

Double-balloon enteroscopy

Will it soon become a new gold standard for small bowel imaging?

Jan Bureš

In this issue of the Journal, Kopáčová et al. (8) report their analysis of the first fifty double-balloon enteroscopies. Diagnostic yield was 70 % in her series and endoscopic therapy was accomplished in 30 % (8). Double-balloon enteroscopy constitutes a quite new quality in digestive endoscopy that makes it possible to investigate a substantial part or even the entire small bowel. It was Yamamoto et al. who first introduced double-balloon enteroscopy into clinical practice (15). More than one hundred papers have been published so far and the first monograph on double-balloon enteroscopy (11) was recently released.

Professor Sugano wrote in his preface to the first monograph on double-balloon enteroscopy: “The double-balloon endoscope came about as the combined result of a brilliant idea and tenacious effort by Hironori Yamamoto” (11). The first clinical application of the double-balloon method was made for diagnosis of small intestinal haemangioma in a patient with Maffucci’s syndrome. Yamamoto attached a hand-made balloon to an upper gastrointestinal endoscope and manually inflated and deflated the balloon, with a sphygmomanometre monitoring pressure (11). An overtube with another inflatable & deflatable balloon and balloon pump controller were replenished. This new endoscopy system was commercialized soon afterwards.

Double-balloon enteroscopy was launched onto the market in November 2003 and soon widespread. Nowadays it is experiencing a boom. Double-balloon enteroscopy has been introduced into clinical practice in more than 400 centres in 35 countries worldwide (November 2006). The highest number of centres currently operate in Germany (143 units). Germany has more centres than the rest of Europe together (123 centres in total). Apart from Germany, other leading European countries are France (27 units), Spain (17 units), Italy (13 units), Austria (11 units) and the Netherlands (9 units) by the end of November 2006. In Central Europe besides Austria, double-balloon

enteroscopy was also introduced in Hradec Králové, Czech Republic, in Budapest, Hungary (Professor Papp) and in Warsaw, Poland (Professor Rydzewska). Of course, there is some question as to what the optimal learning curve is (9) and how many procedures must be done per year in each individual centre to maintain the indispensable skill. In those centres that have long-term experience with both push-enteroscopy and intra-operative enteroscopy, introduction of double-balloon enteroscopy may be easy (7).

Intra-operative enteroscopy has been the gold standard for the investigation of the small intestine to date. It still remains a unique method of examination of the whole small bowel and concurrently provides a solution for pathological findings. However, the investigation is invasive, so precise indication is imperative (7). Recent reports on double-balloon enteroscopy suggest that this new method may be able to replace at least intra-operative enteroscopy in many circumstances (6,10,14). Double-balloon enteroscopy is less invasive but might fail in imaging the whole small intestine. In a retrospective analysis conducted at four European medical centres, a total of 89 double-balloon enteroscopies were performed in 62 patients with suspected or documented small-bowel diseases, but the entire small bowel was completely explored only in 10 patients (16.2 %) (3). Further studies are needed to assess the precise diagnostic yield and therapeutical impact of double-balloon enteroscopy (4,5,12). Intra-operative enteroscopy will be preserved for those cases where double-balloon enteroscopy could not be performed or fails to investigate the entire small intestine, especially to prevent excessive bowel resection (7). Capsule wireless endoscopy is a suitable non-invasive tool for small-bowel investigation and has chiefly been used in patients with obscure gastrointestinal bleeding (1,13). Double-balloon enteroscopy seems to be superior to capsule wireless endoscopy as it is able to identify significant small intestinal pathology missed previously by capsule endoscopy (2).

All double-balloon enteroscopy, capsule wireless endoscopy and intra-operative enteroscopy should

not be considered competitive methods but as being complementary to each other in proper indications.

REFERENCES

1. Apostolopoulos P, Liatsos C, Gralnek IM, Giannakouloupoulou E, Alexandrakis G, Kalantzis C, Gabriel P, Kalantzis N. The role of wireless capsule endoscopy in investigating unexplained iron deficiency anemia after negative endoscopic evaluation of the upper and lower gastrointestinal tract. *Endoscopy* 2006; 38: 1127-1132.
2. Chong AK, Chin BW, Meredith CG. Clinically significant small-bowel pathology identified by double-balloon enteroscopy but missed by capsule endoscopy. *Gastrointest Endosc* 2006; 64: 445-449.
3. Di Caro S, May A, Heine DG, Fini L, Landi B, Petruzzello L, Cellier C, Mulder CJ, Costamagna G, Ell C, Gasbarrini A; for the DBE-European Study Group. The European experience with double-balloon enteroscopy: indications, methodology, safety, and clinical impact. *Gastrointest Endosc* 2005; 62: 545-550.
4. 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.
5. 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.
6. Keuchel M, Hagenmüller F. Small bowel endoscopy. *Endoscopy* 2005; 37: 122-132.
7. Kopáčová M., Bureš J., Vykouřil L., Hladík P., Šimkovič D., Jon B., Ferko A., Tachecí I., Rejchrt S. Intraoperative enteroscopy. Ten years' experience at a single tertiary center. *Surg Endosc* 2006; in press.
8. Kopáčová M, Rejchrt S, Tachecí I, Bureš J. Double-balloon enteroscopy. The first fifty investigations in the Czech Republic. *Folia Gastroenterol Hepatol* 2006; 4: 135 – 148.
9. Mehdizadeh S, Ross A, Gerson L, Leighton J, Chen A, Schembre D, Chen G, Semrad C, Kamal A, Harrison EM, Binmoeller K, Waxman I, Kozarek R, Lo SK. What is the learning curve associated with double-balloon enteroscopy? Technical details and early experience in 6 U.S. tertiary care centers. *Gastrointest Endosc* 2006; 64: 740-750.
10. 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: 33-37.
11. Sugano K, Yamamoto H, Kita H, eds. *Double-Balloon Endoscopy. Theory and Practice*. Tokyo: Springer Verlag, 2006: 117.
12. Sun B, Rajan E, Cheng S, Shen R, Zhang C, Zhang S, Wu Y, Zhong J. Diagnostic yield and therapeutic impact of double-balloon enteroscopy in a large cohort of patients with obscure gastrointestinal bleeding. *Am J Gastroenterol* 2006; 101: 2011-2015.
13. Tacheci 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.
14. Yamamoto H, Kita H. Double-balloon endoscopy. *Curr Opin Gastroenterol* 2005; 21: 573-577.
15. 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:

Professor Jan Bureš, MD, PhD, 2nd Department of Internal Medicine, Charles University, Faculty of Medicine at Hradec Králové, University Teaching Hospital, Sokolská 581, 500 05 Hradec Králové, Czech Republic
E-mail: bures@lfhk.cuni.cz