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Case Report
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Caroli's Syndrome in Hemodialysis: When Diagnostic and Therapeutic Difficulties can have Serious Consequences

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Abstract

What we are going to present is the case of a 65-year-old male patient affected by renal and hepatic disease without checking other cases in his family history. He had been submitted to maintenance hemodialysis for 4 months because of an autosomal recessive polycystic kidney disease. At the start of the hemodialysis session, he reported general malaise, abdominal pain, fever, and, during the last two days, even diarrhea. Laboratory workup showed neutrophilic leukocytosis and an increase in serum amylase and C-reactive protein. Abdominal contrast-enhanced CT scan and MRI cholangiography showed hepatic cysts with marked dilatation of the intra- and extrahepatic bile ducts. The patient underwent cholecystectomy with hepatic-jejunal anastomosis on the loop of Roux and was discharged with oral ciprofloxacin. Histology confirmed marked cystic dilatation of biliary ducts and choledochus. Similar episodes continued, and every time ciprofloxacin was prescribed. After 4 months, a retrograde-endoscopic-pancreatography was undertaken, which led to the diagnosis of Caroli's syndrome associated with polycystic kidneys.

Given the rarity of the disease and the difficulty of diagnosis, it is our opinion that when patients with polycystic kidneys and liver cysts undergo recurrent episodes of septic fever of unknown origin, Caroli's disease should be considered, and the appropriate tests should be carried out to confirm the diagnosis.

Keywords

Caroli's Syndrome, Polycystic Kidney Disease, Polycystic Liver, Renal Disease, Hemodialysis

Case Presentation

We present the case of a Caucasian man, aged 65, who had been on dialysis treatment for two years due to an autosomal recessive polycystic kidney disease. Since the beginning of his hemodialysis sessions, the patient reported abdominal pain. However, fever and diarrhea occurred only in the last two days, associated with feelings of general malaise. On examination, diffuse tenderness on the upper quadrant of the abdomen radiating back was found, weakly positive Murphy, negative Blumberg, mild hepatomegaly, and valid peristalsis. The blood count showed neutrophilic leukocytosis (12.000/µl) associated with an increase in serum amylase (224 IU/l) and CRP (2,5 mg/dl). For this reason, the patient was admitted to Surgery.

Case Report

During the hospitalization, the patient underwent contrast-enhanced CT abdomen (**Fig-1A**, and **Fig-1B**), which described "slightly increased liver size, multiple hypodense cystic formations referring to small cysts, marked dilatation of the intrahepatic and extrahepatic bile ducts, common bile duct of maximum size and absence of acute pancreatitis injury." MR cholangio-pancreatography (**Fig-2**) described "dilatation of the bile ducts and intrahepatic bile ducts ectasia up to the juxta papillary district where it ends quite abruptly. The caliber of the main pancreatic duct is normal. Absence of choledochal lithiasis."

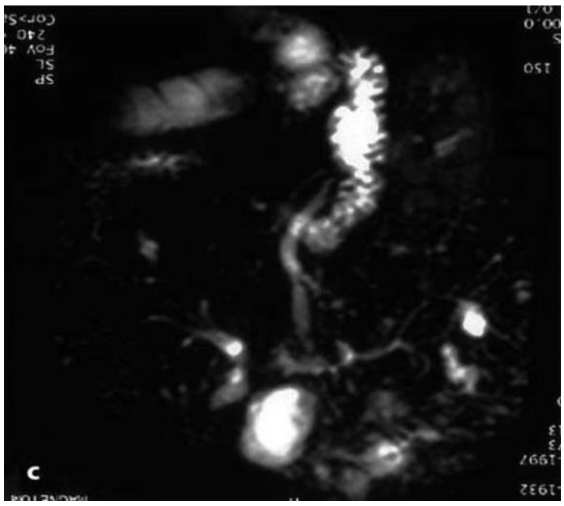


Fig-2:

MR cholangiopancreatography: dilatation of the intrahepatic bile ducts and common bile duct ectasia up in the area of the Vater's papilla where it ends abruptly.

Given the persistence of symptoms and the worsening of the clinical picture, the patient underwent cholecystectomy with hepatic-jejunum-sthomy on Roux loop. Histological examination of the material removed during surgery excluded neoplastic changes in the duodenum and Vater's papilla, putting, however, in evidence a cystic dilatation of extrahepatic and common bile ducts. The patient was then discharged and sent home, recommending antibiotic prophylaxis with ciprofloxacin.

In the following weeks, there were episodes of cholangitis manifesting as recurrent febrile evening

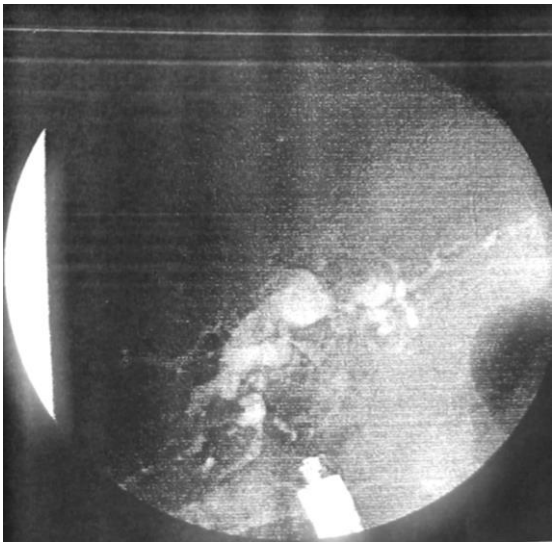
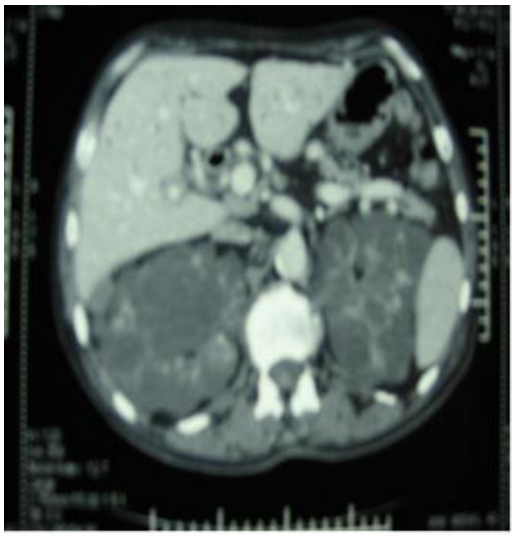


Fig-3:

Endoscopic- retrograde - Cholangio – pancreatography - Nodular aspect of the bile ducts, mainly on the left.

1A)



1B)

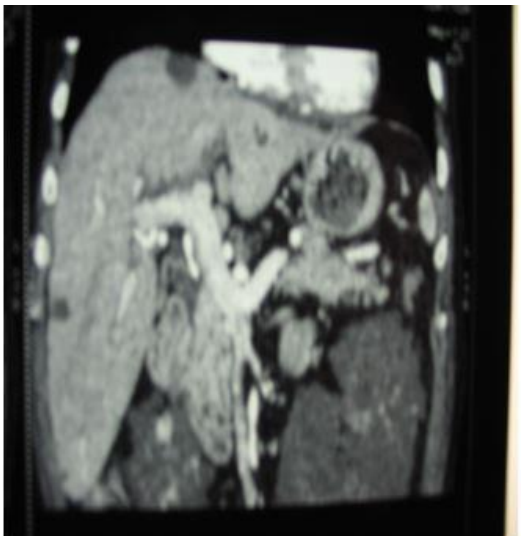


Fig-1:

CT with contrast medium. Apparent multiple cysts with marked dilatation of the intrahepatic and extrahepatic bile ducts, especially of the common bile duct. Complete disruption of polycystic kidneys which have considerable size.

episodes, especially when the patient underwent hemodialysis therapy. It was recommended a therapy based on quinolones (ciprofloxacin or laevofloxacin for 2-3 days) for short periods to avoid the risk of bacterial resistances. Three months after the surgical operation, the unsatisfactory clinical picture (occurring at least one febrile episode every 10 days) led to the patient's hospitalization. An endoscopic-retrograde-cholangio-pancreatography documented "wide hepatic-jejunal-sthomy associated with a nodular thickening of the left branch of the bile ducts, which looks stenotic. This endoscopic picture together with previous data makes a diagnosis of Caroli's syndrome in a patient with polycystic kidneys" (**Fig-3**).

Currently, the patient is being treated with daily ursodeoxycholic acid and paromomycin in cycles of ten days per month to prevent periodic febrile episodes, while quinolones are used when bacterial cholangitis is suspected.

Discussion

Among cystic kidney diseases, the autosomal dominant polycystic kidney disease (ADPKD) and autosomal recessive polycystic kidney disease (ARPKD) may have liver changes resulting in cystic dilatation of the intrahepatic bile ducts, but cysts do not communicate with the biliary system [1]. For Caroli's disease [2-6], we consider a rare congenital disorder characterized by multifocal dilatation of large intrahepatic or distal segmentary bile ducts that form cysts of various volumes that communicate with the biliary tree. Multifocal dilatation can spread and affect the whole intrahepatic biliary tree or regard a segment or a sector of the liver, usually involving the left lobe.

The right hepatic duct or the left or the hepatic-choledochal duct may also be involved. The cystic cavities are lined by cuboidal or cylindrical epithelium and may contain pus, bile, or stones. The onset of symptoms is manifested by recurrent bacterial cholangitis, gallstones, and episodes of pancreatitis [7-11]. The patient then presents with pain, fever, and in about 50% of cases may have obstructive jaundice (absent in the case of our patient).

Several variants of this disease have been described [2,6], which very rarely occur as "pure" forms, with only the cystic dilatation of the intrahepatic bile ducts, and in this case, it is defined as Caroli's disease. The relatively more common variant is called Caroli's syndrome and is characterized by both the expansion of large bile ducts and liver fibrosis in addition to choledochal dilatation, as in the case of our patient.

Symptoms are also correlated with the degree of hepatic fibrosis, and it is possible to detect bacterial cholangitis and portal hypertension. As secondary signs may also be present, including splenomegaly, esophageal varices, and gastrointestinal bleeding.

Caroli's syndrome is frequently associated with other inherited diseases such as sponge kidney and autosomal dominant polycystic kidney disease (more rarely) or autosomal recessive polycystic kidney disease, which is the most common condition, as in the case of our patient. The condition of recessivity of polycystic kidney disease, in our patient, was assumed because the family history was mute both for polycystic and any other kidney disease or for liver disease.

The etiology of Caroli's syndrome is unknown, although it is conceivable it may be transmitted as an autosomal recessive disease in 25-50% of cases and sporadic in the remaining 50-75% of cases. The diagnosis is based on imaging studies [8-13], such as ultrasound, computed tomography, or cholangio MRI. In doubtful cases, it may require the ERCP, percutaneous cholangiography (PTC), the HIDA liver scintigraphy (technetium-labeled immunoacetic acid 99), direct cholangiography, and liver biopsy. Cases of prenatal ultrasound diagnosis are reported [8].

Treatment depends on the clinic [6], the location of cysts, and the stage of disease. It may be conservative, such as antibiotics for infectious complications (as in our patient) and ursodeoxycholic acid to prevent intrahepatic lithiasis (even extracorporeal lithotripsy can be performed). Surgical therapy (hemihepatectomy, lobectomy, or segmentectomy) can be decisive. In this case, the treatment of Caroli's syndrome is surgical excision of cystic dilatation, but this is possible only when the disease affects only a

portion of the liver. If the disease has spread throughout the liver, as in the case of our patient, surgery is not justified, even with the objective to remove the most diseased portion. The remainder portion would be exposed to new infections and the risk of cancerization.

The most logical treatment in severe cases (i.e., where the disease has spread throughout the liver) is liver transplantation [7,11]. The prognosis is variable and is influenced by the frequency and severity of episodes of cholangitis, the presence of associated diseases, and the increased risk of cancer of the bile ducts.

The diagnosis of Caroli's disease is usually made in the fourth decade of life, even though its age of onset can vary (in fact, our patient is currently 65), remaining asymptomatic until the first episode of onset. Since 1958 [2], there have been about 250 documented cases all over the world, and only 3 patients undergoing hemodialysis [3-5]. However, its exceptional impact could also be explained by the large diagnostic problems, so many cases may be undiagnosed.

In our case, as in other cases reported in literature [3-9], only the ultrasound technique did not allow the formulation of diagnosis, documenting only the hepatic steatosis of a first degree and minimum dilatation of the intrahepatic bile ducts. Even if CT abdomen and cholangio MR have been able to observe multiple hypodense cysts and marked dilatation of the intrahepatic and extrahepatic bile ducts, they have never been decisive in making the diagnosis with reasonable certainty. In fact, they were not able to demonstrate communication between the cysts and bile ducts, a prerequisite for a diagnosis of Caroli's disease or syndrome. Thus, in retrospect, even if all the data might have put a strong suspicion for Caroli's disease, the diagnosis of certainty was given by a biopsy and ERCP. Cholecystectomy with hepatic-jejunum-stomy on Roux loop has been erroneously regarded as necessary by the surgeons to get an immediate recanalization of the bile ducts. In contrast, the intervention has worsened the situation so that it is still necessary to frequently use antibiotics (quinolones and paromomycin in cycles of ten days per month) for infectious complications derived from non-continence of the stoma, which causes a reflux of biliary-faecal material and then recurrent episodes of cholangitis.

Conclusion

In conclusion, in patients with polycystic kidney associated with hepatic cysts who develop a fever of unknown origin, Caroli's disease or syndrome should be suspected, and appropriate investigations should be conducted to confirm the diagnosis and guide therapy.

Conflict of Interest

The authors have read and approved the final version of the manuscript. The authors have no conflicts of interest to declare.

References

[1] Pirson Y, Grünfeld JP. Autosomal-dominant polycystic kidney disease. In: Cameron S, Davison AM, Grünfeld JP, Kerr D, Ritz E (eds) Oxford textbook of clinical nephrology. Oxford: Oxford University Press; 1992. pp 2171–88.

[2] Antignac C, Kleinknecht C, Habib R. Nephronophthisis. In: Davison AM, Cameron JS, Grünfeld JP, Kerr DNS, Ritz E, Winearls CG (eds) Oxford textbook of clinical nephrology. Oxford: Oxford University Press; 1998. pp 2417–26.

[3] Jordon D, Harpaz N, Thung SN. Caroli's disease and adult polycystic kidney disease: a rarely recognized association. Liver. 1989 Feb;9(1):30-35. [**PMID**: 2921938]

[4] Sung JM, Huang JJ, Lin XZ, Ruaan MK, Lin CY, Chang TT, Shu HF, Chow NH. Caroli's disease and congenital hepatic fibrosis associated with polycystic kidney disease. A case presenting with acute focal bacterial nephritis. Clin Nephrol. 1992 Dec;38(6):324-28. [**PMID**: 1468163]

[5] Chauveau D, Pirson Y, Le Moine A, Franco D, Belghiti J, Grünfeld JP. Extrarenal manifestations in autosomal dominant polycystic kidney disease. Adv Nephrol Necker Hosp. 1997;26:265-89. [**PMID**: 8922137]

[6] Caroli J, Soupault R, Kossakowski J, Plocker L, Paradowska. La dilatation polykystique congénitale des voies biliaires intra-hépatiques; essai de classification [Congenital polycystic dilation of the intrahepatic bile

ducts; attempt at classification]. Sem Hop. 1958 Feb 18;34(8/2):488-95. French. [**PMID**: 13543375]

[7] Mousson C, Rabec M, Cercueil JP, Virot JS, Hillon P, Rifle G. Caroli's disease and autosomal dominant polycystic kidney disease: a rare association? Nephrol Dial Transplant. 1997 Jul;12(7):1481-83. [**PMID**: 9249792]

[8] Tamiolakis D, Arvanitidou V, Nikolaidou S, Barbagadaki S, Avgidou K, Boglou P, Papadopoulos N. Caroli's syndrome. A case report and review of the literature. Minerva Gastroenterol Dietol. 2004 Jun;50(2):179-81. [**PMID**: 15722989]

[9] Shedda S, Robertson A. Caroli's syndrome and adult polycystic kidney disease. ANZ J Surg. 2007 Apr;77(4):292-94. [**PMID**: 17388839]

[10] Ananthakrishnan AN, Saeian K. Caroli's disease: identification and treatment strategy. Curr Gastroenterol Rep. 2007 Apr;9(2):151-55. [**PMID**: 17418061]

[11] Tallón-Aguilar L, Pareja-Ciuró F, Alamo-Martínez JM, Gómez-Bravo MA. Síndrome de Caroli como causa de trasplante hepático [Caroli syndrome as a reason for liver transplant]. Cir Esp. 2008 Jan;83(1):48. Spanish. [**PMID**: 18208757]

[12] Aguilera V, Rayón M, Pérez-Aguilar F, Berenguer J. Caroli's syndrome and imaging: report of a case. Rev Esp Enferm Dig. 2004 Jan;96(1):74-76. English, Spanish. [**PMID**: 14971999]

[13] Krausé D, Cercueil JP, Dranssart M, Cognet F, Piard F, Hillon P. MRI for evaluating congenital bile duct abnormalities. J Comput Assist Tomogr. 2002 Jul-Aug;26(4):541-52. [**PMID**: 12218818]