CHANGES IN BILE MORPHOLOGY OF THE DISTAL COMMON BILE DUCT ASSOCIATED WITH AGING

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Summary

A gross and microscopic study has been made of the changes associated with aging in the distal common bile duct of normal humans. Grossly a progressive narrowing develops with aging at the level of the preampullary portion of the common bile duct. On the contrary, the pancreatic portion of the common bile duct has a tendency to dilatation with aging. Histologically the thickening and sclerosis of the wall in the preampullary portion represent the changes increasing in degree with aging, consisting of: 1) submucosal glandular proliferation and fibrosis, and 2) intermuscular glandular proliferation and fibrosis. On the other hand, the diffuse sclerosis in the pancreatic portion gradually occurs with aging, consisting of: 1) proliferation and fragmentation of elastic fibers, and 2) increase in collagen fibers. Factors influencing the development of these changes associated with age are discussed. The author presumes that decrease in response to an upward tendency of the intraductal pressure resulting from diffuse sclerosis in the wall of the common bile duct, in addition to a progressive narrowing of the preampullary portion, may be responsible for dilatation of the common bile duct, moreover, bile stasis and infection on the biliary tract. It is suggested therefore that these alterations with aging process in the terminal common bile duct may be a responsible agent in the formation of common duct stones.

Key Words: distal common bile duct, aging, duodenal papillitis, common duct stone.

Introduction

It has been observed that the presence of common duct stones is associated with a high incidence of narrowing in the terminal portion of the common bile duct with dilatation above. It is suggested that stenosis of the sphincter of Oddi or stricture of the terminal biliary tract may be a frequent responsible agent in the formation of gallstones.

Disorders of the lower end of the common bile duct excluding tumor can be divided into those due to inflammation, or function; and they may be subdivided into primary or secondary disorders. Secondary abnormalities probably result from disease of the surrounding structure, as duodenitis, cholangitis, choledocholithiasis, hepatitis, or pancreatitis. Until now, many descriptions concerning, either primary or secondary abnormality of the lower end of the common bile duct, called various terms, eg, sclerosing choledocholithiasis, fibrosis of the sphincter of Oddi, and...
stenosing papillitis, have been published. However, the true incidence, the etiology, the histological changes, and the role in primary disease all remain obscure.

The author will attempt to identify this primary disease process by discussing morphological aspects of the distal common bile duct with aging, using autopsy materials from newborn to old age. In addition, the age-associated changes are compared with histopathologic findings on the distal common bile duct in patients with “silent” choledocholithiasis found only at autopsy.

Materials and Methods

Using a series of 35 fresh autopsy materials which obtained from cadavers without disorders of the liver, biliary tract and pancreas, within five hours after death, at Tokyo University Hospital, the lower end of the common bile duct including the major duodenal papilla was morphologically studied. All 35 cases are intramural union in type according to Elias, possessing the ampulla of Vater (hepatopancreatic duct) representing a mild widening of the conjoined portion of the common bile and pancreatic duct just before it enters the duodenum through the intestinal wall. The age and sex distribution among 35 cases is shown in Fig. 1. The widest circumference in the lumen of the distal common bile duct were respectively measured at three different levels (the ampulla of Vater, preampullary and pancreatic portions) as Fig. 2, and cross sected specimens were obtained from the same level for histological study. The sections were stained with Hematoxylin-Eosin, Azan-Mallory and Elastica-van Gieson.

Result

I. Measurement of the circumference at three different levels on a group of 35 cases.

The widest circumference in the lumen of the ampulla of Vater, preampullary and pancreatic portions of the common bile duct are respectively shown as A, B, and C. In Fig. 3, 4, and 5 the data for A, B, and C are plotted against age; the respective linear regression lines are also represented, together with the computed correlation coefficients.

No significant correlation exists between B and age (Fig. 4), as well as between A and age on a group of 35 cases (Fig. 3). However, B on group of 25 cases over 40 years old showed a significant negative correlation with age. The equation of the regression line was $Y = 8.86 - 0.06X$, with $r = -0.487$ and $p < 0.05$. The widest circumference in the lumen of the pancreatic portion of the common bile duct (C) showed a statistically significant positive correlation with age on a group of thirty-five cases (Fig. 5). The equation of the regression line computed for C against age was: $Y = 5.4 + 0.1X$, with $r = 0.730$ and $p < 0.001$.

From these studies of measurements it may be inferred that the circumference in a lumen, especially at the level of the preampullary portion becomes narrower with aging on a group of 25 cases over forty years old, and the widest circumference in the lumen of the pancreatic portion of the common bile duct has a tendency to dilatation with aging on a group of 35 cases. A highly significant positive correlation