

# Retrieval of retained wireless capsule endoscope from the ileum by means of push-and-pull enteroscopy using the double-balloon technique (double-balloon enteroscopy) in a patient with Crohn's disease

Stanislav Rejchrt, Marcela Kopáčová, Ilja Tachecí, Jan Bureš

2nd Department of Medicine, Charles University in Praha, Faculty of Medicine at Hradec Králové, University Teaching Hospital, Hradec Králové, Czech Republic

*Rejchrt S, Kopáčová M, Tachecí I, Bureš J. Retrieval of retained wireless capsule endoscope from the ileum by means of push-and-pull enteroscopy using the double-balloon technique (double-balloon enteroscopy) in a patient with Crohn's disease. Folia Gastroenterol Hepatol 2006; 4 (1): 33 – 37.*

**Abstract.** Push-and-pull enteroscopy using the double-balloon technique (double-balloon enteroscopy) enables investigation of the entire small intestine in most cases. We describe a technical note showing in a 51-year-old man with Crohn's disease that double-balloon enteroscopy can be easily used to retrieve a retained wireless capsule endoscope from the ileum and thus prevent the patient from having to undergo surgery to remove the capsule.

**Key words:** push-and-pull enteroscopy, double-balloon enteroscope, wireless capsule endoscope, retention, endoscopic retrieval, stenosis, Crohn's disease

*Rejchrt S, Kopáčová M, Tachecí I, Bureš J. Úspěšné vyjmutí retinované endoskopické kapsle z ilea metodou dvojbalonové enteroskopie u nemocného s Crohnovou chorobou. Folia Gastroenterol Hepatol 2006; 4 (1): 33 – 37.*

**Abstract.** Dvojbalonová enteroskopie (push-and-pull enteroscopy) je nová metoda, která umožňuje endoskopické vyšetření celého tenkého střeva u většiny pacientů. V této technické poznámce popisujeme případ 51-letého nemocného, u kterého byla metodou dvojbalonové enteroskopie vyjmuta retinovaná endoskopická kapsle z distálního ilea. Díky tomuto výkonu (který trval 75 min.) nemusel pacient podstoupit chirurgické odstranění retinované endoskopické kapsle.

**Klíčová slova:** dvojbalonová enteroskopie, endoskopická kapsle, retence, endoskopické vyjmutí, stenóza tenkého střeva, Crohnova choroba

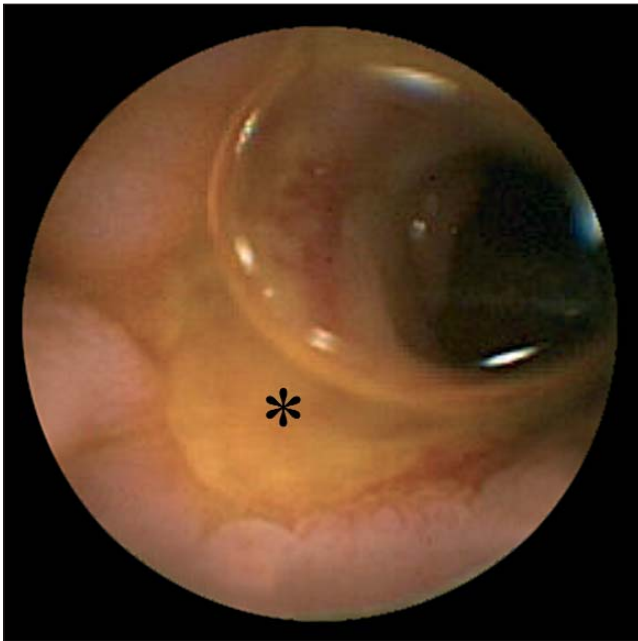


Figure 1  
Capsule endoscopy. A circular ileal ulcer (asterisk) extending in front of the stenosis.

nical studies have been published (5,6,8,16), indications and yield of this method have been designed (9,11,14,16) and only recently, double-balloon enteroscopy has been introduced into clinical gastroenterology.

We report a technical note on the use of push-and-pull enteroscopy by the double-balloon technique to extract an impacted wireless capsule endoscope from the ileum.

### Case report

A 51-year-old man suffered from Crohn's disease since 1983. Because of multiple intestinal stenoses, resection of the terminal ileum and right hemi-colectomy was performed in 1983 and multiple strictureplasty was carried out by surgery in 1992, 1994 and 1999. Follicular (centroblastic) non-Hodgkin B-cell lymphoma was revealed by histology of a resected ileal loop

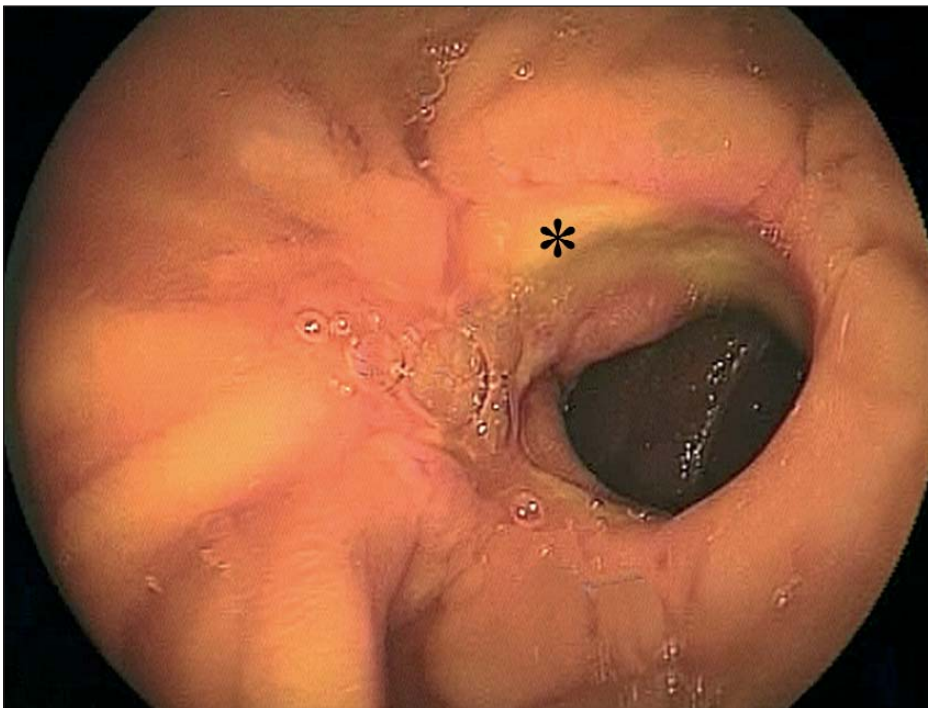


Figure 2  
Double-balloon enteroscopy. Stenosis with circular ulceration (asterisk) in the ileum. Corresponding image to the Figure 1.

Push-and-pull enteroscopy using the double-balloon technique (double-balloon enteroscopy) enables investigation of the entire small intestine in most cases. The idea for this method was patented in the USA by Frazer as "apparatus for endoscopic examinations" as far back as 1979 (7). However, it was not until 2001 that double-balloon enteroscopy was introduced into digestive endoscopy by Yamamoto et al. (the first investigation was performed in June 1999 at Jichi Medical School, Japan) (17). Currently, initial cli-

in 1999 (followed by six courses of chemotherapy). Full remission of both Crohn's disease and lymphoma was achieved. The patient was symptom free till autumn 2005 when he was presented with mild dull abdominal pain. Laboratory tests were thoroughly normal (including normal erythrocyte sedimentation rate, C-reactive protein and platelet count). Wireless capsule endoscopy (PillCam, Given Imaging) was performed in December 2005 and showed severe inflammatory involvement of the small intestine including

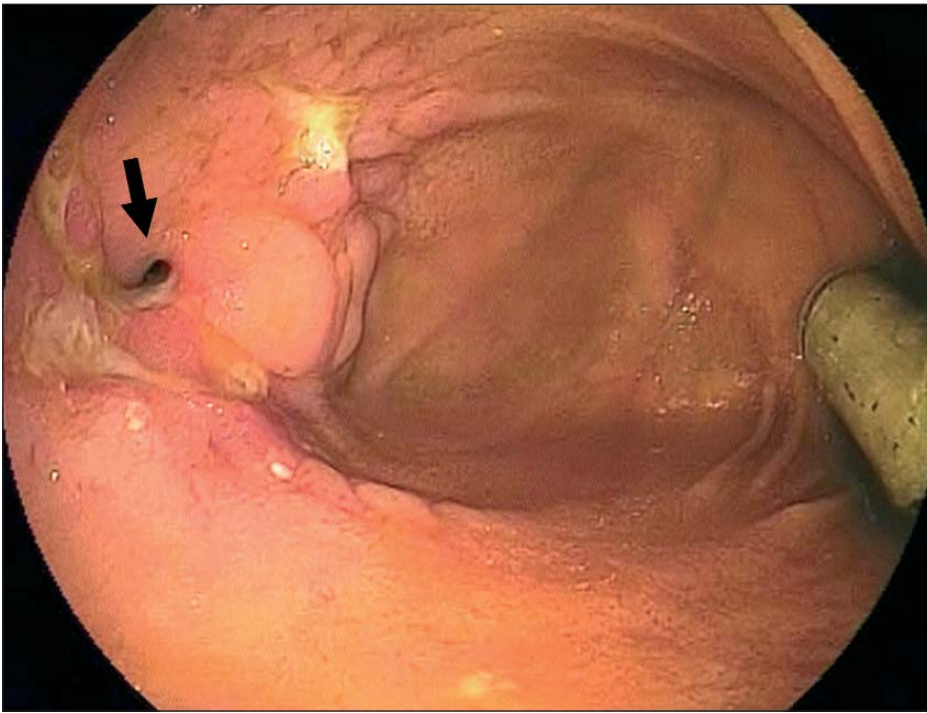


Figure 3  
Double-balloon enteroscopy. Tight stenosis with ulceration (arrow) and prestenotic dilatation of the distal ileum with retained capsule endoscope (at the right part of the picture).

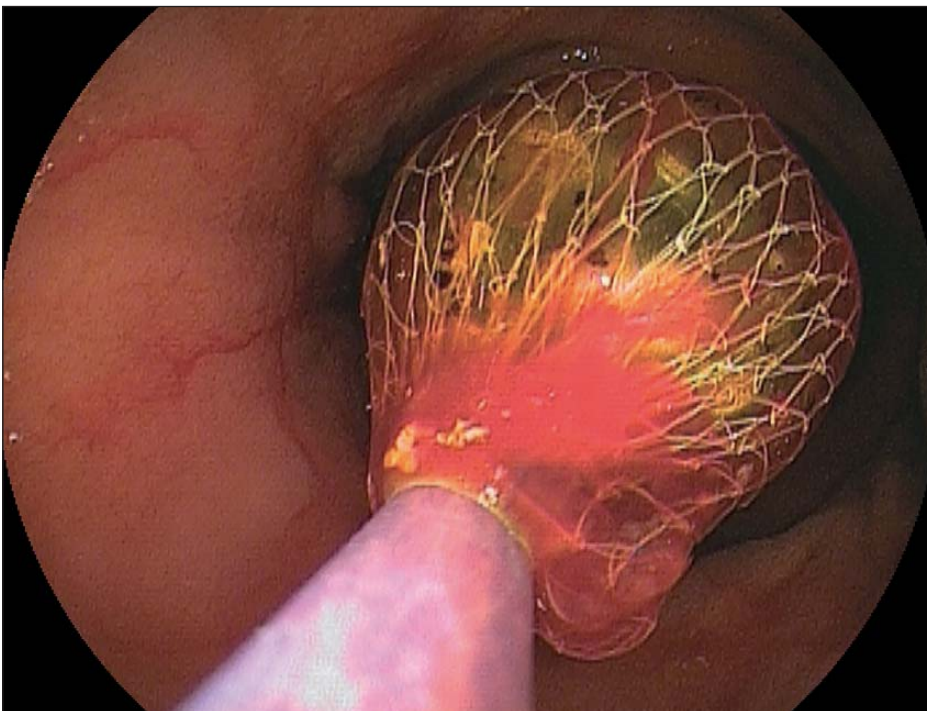


Figure 4  
Double-balloon enteroscopy. The capsule endoscope captured in the extraction net being retrieved from the ileum.

multiple ulcers and stenoses (Fig. 1). This investigation was complicated by retention of the capsule.

Subsequent push-enteroscopy and ileoscopy were carried out but failed to reach the place of ileal stenosis with the retained capsule. In March 2006, oral push-and-pull (double-balloon) enteroscopy was performed using a Fujinon EN 450T5 enteroscope. Three subsequent stenoses with ulcers were found (within 20 cm) in the ileum (Fig. 2). The most distal one (with a diameter of 3 mm) was preceded by prestenotic dilatation of the lumen and the retained capsule was

found here (Fig. 3). The capsule was captured using an extraction net and retrieved together with the enteroscope (Figs 4-6). The procedure took 75 minutes. Histology of biopsy specimens taken of ulcers proved Crohn's disease but found no lymphoma. Pharmacological treatment of Crohn's disease has been strengthened (including total parenteral nutrition) and subsequent endoscopic dilatation of stenoses is planned.

Video-recording of this case report is available from the Internet website of the Journal at [www.pro-folia.com](http://www.pro-folia.com).



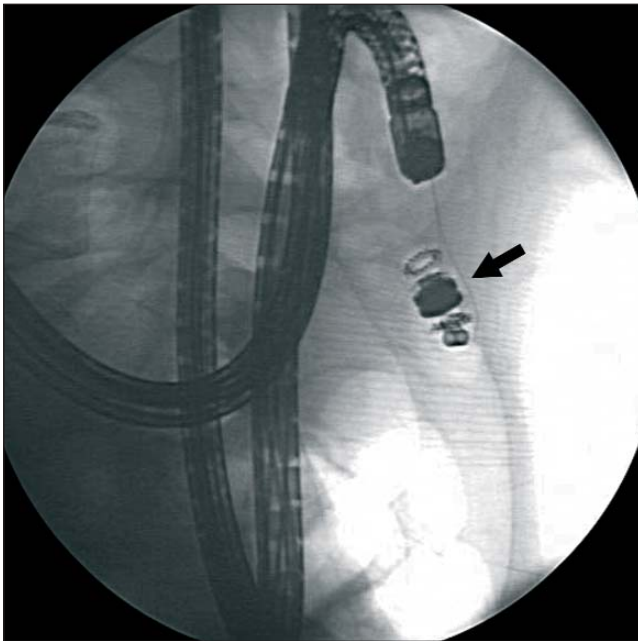


Figure 5  
**Fluoroscopy control of capsule extraction by means of double-balloon enteroscopy. The capsule endoscope (arrow) captured in the extraction net being retrieved.**

eval of impacted foreign bodies but also makes it possible to take biopsy specimens and offers endoscopic dilatation of stenoses in suitable cases.

Extraction of impacted capsule endoscopes using double-balloon enteroscopy has been reported by other authors recently (1,10,12). In all these cases, the procedure was feasible, safe, successful and easy to perform.

In conclusion, push-and-pull enteroscopy using the double-balloon method is a very useful therapeutic intervention to solve retained foreign bodies in the small intestine.



Figure 6  
**The tip of the double-balloon enteroscope and removed capsule in the extraction net.**

## Discussion

We describe a technical note showing that double-balloon enteroscopy can be easily used to retrieve a retained wireless capsule endoscope from the ileum and thus prevent the patient from having to undergo surgery to remove the capsule.

Retention of the wireless capsule endoscope has been reported in 0.75 up to 10 % patients that would require surgical or endoscopic retrieval (2-4,13,15). Before the double-balloon era, surgery was necessary to remove trapped capsules (usually together with the surgical treatment of the underlying cause of retention) (3). Double-balloon enteroscopy enables not only retri-

## REFERENCES

1. Al-toma A, Hadithi M, Heine D, Jacobs M, Mulder C. Retrieval of a video capsule endoscope by using a double-balloon endoscope. *Gastrointest Endosc* 2005; 62: 613.
2. Barkin JS, Friedman S. Wireless capsule endoscopy requiring surgical intervention. *Am J Gastroenterol* 2002; 97, No 9 Suppl: S298.
3. Cave D. Wireless capsule endoscopy. *UpToDate* online, vol 14.1. Welleley, 2006.
4. Cave DR. Wireless video capsule endoscopy. *Clin Perspect Gastroent* 2002; 5: 203 – 207.
5. Di Caro S, May A, Heine DG, Fini L, Landi B, Petruzzello L, Cellier C, Mulder CJ, Costamagna G, Ell C, Gasbarrini A; DBE-European Study Group. The European experience with double-balloon enteroscopy: indications, methodology, safety, and clinical impact. *Gastrointest Endosc* 2005; 62: 545 – 550.
6. Ell C, May A, Nachbar L, Cellier C, Landi B, di Caro S, Gasbarrini A. Push-and-pull enteroscopy in the small bowel using the

- double-balloon technique: results of a prospective European multicenter study. *Endoscopy* 2005; 37: 613 – 616.
7. Frazer RE. Apparatus for endoscopic examination. US patent 4,176,662. 1979.
  8. Heine GD, Hadithi M, Groenen MJ, Kuipers EJ, Jacobs MA, Mulder CJ. Double-balloon enteroscopy: indications, diagnostic yield, and complications in a series of 275 patients with suspected small-bowel disease. *Endoscopy* 2006; 38: 42 – 48.
  9. Kita H, Yamamoto H. Double-balloon endoscopy for the diagnosis and treatment of small intestinal disease. *Best Pract Res Clin Gastroenterol* 2006; 20: 179 – 194.
  10. Lee BI, Choi H, Choi KY, Ji JS, Kim BW, Cho SH, Park JM, Lee IS, Choi MG, Chung IS. Retrieval of a retained capsule endoscope by double-balloon enteroscopy. *Gastrointest Endosc* 2005; 62: 463 – 465.
  11. May A, Nachbar L, Ell C. Double-balloon enteroscopy (push-and-pull enteroscopy) of the small bowel: feasibility and diagnostic and therapeutic yield in patients with suspected small bowel disease. *Gastrointest Endosc* 2005; 62: 62 – 70.
  12. May A, Nachbar L, Ell C. Extraction of entrapped capsules from the small bowel by means of push-and-pull enteroscopy with the double-balloon technique. *Endoscopy* 2005; 37: 591 – 593.
  13. Rondonotti E, Herrerias JM, Pennazio M, Caunedo A, Mascarenhas-Saraiva M, de Franchis R. Complications, limitations, and failures of capsule endoscopy: a review of 733 cases. *Gastrointest Endosc* 2005; 62: 712 – 716.
  14. Sunada K, Yamamoto H, Kita H, Yano T, Sato H, Hayashi Y, Miyata T, Sekine Y, Kuno A, Iwamoto M, Ohnishi H, Ido K, Sugano K. Clinical outcomes of enteroscopy using the double-balloon method for strictures of the small intestine. *World J Gastroenterol* 2005; 11: 1087 – 1089.
  15. Tachei I, Rejchrt S, Drastich P, Lata J, Stehlik J, Novotny A, Spicak J, Dite P, Zavoral M, Lukas M, Bures J. Capsule endoscopy – initial experience in the Czech Republic: a retrospective multi-centre study. *Acta Endoscopica* 2005; 35: 329 – 338.
  16. Yamamoto H, Kita H, Sunada K, Hayashi Y, Sato H, Yano T, Iwamoto M, Sekine Y, Miyata T, Kuno A, Ajibe H, Ido K, Sugano K. Clinical outcomes of double-balloon endoscopy for the diagnosis and treatment of small-intestinal diseases. *Clin Gastroenterol Hepatol* 2004 ; 2: 1010 – 1016.
  17. Yamamoto H, Sekine Y, Sato Y, Higashizawa T, Miyata T, Iino S, Ido K, Sugano K. Total enteroscopy with a nonsurgical steerable double-balloon method. *Gastrointest Endosc* 2001; 53: 216 – 220.

**Correspondence to:**

Associate Professor Stanislav Rejchrt, MD, PhD,  
2nd Department of Medicine, Charles University Teaching  
Hospital, Sokolská 581, 500 05 Hradec Králové,  
Czech Republic.  
E-mail: rejchrt@lfhk.cuni.cz