A Histopathologic Study of the Region of the Ampulla of Vater in Congenital Biliary Atresia

Takeshi Miyano, Keijiro Suruga, Koichiro Kimura and Koichi Suda

ABSTRACT: A histopathologic investigation of the duodenal wall and adjacent tissues in the vicinity of the papilla of Vater was performed in 37 autopsied cases of congenital biliary atresia which were treated in the Department of Pediatric Surgery of the Juntendo University Hospital during the past 11 years. A high incidence of the association of a congenitally abnormal junction of the common bile duct and pancreatic duct, that is, a long common channel and a poorly developed sphincter musculature, were found in congenital biliary atresia. This suggests the possibility that reflux of pancreatic juice into the biliary system, followed by nonsuppurative chronic inflammation of bile ducts, may ultimately lead to the obstructive cholangiopathy seen in biliary atresia.

KEY WORDS: biliary atresia, papilla of Vater, long common channel, obstructive cholangiopathy.

INTRODUCTION

The pathogenesis of congenital biliary atresia is uncertain.\textsuperscript{1,2} As demonstrated in our prior histopathologic studies on remnants of the extrahepatic bile ducts of “uncorrectable” biliary atresia, progressive inflammatory changes may be an important factor related to the etiology of this lesion.\textsuperscript{3}

From the embryologic point of view, the ampulla of Vater is situated in the position of the primary anlage of the entire hepatobiliary tract. Nevertheless, few studies have been performed on this part of biliary tract in research on biliary atresia. The purpose of this study is to describe the histopathology of the extrahepatic bile ducts, especially in the area of the ampulla of Vater, in patients with congenital biliary atresia.

MATERIALS AND METHODS

Thirty-seven autopsied cases of congenital biliary atresia, treated in the Department of Pediatric Surgery of the Juntendo University Hospital during past 11 years were studied by histopathologic techniques. Following removal of the pancreas, the second portion of duodenum and adjacent tissues from the cadaver “en bloc,” 30 of the 37 cases were studied by a transverse serial section technique transecting the areas of the common bile duct. Remaining 7 cases were studied by a longitudinal serial section technique through the site of the common bile duct. Four of these cases were also studied by the serial section reconstruction method on glass plates. Thirty-five cases autopsied patients, without hepatobiliary disease, of ages less than 12 months were also examined by the longitudinal serial section technique as a control.

RESULTS

1) Control group (Patients without Hepatobiliary Disease)

The manner in which the ducts opened into the duodenum was mainly divided into three types by many authors in adults.\textsuperscript{4–6}
Furthermore, we divided Type III (common channel formation) into two types as shown in Fig. 1. In control cases, the junction of the bile and the pancreatic duct was found to be situated in the mucosal or submucosal layer of the duodenum (Type, IIIa) in all (100%). The so-called “common channel” of the common bile duct and pancreatic duct was shorter than 2 mm (average length, 1.3 mm) in all cases. Sphincter of Oddi muscle was found to be recognizable and well-developed in all cases. The common bile duct and pancreatic duct penetrate the propria muscularis of the duodenum obliquely at an acute angle and, in parallel, that is, side-by-side. Thus, the angle of the junction of the common bile duct and pancreatic duct was very acute in these patients (Fig. 2 and 3).

2) Patients with Congenital Biliary Atresia

The Length of Common Channel. In 20 of the 30 patients with congenital biliary atresia, the length of the common channel was found to be greater than 4 mm, as measured by the transverse serial section method. It was longer than 6 mm in 6 of 7 cases as measured by the longitudinal serial section method. And in 61% of these cases, the junction of the bile and pancreatic duct was identified to be situated below the propria muscularis of the duodenum (Type, IIIb) (Figs. 4, 5, 6 and 7).