A 75-year-old man attended the emergency department complaining of upper abdominal colic accompanied by nausea and cold sweating for 24 hours. Physical examination found that there was mild tenderness and tension in the upper region of his abdomen. Several of his liver function test and blood chemistry values were abnormal: neutrophil count 7710/µL (reference 2000–7000/µL), total bilirubin 2.1mg/dL, direct bilirubin 1.3mg/dL, pancreatic lipase 2085IU/L. In addition, acute inflammatory markers, including procalcitonin (0.63 ng/mL), IL-6 (287 pg/mL), and C-reactive protein (59.1 mg/mL), were all elevated. A non-enhanced abdominal computed tomography scan indicated the presence of an 8-mm stone in the distal common bile duct (▶ Fig. 1).

Endoscopic retrograde cholangiopancreatography (ERCP) was performed on the second day after admission. The duodenoscope reached the descending duodenum smoothly. However, as the angle between the bile duct and cannulation was almost a right angle, possibly caused by a diverticulum, an experienced endoscopist failed to complete biliary cannulation after several attempts (▶ Fig. 2). Several days later, a second try was made, this time using magnets to help tackle the difficult papilla (▶ Video 1). A magnetic bead was fixed next to the papilla and a powerful magnet placed externally (▶ Fig. 3a, b). Through the attraction between the magnets, the angle was changed and the biliary cannulation was then successfully performed (▶ Fig. 3c, d). Following cannulation, the sphincter was cut about 5mm using blended current. Finally, the stone was extracted using a stone basket, and the filling defect disappeared (▶ Fig. 3e, f). There were no complications.

Reports exist of magnets playing an important role in endoscopic surgery [1, 2]. In the present case, biliary cannulation that was difficult using the conventional...
The technique was achieved successfully in a short time with the help of magnets. The advantage of the magnets was that the direction and force of traction could be easily adjusted, which was helpful in tackling the difficult papilla. This technique could be applied to other, similar situations during ERCP.

Endoscopy_UCTN_Code_TTT_1AR_2AK

Funding

Sichuan University, West China Hospital, 1·3·5 Project for Disciplines of Excellence ZYJC21011

Competing interests

The authors declare that they have no conflict of interest.

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Endoscopy
DOI 10.1055/a-1756-4349
ISSN 0013-726X
published online 2022
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Georg Thieme Verlag KG, Rüdigerstraße 14, 70469 Stuttgart, Germany

Fig. 3 The process of successful biliary cannulation. a A magnetic bead (white arrow) was fixed next to the papilla. b A powerful magnet was placed externally. c Biliary cannulation was successfully performed. d Fluoroscopic image: the yellow arrow indicates the stone and the green arrow the magnetic bead. e The stone was extracted. f The filling defect disappeared.