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Spiral enteroscopy: Prime time or for the happy few?

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A B S T R A C T

Spiral enteroscopy is the newest of the deep enteroscopy techniques. The current technique employs an overtube with a raised spiral at the distal end to plect the small intestine and achieve deep small bowel intubation. Although spiral enteroscopy is a novel technique, the learning curve is comparable to the balloon enteroscopy techniques. There is some evidence of improved speed of spiral enteroscopy procedures with superior control compared to the balloon endoscopy technologies. Altered surgical anatomy deep enteroscopy has been shown to have similar safety and efficacy to competitive technologies, particularly in cases of Roux-en-Y ERCP cases. Spiral enteroscopy is safe and effective for deep small bowel enteroscopy and diagnostic yield and therapeutic yields are similar to alternate technologies. There are bright future applications of the technology with enteroscopes and an integrated spiral. Spiral enteroscopy is an advanced technique that can be performed by any skilled endoscopist.

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Introduction

The world of deep enteroscopy has changed significantly in the last decade. In the last ten years we have seen the introduction of a number of small bowel visualization devices. The newest being spiral enteroscopy(SE). All current deep enteroscopy techniques take advantage of the small intestine having a moveable mesentery that can be plected on the enteroscope. Spiral enteroscopy converts rotational

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energy into linear force to pull the intestine on the enteroscope and the mobile mesentery allows this to occur.

Spiral enteroscopy (SE) is a technique that was first introduced in 2005 by Akerman and Cantero [2] for deep small bowel intubation. SE has now been used in a large number of standard and altered anatomy deep enteroscopy including ERCP cases and placement of enteral stents. The SE technique is performed by placing an overtube (Discovery SB) over an enteroscope (inner diameter less than 9.4 mm). The overtube has spiral raised element located at the distal end which aids in the advancement of the enteroscope through the small bowel (SB). This is accomplished by a rotational movement which pleats the SB on the enteroscope and allow for propulsion into the bowel.

Diagnosis and treatment of SB disease has been a clinical challenge for years and not until 1980's with the introduction of the Sonde enteroscopy was there a method to visualize the entire small intestine without surgery. However, this method has fallen out of favour due to lack of therapeutic capabilities, long procedure times and discomfort to patients. The small bowel is well designed to thwart standard push technique through the small intestine. Push enteroscopy was the next modality to be used but was difficult to advance due to looping within the stomach and stretching in the proximal jejunum. In 2001 Yamato et al commercialized Double Balloon Enteroscopy (DBE) which used an overtube with repetitive inflation and deflation of balloons pull the SB onto the overtube. The Single Balloon Enteroscopy (SBE) followed the DBE. In this technique, a single balloon hooks the SB and allows for pleating of the SB over the enteroscope. Comparative studies have found that SE has comparable safety and efficacy with decreased procedure time and increased control of withdrawal [6,7].

In the first study by Akerman and Cantero [2], an Endo-ease discovery SB overtube and a paediatric colonoscopy was used as the prototype. This initial work established the safety and efficacy of the SE technique and led to advancement in the technology with a newly designed Discovery SB (DSB) overtube that is 118 cm in length with a five mm high Spiral that spans 21 cm of the distal end and will accept an enteroscope 9.4 mm or less in diameter. The newly designed Discovery SB overtube has a smaller diameter with softer spirals. Initial studies done by Akerman et al with the new DSB overtube showed an increase depth of insertion and shorter procedural times then seen in the original design [3] The distal end of the discovery SB overtube has a locking device which allows for the fixation of the overtube to the endoscope while, still allowing for the rotation of the device at the proximal end. The proximal end also contains two handles which aids in this rotation.

Spiral enteroscopy can be performed with a single physician and a technician. A recent abstract presented by Akerman et al [4] demonstrated SE performed with one physician and non-MD tech without previous training on the technique. 11 patients with mean age of 52 years old were examined. The time to maximal depth was 27.6 min and total procedural time was 41.7 min. The maximal depth beyond the LOT was 314 cm. No serious complication was noted with mild mucosal trauma in 36% of the cases. The study concluded that physicians who mastered the technique were able to perform the procedure with a non-MD technician.

There are several key points in the set up and performance of the SE technique. Lubrication of the internal lining of the Discovery SB overtube is done before inserting the enteroscope. The device is then locked onto the enteroscope at 22 cm allowing for the distal tip of the enteroscope to be free of any overtube which allows for flexibility and easier progression through the upper GI tract to the ligament of Trietz (LOT). Once past the LOT, the small bowel can be pleated onto the scope with rotation of the spiral due to the free mobility of the SB. Advancement at this point is made by clockwise spiral motion. Once the spiral motion is no longer able to pleat the SB, the overtube is then unlocked from the scope and the scope is maximally advanced into the small bowel. The Discovery SB overtube may rotate while hooking and suctioning the small bowel along with withdrawing the enteroscope through the overtube. This can assist deeper small bowel intubation. The withdrawal of the enteroscope is accomplished by unlocking the enteroscope and slowly rotating the scope in a counterclockwise direction allowing time for the intestine to slowly be fall off the endoscope. Once the overtube reaches the stomach at about 60 cm, the overtube is unlocked from the enteroscope to allow for careful inspection of the LOT and duodenum. The Scope is then reattached to the overtube and the entire device is removed by a counterclockwise motion. An additional advantage to the use of SE is none of the components contain any latex unlike the balloons most commonly used in DBE [4].

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