# Successful laser lithotripsy using peroral SpyGlass cholangioscopy in a patient with Mirizzi syndrome

Mirrizi syndrome is a rare cause of obstructive jaundice. Open surgery is the usual treatment, but laparoscopy has also been advocated, and in order to avoid bile duct injuries, subtotal cholecystectomy and/or leaving a long cystic duct has gained popularity [1–3]. A retained cystic duct stone (CDS) is seen in 16 % of patients with postcholecystectomy syndrome; several modalities of treatment have been suggested but are more valuable for retained common bile duct stones (CBDS), because CBDS are accessible [4]. Retained CDSs, as in Mirrizi syndrome, are not easily accessible. This report describes the successful treatment of a difficult retained CDS in a patient with Mirrizi syndrome type 1, using a peroral SpyGlass (Boston Scientific, Massachusetts, USA) and intraductal laser lithotripter.

A 25-year-old woman with obstructive jaundice had endoscopic retrograde cholangiopancreatography (ERCP) which showed Mirrizi syndrome type 1 (**Fig. 1**). She underwent laparoscopic cholecystectomy, but her jaundice was not relieved. A second ERCP revealed three CDSs. Attempts to extract the CDSs were unsuccessful (**Fig. 2**).

The patient underwent open resection of the remaining gallbladder, with stone extraction. Later, 1 month postoperatively, a repeat ERCP showed dilated common bile duct (CBD) and common hepatic duct, and a remaining CDS. Several attempts to extract the CDS were unsuccessful (**Fig. 3**). A 10-Fr, 10-cm stent was inserted, and an ERCP plus SpyGlass and laser lithotripsy was performed. This showed a large yellowish stone in the mid cystic duct (**Fig. 4**).

Using the Holmium laser CALCULASE device (Karl Storz, Tuttlingen, Germany), and the probe with frequency 6, energy 1.2–1.7 was used to fragment the stone. The fragments were extracted, and the cholangiogram confirmed that the CBD and cystic ducts were stone free (**Fig. 5**).

Retained CBDS are not rare, and ERCP, endoscopic sphincterotomy, and CBDS extraction is the treatment of choice. This, however, is not successful for stones greater than 2 cm in diameter. These stones require mechanical lithotripsy, sphincterotomy, and balloon dilation, electrohydraulic, or laser lithotripsy [4]. Failure to do mechanical lithotripsy will necessitate either electrohydraulic or laser lithotripsy, which requires direct visual control. In our patient, this was achieved using the single-operator per-

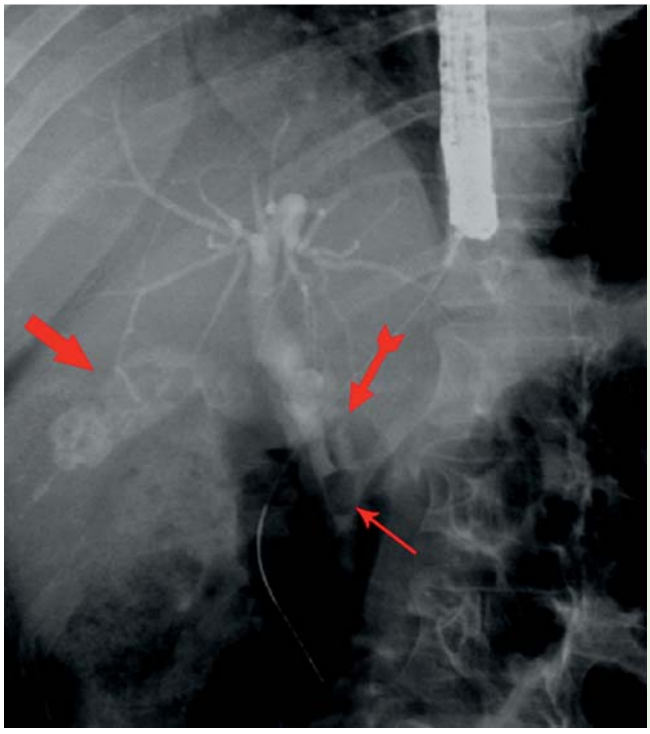

**Fig. 1** Endoscopic retrograde cholangiopancreatography (ERCP) showing Mirizzi syndrome. Note the gallstones (thick arrow), the long and low inserted cystic duct (arrow with tail), and the stone impacted in the cystic duct (thin arrow).

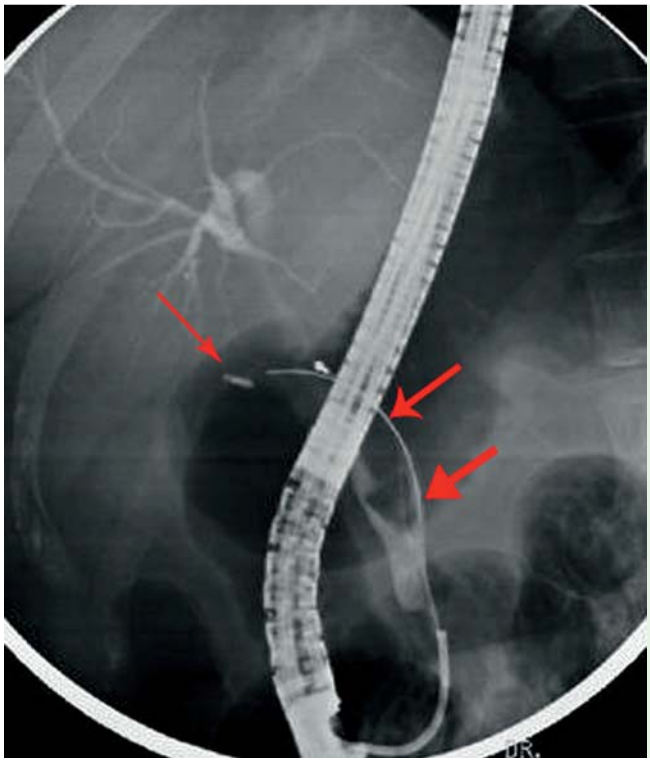

**Fig. 2** Post-laparoscopic-cholecystectomy endoscopic retrograde cholangiopancreatography (ERCP) showing residual cystic duct stones. Note the clip on the cystic duct (thin arrow), the guide wire in the cystic duct (medium arrow), and the residual stone impacted in the cystic duct (thick arrow).

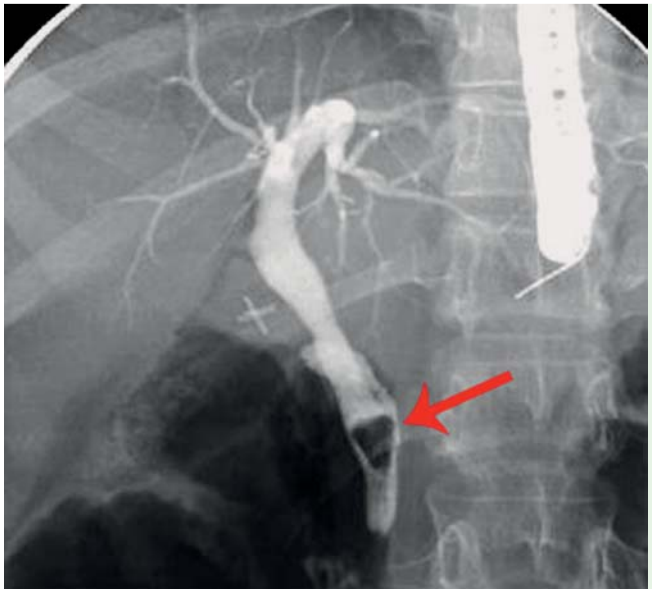

**Fig. 3** Post-open-surgery endoscopic retrograde cholangiopancreatography (ERCP) showing residual cystic duct stone (arrow).


**Fig. 5** Endoscopic retrograde cholangiopancreatography (ERCP) showing complete clearance of the cystic duct and normal caliber of the bile ducts. Note the residual cystic duct remnant (arrow).

oral SpyGlass cholangiopancreatoscope and intraductal laser lithotripter. SpyGlass provides direct visualization of all bile ducts, which enables a single physician to diagnose and perform therapeutic intervention in one procedure [5]. To the best of our knowledge, this is the first case in which the SpyGlass and laser lithotripsy were successfully used to treat a difficult retained CDS in a patient with Mirrizi syndrome type I.

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**Competing interests:** None

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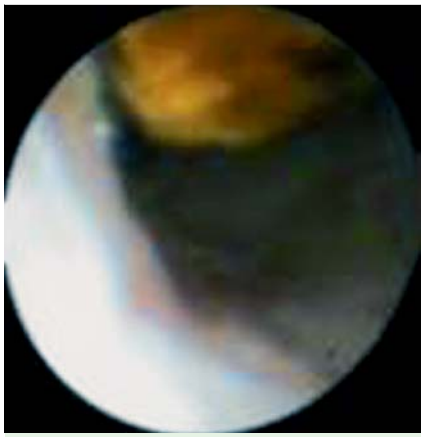

**Fig. 4** Endoscopic retrograde cholangiopancreatography (ERCP) using the SpyGlass and showing the residual stone in the cystic duct.

## References

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