‘Doing the twist’: Insight gained from spiral enteroscopy

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Innovation over the past decade has led to the development of novel techniques that enable deep enteroscopy, completion of previously failed colonoscopies and that permit access to the papilla in patients with surgically altered anatomy. Double-balloon enteroscopy (DBE) was first introduced in 2001 (1) followed by single-balloon enteroscopy (SBE) in 2006 (2). Both DBE and SBE are now widely available and practiced worldwide. The newest of these techniques is spiral enteroscopy (3), which uses an overtube with a raised spiral at the distal end to pleat the small intestine. The literature on spiral enteroscopy is developing, with early evidence suggesting that it offers diagnostic and therapeutic capabilities comparable with the balloon-assisted modalities while allowing enhanced scope control during withdrawal (4) and increased procedural speed (5).

Deep enteroscopy is a relatively invasive procedure and adverse events can occur. While all conventional complications of standard endoscopy are possible, considerable attention has been devoted to pancreatitis, which has been observed in 0.2% to 0.3% of DBE cases (6-8). In addition to clinical pancreatitis, asymptomatic hyperamylasemia is a well recognized and significantly more frequent phenomenon. Pancreatitis following SBE hadn't been reported until recently (9) but hyperamylasemia has also been frequently observed (10). Several theories to explain the pancreatitis have been suggested including obstruction of the papilla following balloon inflation, irritation of the sphincter of Oddi, mechanical strain on the pancreas during repetitive push-pull movements of the overtube and vascular injury from compression of peripancreatic vessels. Of course, elevations in serum amylase levels are nonspecific and can be associated with a range of abdominal processes in addition to pancreatitis, including perforation, intestinal ischemia and obstruction, as well as diseases of the salivary glands.

In the current issue of the *Canadian Journal of Gastroenterology*, Teshima et al (11) (pages 603-606) report procedural details and complications, including hyperamylasemia and pancreatitis, following spiral enteroscopy. Thirty-two patients underwent antegrade spiral enteroscopy at Erasmus MC University Medical Center in Rotterdam, The Netherlands, over a 16-month period. No cases of pancreatitis were observed. However, after excluding two patients with macroamylasemia, they found a mean 2.9-fold rise in serum amylase levels in six (20%) of the remaining 30 patients. Hyperamylasemia was more frequent in Peutz-Jeghers syndrome patients and in those who required sedation with propofol, suggesting that it may be more common during difficult examinations. No additional adverse events were reported within 30 days of the procedures.

There are important limitations in the study by Teshima et al (11) that were acknowledged by the authors. The cohort studied was small

and, thus, the rate of hyperamylasemia reported may be imprecise. Furthermore, although no cases of pancreatitis were observed, one cannot conclude from this small study that pancreatitis does not occur following spiral enteroscopy. Second, serum lipase levels were not measured nor was serum amylase fractionated into isoenzyme components. Therefore, the origin of the elevations in amylase levels following spiral enteroscopy could not be determined.

Despite its limitations, the article by Teshima et al is an important contribution. Taken together with a large multicentre registry study reported in abstract form (12), in which no cases of pancreatitis were observed following 1750 spiral procedures, it certainly would appear that the risk of clinical pancreatitis following spiral enteroscopy is much lower than that observed following balloon enteroscopy. Furthermore, the frequent finding of hyperamylasemia in the absence of bona fide pancreatitis following spiral enteroscopy is noteworthy given the important technical differences between spiral enteroscopy and the balloon-assisted approaches. The SBE, DBE and spiral techniques are similar in their goal of pleating the small bowel on the overtube and endoscope, but differ in their method of achieving this. The balloon techniques use a repetitive reducing or pulling of the balloons to advance. In contrast, the spiral technique avoids pulling of the overtube and instead uses the forces of rotation of the spiral to pull the small bowel onto the overtube. These differences in technique may offer some insight into the mechanism of hyperamylasemia and the apparent lower reported risk of pancreatitis during spiral enteroscopy. It may be that elevations in amylase levels following spiral enteroscopy reflect either clinically insignificant pancreatic trauma from stretch or compression of peripancreatic vessels, or from ischemia or traumatic injury to the small bowel itself. In fact, it may also be that many of the cases of hyperamylasemia following balloon-assisted enteroscopy have nothing to do with the pancreas. Time will tell.

Spiral enteroscopy, along with DBE and SBE, represent landmark developments in endoscopy. These procedures certainly have drawbacks, including risks to patients; however, in those with appropriate indications, the procedure-related risks are typically outweighed by the many potential benefits. It is imperative that endoscopists discuss the possibility of pancreatitis following DBE and SBE – and possibly spiral enteroscopy – until additional data become available. However, while the frequent hyperamylasemia following these procedures is interesting, it is usually clinically insignificant and, thus, we do not measure it routinely in the absence of pain following the procedure.

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