Abdominal Radiology (2019) 44:1195–1196
https://doi.org/10.1007/s00261-018-1873-9

CLASSICS IN ABDOMINAL RADIOLOGY

Beaded bile ducts in primary sclerosing cholangitis

Dario Giambelluca[1] · Claudio Leto[1] · Francesco D'Arpa[2] · Massimo Midiri[1] · Giuseppe Salvaggio[1]

Published online: 1 January 2019

The "beaded" appearance is a characteristic imaging finding described for the endoscopic retrograde cholangiopancreatography (ERCP) or MRCP (magnetic resonance cholangiopancreatography) diagnosis of primary sclerosing cholangitis (PSC). It refers to the presence of multifocal intra- and extra-hepatic bile duct strictures alternating with normal caliber or slightly dilated segments, resembling beads on a string (Fig. 1) [1].

PSC is an uncommon, idiopathic, chronic condition, due to a fibrosing inflammatory process involving the biliary tree. Histologically, it is characterized by submucosal periductal fibrosis and variable periportal inflammatory cell infiltration that can result in bile duct obliteration, cholestasis, and biliary cirrhosis [2]. Classically, PSC is associated with inflammatory bowel disease (in 60–80% of patients), especially ulcerative colitis, and other autoimmune diseases, such as retroperitoneal fibrosis, mediastinal fibrosis, and Sjögren syndrome [2, 3].

Traditionally, ERCP was widely used for the diagnosis of PSC, and it has generally been considered the gold standard imaging technique, because of its high spatial resolution for peripheral intrahepatic biliary tree detail (Fig. 2), and interventional capabilities such as mechanical dilation of obstructing strictures, stent placement, and biopsy. However, ERCP is an invasive method which can produce serious

Fig. 1 Tree covered with strings of beads. Public domain image (https://pixabay.com/it/mardi-gras-new-orleans-albero-2606491/). Accessed 20/10/2018

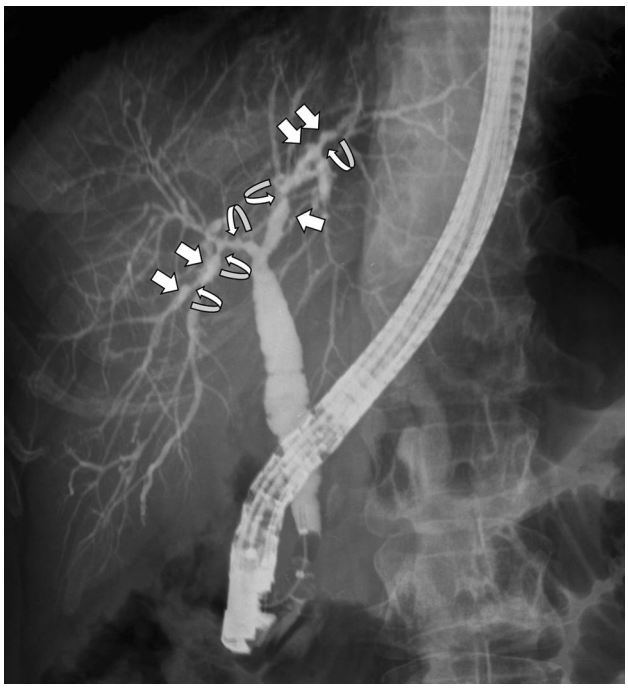

Fig. 2 ERCP image in a 55-year-old woman with PSC shows multifocal segmental strictures of intrahepatic bile ducts (curved arrows), alternating with areas of dilatation (straight arrows), resulting in a "beaded" appearance

✉ Giuseppe Salvaggio
p.salvaggio@libero.it

[1] Section of Radiological Sciences, Di.Bi.Med, University of Palermo, Via del Vespro 127, 90127 Palermo, Italy

[2] Department of General Surgery and Emergency, University of Palermo, Via del Vespro 127, 90127 Palermo, Italy

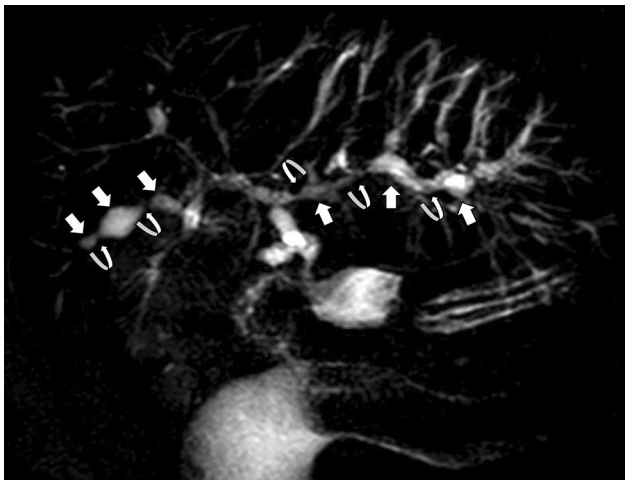

Fig. 3 Primary sclerosing cholangitis in 61-year-old woman, with prior cholecystectomy. Coronal MIP MRCP image depicts the typical "beaded" appearance of PSC in the liver, due to the presence of multiple strictures (curved arrows) and dilatations (straight arrows) of the intrahepatic biliary tree

complications, such as cholangitis and perforations [2, 4]. MRCP offers a noninvasive cholangiographic alternative that offers similar diagnostic accuracy for evaluating patients with PSC. Using maximum intensity projection reconstruction, MRCP nicely depicts the "beaded" appearance of bile ducts (Fig. 3) [4]. Moreover, MRCP can assess bile ducts not visualized at ERCP because of strictures, sometimes allowing early detection of cholangiocarcinoma [2, 3].

Funding No funding was received for this study.

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. MacCarty RL, LaRusso NF, Wiesner RH, Ludwig J (1983) Primary sclerosing cholangitis: findings on cholangiography and pancreatography. Radiology 149(1):39–44. https://doi.org/10.1148/radiology.149.1.6412283
2. Vitellas KM, Keogan MT, Freed KS, et al. (2000) Radiologic manifestations of sclerosing cholangitis with emphasis on MR cholangiopancreatography. Radiographics 20(4):959–975. https://doi.org/10.1148/radiographics.20.4.g00jl04959
3. 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
4. Elsayes KM, Oliveira EP, Narra VR, et al. (2006) MR and MRCP in the evaluation of primary sclerosing cholangitis: current applications and imaging findings. J Comput Assist Tomogr 30(3):398–404