



# The “pruned tree” appearance of primary sclerosing cholangitis

Dario Giambelluca<sup>1</sup> · Giuseppe Cutaia<sup>1</sup> · Massimo Midiri<sup>1</sup> · Giuseppe Salvaggio<sup>1</sup>

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## Introduction

The “pruned tree” appearance is a characteristic imaging finding described for the endoscopic retrograde cholangiopancreatography (ERCP) or magnetic resonance cholangiopancreatography (MRCP) diagnosis of long-standing primary sclerosing cholangitis (PSC). It refers to the presence of peripheral obliteration and reduced arborization of the intrahepatic bile ducts, resulting in a “pruned tree” appearance (Fig. 1) [1].

PSC is a chronic inflammatory cholangiopathy, which typically occurs in young and middle-aged men, due to an

immune-mediated cholangiocyte injury involving the biliary tree [1]. It can manifest with various features and variable slow progression over 10–15 years, eventually resulting in biliary fibrosis, cholestasis, biliary cirrhosis and hepatic failure [2, 3].

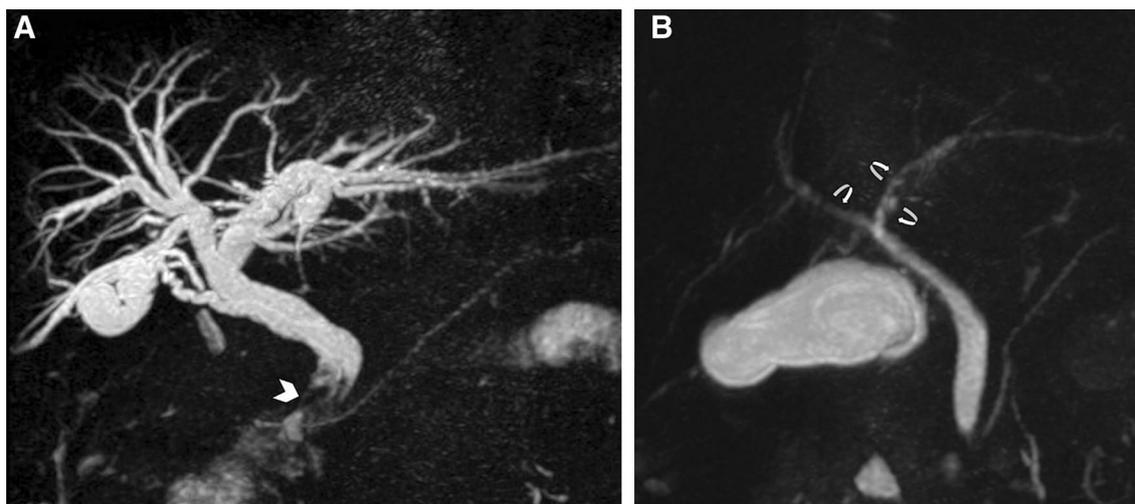
PSC diagnosis is usually made on the basis of clinical, laboratory and cholangiography findings [1]. MRCP is the first-line imaging modality for assessment of bile duct abnormalities in cases of suspected PSC [4]. MRCP is a non-invasive cholangiographic technique with similar sensitivity and specificity compared to ERCP [1]. This latter should be performed in case of clinical suspicion with negative or



**Fig. 1** A tree before and after pruning. Courtesy of <http://inorganicgardening.blogspot.com>. Accessed 25 Mar 2019

✉ Giuseppe Cutaia  
cutaiagiuseppe7@gmail.com

<sup>1</sup> Section of Radiological Sciences, Bi.N.D, University of Palermo, Via del Vespro 129, 90127 Palermo, Italy



**Fig. 2** **a** Coronal MIP MRCP image, in a 64-year-old man with cholestasis, demonstrates intrahepatic and extrahepatic bile duct dilatation, due to the presence of a gallstone (arrow) within the common bile duct. Note the network of various sized bile ducts branching through the liver, resembling the tree branches pattern. **b** Coronal

MIP MRCP image, in a 57-year-old woman with advanced PSC, demonstrates the obliterated peripheral bile ducts, resulting in “pruned tree” appearance. Note the presence of multifocal segmental strictures and dilations (curved arrows) of the intrahepatic biliary tree, typical feature of PSC

non-diagnostic MRCP findings [1, 4]. Moreover, ERCP also offers therapeutic possibilities, like dilatation or stenting of obstructing strictures, and histological sampling, but with risk of post procedural complications [3].

The cholangiographic findings in PSC differ among the evolutionary disease stages [1]. As the disease progresses and strictures worsen, small peripheral ducts become obliterated and poorly visualized on MRCP (Fig. 2) or ERCP, and a “pruned-tree” appearance may become visible [4, 5].

### Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interests.

**Research involving human participants and/or animals** This article does not contain any studies with human participants or animals performed by any of the authors.

**Informed consent** Statement of informed consent was not applicable since the manuscript does not contain any patient data.

### References

1. Kovač JD, Weber MA (2016) Primary biliary cirrhosis and primary sclerosing cholangitis: an update on MR imaging findings with recent developments. *J Gastrointest Liver Dis* 25(4):517–524. <https://doi.org/10.15403/jgld.2014.1121.254.vac>.
2. Giambelluca D, Leto C, D’Arpa F, et al. (2019) Beaded bile ducts in primary sclerosing cholangitis. *Abdom Radiol*. <https://doi.org/10.1007/s00261-018-1873-9>.
3. Vitellas KM, Keogan MT, Freed KS, et al. (2000) Radiologic manifestations of sclerosing cholangitis with emphasis on MR cholangiopancreatography. *Radiographics* 20(4):959–75. <https://doi.org/10.1148/radiographics.20.4.g00jl04959>.
4. Seo N, Kim SY, Lee SS, et al. (2016) Sclerosing cholangitis: clinicopathologic features, imaging spectrum, and systemic approach to differential diagnosis. *Korean J Radiol* 17(1):25–38. <https://doi.org/10.3348/kjr.2016.17.1.25>.
5. Ludwig J, MacCarty RL, LaRusso NF, et al (1986) Intrahepatic cholangiectases and large-duct obliteration in primary sclerosing cholangitis. *Hepatology* 6(4):560–8. <https://doi.org/10.1002/hep.1840060403>.

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