patients, 51 had periampullary diverticula. In 27 patients the papilla was located inside the diverticulum (Group I), in 19 patients it was located at the edge of the diverticulum (Group II), and 5 patients it was located at a distance closer than 3 cm to the diverticulum (Group III). Seventeen patients in group I and 11 patients in group II had had a previous cholecystectomy. The overall incidence of biliary system stone disease was 22.2% in group I, 36.8% in group II, and 100% in group III. All patients were treated with endoscopic sphincterotomy and three (two in group I and one in group II) developed biliary system disease (cholangitis or pancreatitis). We think that sphincterotomy should be applied regardless of the presence of stone if the papilla is located inside or at the edge of the diverticulum. If the papilla is located 3 cm or more far for diverticulum, it should be considered within the frame of general sphincterotomy indications in the absence of stone disease.

KEY WORDS: acute cholangitis; acute pancreatitis; duodenal diverticula; periampullary diverticula.

Etiological causes in patients with acute cholangitis and acute pancreatitis who are often admitted to surgical clinics are generally focused on a few frequent factors. But less frequently observed etiological causes may constitute problems for patients and doctors.

Duodenal diverticula (DD) are classified as primary (true) or secondary (false) diverticula. Secondary diverticula are generally related to chronic duodenal ulcer. Primary diverticula are mostly solitary and observed in the concavity of the second part of the duodenum, in the ampulla vateri region. They are largely asymptomatic. Surgical treatment for DD is indicated only in the presence of complications, because surgical treatments may be difficult (1, 2).

Incidence rates of DD depend on the diagnosis method and on the average age at the time of diagnosis. These rates vary in barium graphs, endoscopic retrograde cholangiopancreaticography (ERCP) series, and autopsy series, at 1–5, 23, and 14.5–22% respectively (1–3).

Endoscopic cannulation of DD and sphincterotomy may result in failure, especially if they are located at the depths of the duodenum (4–7). Complications such as jaundice, cholangitis, acute, and chronic pancreatitis may be observed in DD (1).

Pancreaticobiliary disease caused by the relationship of papilla to DD or by its location within the DD is a situation requiring attention due to treatment problems. In this study a detailed classification of DD is used as a guide for management of pancreaticobiliary disease associated with DD.

PATIENTS AND METHODS

Patients admitted to the Endoscopy Unit of the Department of General Surgery, Atatürk University School of Medicine,

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between May 1999 and February 2001 and who had ERCP because of previous or current acute pancreaticobiliary disease were included in the study. These patients were examined with respect to localization of papilla–diverticula and to the relations of the localization to pancreaticobiliary disease.

Patients were classified according to the location of papilla and diverticula into three groups.

Group I: The papilla is located inside the diverticulum.
Group II: The papilla is located at the edge of the diverticulum.
Group III: The papilla is located at a distance closer than 3 cm to the diverticulum. Patients with papilla is far away the diverticulum were excluded.

The patients were followed up for at least 18 months (between 18 and 24 months).

Statistical Evaluations. The difference between the ratios of the groups was evaluated using the Z test.

RESULTS

Of 381 patients who had ERCP, 51 had periampullary diverticula (13.4%). Of the patients with DD, 27 (52.9%) were in Group I, 19 (37.3%) were in Group II, and 5 (9.8%) were in Group III.

Group I (27 Patients). Seventeen patients had had a previous cholecystectomy (62.9%), and of these, two had a common bile duct (CBD) stone (11.8%). Of 10 patients (37.0%) who had not had a previous cholecystectomy, 2 had a CBD stone (20.0%) and 2 had cholelithiasis (20.0%). The overall number of patients with biliary tract stone disease in this group was six (22.7%).

Group II (19 Patients). Eleven patients had had a previous cholecystectomy (57.8%), and of these, three had a CBD stone (27.3%). Eight patients (42.1%) had not had a previous cholecystectomy, and of these, one patient (12.5%) had a CBD stone and three patients had cholelithiasis (37.5%). The overall number of patients with biliary tract stone disease in this group was six (36.8%).

Group III (5 Patients). One of the five patients in group III had had a previous cholecystectomy (20.0%) and had a CBD stone. Four patients (80.0%) had cholelithiasis, and one (25.0%) both a CBD stone and cholelithiasis. All patients in this group had biliary tract stone disease.

All Groups. There were no statistically significant differences between DD and cholecystectomy among the groups (in all groups $P > 0.05$). Sphincterotomy was performed in all patients in all three groups. After ERCP three patients (two in group I and one in group II) developed biliary system disease (cholangitis or pancreatitis). Two of them were treated with choledochoduodenostomy, and the other with endoscopic sphincterotomy. But at follow-up there were no CBD stones. The relationship of previous cholecystectomy and biliary system stone disease is shown in Tables 1 and 2.

DISCUSSION

Complications of DD may be related to the mechanical pressure of diverticula or to inflammation. However, the relation between DD and biliary tract diseases has not been clearly defined yet (2).

Several authors have shown in various clinical studies that there is a relation between periampullary diverticula and biliary tract stone disease (5, 8–10). Kim *et al.* (8) found the incidence of biliary tract stone disease to be 44% in patients with periampullary diverticula. In our series, the incidence of biliary tract stone disease was 22.2% in group I, 36.8% in group II, and 100% in group III. The overall incidence was 35.3%. These rates are compatible with the data in the literature.

Several theories other than a high stone incidence have been proposed to explain pancreaticobiliary disease in periampullary diverticula. It has been proposed that there is dysfunction in the sphincter of Oddi, which in turn causes reflux of pancreatic fluid and intestinal content (11, 12). In addition, biliary and pancreatic complications may occur as a complication of diverticula stasis (13). Another theory argues that diverticula cause spasm of the sphincter and increase biliary tract pressure (5). This can also be considered as a factor in the mechanical pressure of DD or in the pathogenesis of the created inflammation.

TABLE 1. DISTRIBUTION OF PREVIOUS CHOLECYSTECTOMY AND BILIARY SYSTEM STONE DISEASE

Group	n	(*Previous operation*) *Cholecystectomy*	n	*GS**	*CBD* stone*	*Biliary system stone disease*	
I	27	With	17	—	2	2 (11.8%)	6 (22.2%)
		Without	10	2	2	4 (40.0%)	
II	19	With	11	—	3	3 (27.3%)	7 (36.8%)
		Without	8	3	1	4 (50.0%)	
III	5	With	1	—	1	1 (100%)	5 (100%)
		Without	4	4	1 (with GS)	4 (100%)	

*GS, gallbladder stone; CBD, common bile duct.

TABLE 2. DISTRIBUTION OF BILIARY SYSTEM DISEASE ACCORDING TO PREVIOUS CHOLECYSTECTOMY

(Previous operation) Cholecystectomy	n	*GS**	*CBD*stone*	*Biliary system stone disease*
With	29	—	6	6 (20.7%)
Without	22	9	4	13 (59.1%)
Total	51	9	10	19 (37.3%)

*GS, gallbladder stone; CBD, common bile duct.

In our series, it was found that group I patients had a lower occurrence of biliary tract stone diseases than group II ($P < 0.05$) or group III ($P < 0.01$) patients and that there was no significant difference between group II and group III ($P > 0.05$). Despite the fact that our total stone disease incidences were similar to the levels generally published in the literature, it is not possible to make any comment since no information was available as to the relation between the stone and the location of the papilla, within or near the diverticula. Although it seemed likely at first that the stone rate would be higher, it was found to be significantly lower when the papilla was within the diverticula.

One of the crucial issues is the method to follow in the presence of DD and in the absence of biliary tract stone disease. Surgical removal of DD is an undesirable method for technical reasons and due to high morbidity or mortality rates.

Successful treatment outcomes with endoscopic sphincterotomy in patients with periampullary diverticula have been reported in several studies (4, 13, 14). In our study, sphincterotomy was performed in all patients in groups I and II and was found to yield good clinical results in all of them, regardless of the existence of stone disease. Sphincterotomy is considered necessary in patients with diverticula, who have especially narrow channels and discharge difficulties. The reason for applying sphincterotomy to all group III patients was the presence of bile duct stones in all patients in that group. In our opinion, it would be appropriate to apply the known indications of sphincterotomy to patients with no stones in this group. That is, it may not be necessary to apply sphincterotomy to all patients. However, the insufficient number of patients in that group prevents our digitalization of the data obtained. ERCP and sphincterotomy procedures were successfully performed in all our patients without any technical difficulties, and no subsequent complications were observed despite the claims in the literature that ERCP and sphincterotomy procedures may fail due to DD (4–7).

Mackenzie *et al.* (2) reported that the risk of recurrence of biliary tract disease is low following cholecystectomy in patients with DD. In our series of patients referred to our center after cholecystectomy, six (20.7%) had a CBD stone.

In conclusion, we suggest that in cases where the papilla is located inside or at the edge of the duodenal diverticulum, it is appropriate to apply sphincterotomy regardless of the presence of biliary stone, while in cases where the papilla is located at a distance closer than 3 cm, sphincterotomy may be applied at the presence of biliary stone.

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