*Case Report*

# CAROLI'S SYNDROME ASSOCIATED WITH POLYCYSTIC KIDNEY DISEASE

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## ABSTRACT

Congenital intrahepatic biliary duct dilatation associated with congenital hepatic fibrosis (CHF), referred to as Caroli's syndrome, is a rare condition. Caroli's syndrome is generally associated with autosomal recessive polycystic kidney disease (ARPKD) or rarely autosomal dominant polycystic kidney disease (ADPKD).

İn this case report, we describe a thirteen and a nine-year-old two brothers with Caroli's syndrome and polycystic kidney disease. There was no parental consanguinity. The elder brother had a history of jaundice. However, the little one had only a history of periodic abdominal pain and on follow up, he had acute pyelonephritis.

**Key Words:** Caroli's Syndrome, poliycystic kidney disease, children, acute pyelonephritis

## INTRODUCTION

Combined cystic disease of the kidney and liver is characterized by congenital dilatation of tubular structures and fibrosis of both organs. Cystic dilatation of intrahepatic biliary ducts and extensive degrees of portal fibrosis are noted in liver histopathology.

Embryological precursors of bile ducts termed as "ductal plate" was first described by Hammer in 1926 (1). More recently Desmet (2) has postulated that the abnormal persistence of ductal plate or defects in its remodelling caused various types of ductal plate malformations and extensive spectrum of congenital intrahepatic bile duct diseases (3).

The current consensus holds that ductal plate and renal tubular differentiation share the same genetic determinants. The available data suggest that single gene defects give rise to different clinicoanatomic entities, such as autosomal recessive polycystic kidney disease (ARPKD), autosomal dominant polycystic kidney disease (ADPKD), congenital hepatic fibrosis (CHF), Caroli's disease and syndrome (3,4).

In this case report, we describe two brothers with Caroli's syndrome and polycystic kidney disease one of whom had acute pyelonephritis on follow up.

## CASE REPORT

A thirteen-year-old boy had first consulted to a physician for gastroenteritis. Hepatomegaly was noted and the patient referred to our hospital for further evaluation. He had a history of jaundice two years ago. There was no parental consanguinity.

On examination, he was 33 kg in weight (3-10%), 137 cm in height (<3%). Blood pressure was 100/50 mmHg. The liver was palpated 7 cm below the costal margin and the spleen was not palpated. Urinalysis, hematological and biochemical test values were within normal levels. Hepatitis A, hepatitis B and hepatitis C markers were negative. Abdominal ultrasonography revealed increased liver size and parenchyma echogenity. On the middle of the right lobe, a 13x19 mm cyst with regular margins was detected (Fig.1). Both kidneys were enlarged and hyperechogenic and renal paranchyme-sinus differentiation could not be exactly made. In the right kidney, two cystic lesions each 5-6 mm in diameter were noted (Fig.2). Abdominal computed tomography (CT) revealed multiple cysts in liver parenchyma. Kidneys were bilaterally enlarged and polycystic, with the largest cyst 2.5 cm in diameter (Fig.3). Other intraabdominal organs were normal. Cranial CT was normal. Endoscopic retrograde cholangio-pancreatorgraphy (ERCP) revealed cystic dilatation of the intrahepatic biliary ducts and normal extrahepatic bile ducts (Fig.4). Fibrosis in portal area and proliferation and arborization of biliary ducts were noted in liver biopsy (Fig.5). Lobular structure of the liver was intact. Duplex Doppler ultrasonography was normal and endoscopic examination showed no gastric or esophageal varices. Caroli's syndrome was diagnosed with these findings.

Abdominal ultrasonographic examination of his parents and three siblings were normal, except his nine-year old brother. In his prior history, he had periodic abdominal pain. Physical examination was normal except hepatomegaly. Hematological and biochemical indices were all normal. Ten to 15 white blood cells were detected in urinalysis. However, uine culture was negative for bacteria.

Abdominal ultrasonography revealed multiple liver cysts. The kidneys were bilaterally enlarged and hyperechogen and the cortex-sinus could not be exactly differentiated.

Abdominal CT revealed cystic dilatation of intrahepatic biliary ducts. Bilateral, multiple renal cysts as well as a renal stone in the lower pole of right kidney were noted. Cranial CT was normal. ERCP revealed multiple, 10-14 mm. diameter cystic dilatation of intrahepatic biliary ducts and normal extrahepatic bile ducts (Fig.6). Dupplex Doppler ultrasonography and esophagoscopy were normal. The findings of liver biopsy specimens were compatible with congenital hepatic fibrosis.

Fever, hypogastric and lumbar pain with leucocytosis and elevated C- reactive protein (CRP) dveloped in the second case four days after ERCP. A fibrinoid material was passed with urine. Histological analysis of this material showed fibrine and blood elements. Several white and red blood cells were detected in urinalysis. Renal and liver function tests, serum alkaline phosphatase, gama glutamyltransferase, amylase and lipase levels were within normal ranges. Recent abdominal CT revealed dilated right renal pelvis and proximal ureter and that the function of the right kidney was delayed. Urine culture revealed colony count of $10^5/mm^3$ E.coli. The patient was given intravenous wide spectrum antibiotics and fever was controlled on the fourth day of the treatment.

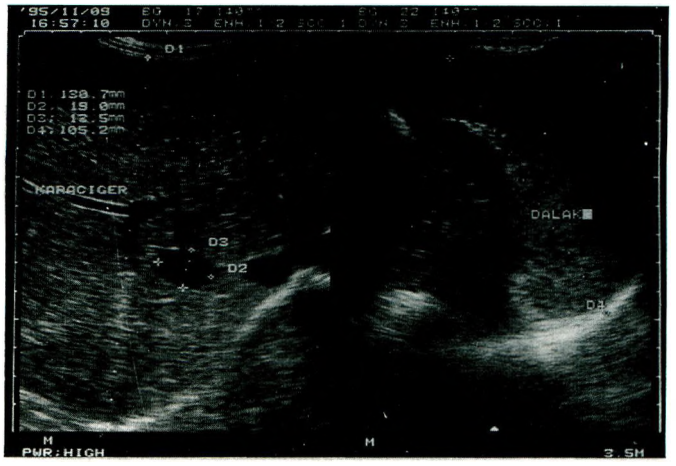


**Fig.1:** Abdominal ultrasonography shows increased liver parenchyma ecogenity and a hepatic cyst.

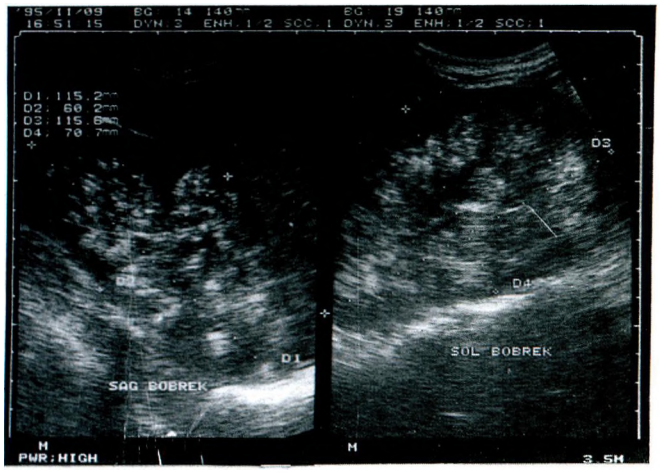


**Fig.2:** Sonogram of kidney shows cystic lesions.

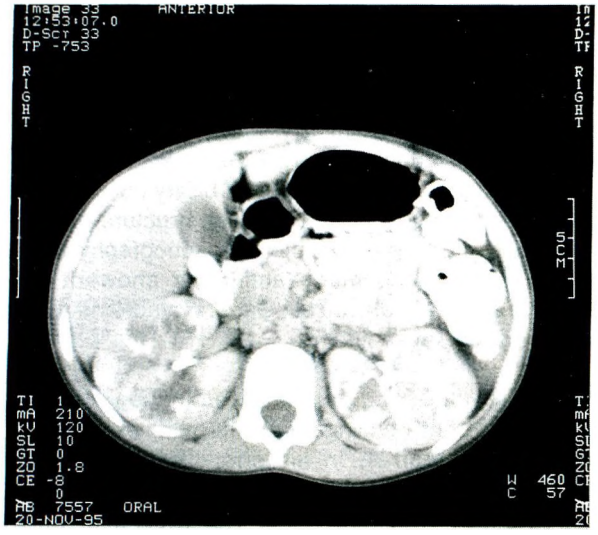


**Fig.3:** CT-scan shows renal and hepatic cysts.

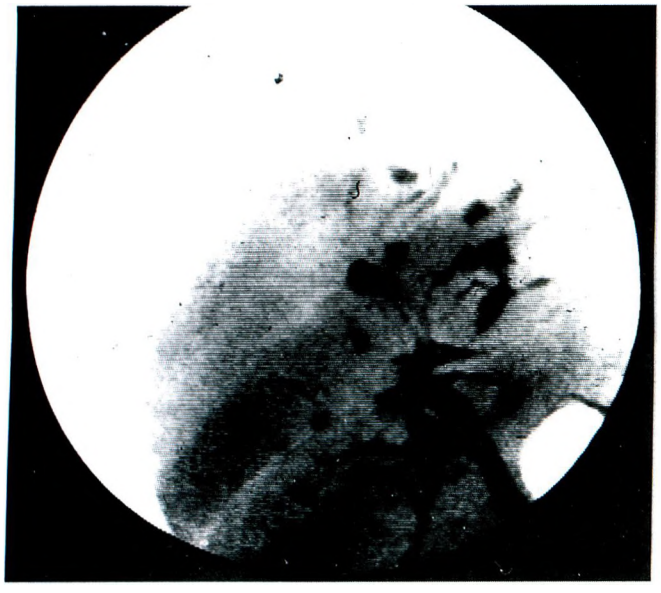

**Fig.4:** Endoscopic retrograde cholangio-pancreatography shows cystic dilatation of the intrahepatic biliary ducts.

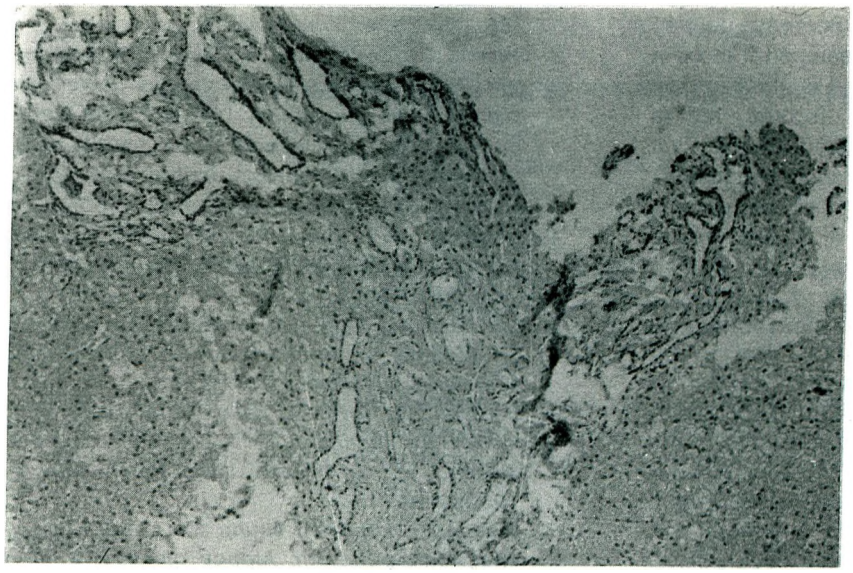

**Fig. 5:** Liver: Fibrosis in the portal area and proliferation and arborization of biliary ducts (HE x 400).

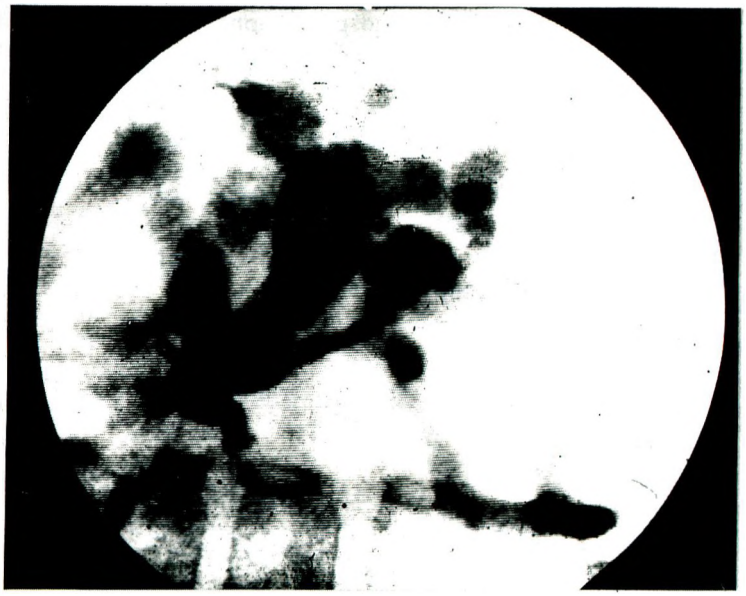

**Fig. 6:** ERCP of the second case shows cystic dilatation of the intrahepatic biliary ducts.

## DISCUSSION

Two different forms of congenital hepatic biliary ductal dilatations were first described by Caroli in 1958. These forms are combined with renal cystic disease. The common form termed Caroli's syndrome are generally associated with portal tract lesions that is typical for congenital hepatic fibrosis. In the rare form, there is only dilatation of biliary ducts which is called as Caroli's disease(1). Both forms are common in women. Although symptoms appear at adulthood, there are a few reported cases that were symptomatic in childhood (5).

Caroli's syndrome and Caroli's disease are autosomal recessive disorders, mostly associated with ARPKD (6). Association with ADPKD is rare (7). Periodic abdominal pain, hepatomegaly and occasional jaundice are the major symptoms. As Caroli's syndrome is associated with CHF, clinical signs of portal hypertension, cholangitis or mixed symptoms may be present or it may remain latent (8). Ectasia of the intrahepatic ducts may produce biliary slugh and stone formation (1). Ultrasonography, CT, scintigraphic methods and cholangiogram are helpful for diagnosis (9).

Jaundice may be due to cholangitis which was present in the prior history of the first case. However, periodic abdominal pain was the only symptom in the second case. Caroli's syndrome was diagnosed in both cases by demonstration of dilatations of the intrahepatic ducts with radiological procedures and biopsy proved portal fibrosis with otherwise normal

liver structure. Although, we did not have kidney biopsy and genetic studies, we presumed it to be a juvenile type ARPKD. Other visceral anomalies may accompany ADPKD and the hepatic lesion encountered in ADPKD is an isolated hepatic cyst (10). The absence of any other visceral anomalies and normal ultrasonographic findings of both parents reduce the probability of diagnosis of ADPKD due to spontaneous mutation.

Cholangitis, cholelithiasis, biliary abscess formation, sepsis and cholangiocarcinoma are major complications of Caroli's syndrome (1). Symptoms immediately after ERCP suggested a diagnosis of cholangitis; however laboratory findings were adjusted as acute pyelonephritis in the second case. In the literature, there is only one case report describing acute pyelonephritis in a patient with poycystic kidney disease associated with Caroli's disease and congenital hepatic fibrosis (11). Symptoms and signs of acute pyelonephritis had been improved with antibiotics in that case report as in our case.

Treatment of Caroli's syndrome depends on the type of the complications. If biliary lesions are localised, partial hepatectomy will be the choice (12).

In conclusion, familial screening is essential to disclose affected family members. Such patients should be followed up for the potential complications associated with the disease.

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