Surgical procedure for unexpected balloon burst complication during endoscopic balloon dilatation in a patient with common bile duct stones

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Abstract

Background: Endoscopic balloon dilatation (EBD) is the established treatment for common bile duct (CBD) stones. Although pancreatitis and bleeding have been reported as major complications of EBD, balloon-related complications are rarely reported in EBD.

Case presentation: A 30-year-old woman with suspected CBD stones underwent endoscopic retrograde cholangiopancreatography (ERCP) and EBD. During EBD, the balloon of the EBD catheter suddenly burst at the biliary sphincter. We therefore performed surgical intervention: removal of the broken EBD catheter and T-tube drainage. Finally, the patient was discharged without any complications.

Conclusions: We present a case involving a burst balloon of an EBD catheter as a rare complication during EBD, as well as the surgical technique that was used to treat this complication.

Keywords: Endoscopic balloon dilatation, Common bile duct stones, Complications
caught at the biliary sphincter (Figs. 1, 2). A computed tomography (CT) scan showing the burst balloon located at the site of the biliary sphincter (Fig. 3). Finally, we had to perform surgical intervention to remove the EBD. We made an incision at the pylorus, and then we manually pulled the EBD catheter through this incision, as shown in Fig. 4a, b. The broken catheter was successfully removed without injuring the biliary sphincter. Cholecystectomy, CBD exploration, and then removal of the CBD stone were performed. A T-tube was inserted for drainage. Intra-operative cholangiography revealed no residual stones and no biliary sphincter abnormality (Fig. 5). The burst balloon of the EBD catheter is shown in Fig. 6. The patient was discharged without any complications after removal of the T-tube on post-operative day 14.

Discussion
EBD is the treatment of choice for patients with CBD stones. The high success rate and safety of this modality have been well established by a number of studies [1–3]. Complications of EBD, such as pancreatitis, hemorrhage, perforation, and infection have been reported [4–9]. In the current case, we demonstrated balloon burst of an EBD catheter as a rare complication of EBD. According to the product information of the EBD catheter, the balloon is made from nylon [10]. We checked the condition of balloon as a precaution; however, we could not prevent this serious complication. Although no structural abnormalities of the distal bile duct were observed in this case, stricture or a tapered distal bile duct would increase the risk of balloon-related complications. To our knowledge, the present case study represents the first report regarding a burst balloon as a complication of EBD which required surgical treatment. Through our experience, we think that it is important to provide patients with information about this complication before performing EBD. We therefore believe that we should include the information about this complication when obtaining informed consent from patients.
Regarding the surgical technique, we think that there were three important considerations in the surgical removal of the burst balloon of the EBD catheter that was trapped at the biliary sphincter. First, we made the incision at the pylorus to remove the catheter, based on the consideration that an incision at the 2nd portion of the duodenum would increase the risk of post-operative complications (e.g., duodenal stenosis or leakage). Second, we preformed cholecystectomy and intra-operative cholangiography because residual stones were present in the CBD. Third, we had to pay attention to biliary sphincter edema and dysfunction induced by the burst balloon. Thus, a T-tube was inserted into the CBD after CBD stone removal.

**Conclusion**

Reports of balloon-related complications occurring during EBD are very rare. It is important to know about this serious complication and the surgical technique for that was used to treat it.
Acknowledgements
None.

Authors’ contributions
KM performed data collection and drafted the manuscript. HS participated in technical editing of the manuscript. Both authors read and approved the final manuscript.

Funding
No funding was received for this case report.

Availability of data and materials
The authors declare that all the data in this article are available within the article.

Ethics approval and consent to participate
Not applicable.

Consent for publication
The patient provided both verbal and written informed consent to publish the case, including the publication of images.

Competing interests
The authors have no conflict of interest to declare.

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Received: 23 July 2020   Accepted: 21 September 2020
Published online: 02 October 2020

References
1. Staritz M, Ewe K, Büschenfelde KH. Endoscopic papillary dilatation, a possible alternative to endoscopic papillotomy. Lancet. 1982;1:1306–7.
2. Ortiz R, Parente A, Perez-Egido L, Burgos L, Angulo JM. Long-term outcomes in primary obstructive megaureter treated by endoscopic balloon dilatation. Experience After 100 Cases. Front Pediatr. 2018;6:275.
3. Lai KH, Chan HH, Tsai TJ, Cheng JS, Hsu PI. Reappraisal of endoscopic papillary balloon dilatation for the management of common bile duct stones. World J Gastroenterol. 2015;7(2):77–86.
4. Vlavianos P, Chapra K, Manadalia S, Anderson M, et al. Endoscopic balloon dilatation versus endoscopic sphincterotomy for the removal of bile duct stones: a prospective randomised trial. Gut. 2003;52:1165–9.
5. Arnold JC, Benz C, Martin WP, et al. Endoscopic Papillary Balloon Dilatation vs. Sphincterotomy for removal of common bile duct stones: a prospective randomized pilot study. Endoscopy. 2001;33(7):563–7.
6. Fujiawa T, Kagawa K, Hisatomi K, Kubota K, Nakajima A, Matsuhashi N. Is endoscopic papillary balloon dilatation really a risk factor for post-ERCP pancreatitis? World J Gastroenterol. 2016;22(65):5909–16.
7. Barón TH, Harewood GC. Endoscopic balloon dilatation of the biliary sphincter compared to endoscopic biliary sphincterotomy for removal of common bile duct stones during ERCP: a meta analysis of randomized, controlled trials. Am J Gastroenterol. 2004;99(8):1455–60.
8. Park SJ, Kim JH, Hwang JC, Kim HG, Lee DH, Jeong S, et al. Factors predictive of adverse events following endoscopic papillary large balloon dilatation: results from a multicenter series. Dig Dis Sci. 2013;58(4):1100–9.
9. Indications, Safety, and Warnings. Biliary Balloon Dilatation Catheter, Boston, Scientific. https://www.bostonscientific.com/content/dam/bostonscientific/endo/portfolio-group/hurricane-rx-balloon-dilation/237709_dfu_hurricaneRx.pdf. Accessed 26 June 2020.
10. Product information, Hurricane™ RX Biliary Balloon Dilatation Catheter, Boston, Scientific. https://www.bostonscientific.com/jp-jp/products/catheter-balloon/HurricaneRX.html. Accessed 25 Aug 2020.

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