

# Case Presentation: Upper Enteroscopy Using a New Single-Balloon Technique Employing a Standard Endoscope

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## PATIENT HISTORY

A 68 year old obese white male with history of coronary artery disease, congestive heart failure, diabetes type 2, chronic renal failure and history of intermittent melena and COPD on continuous O<sub>2</sub>, was referred to our center 18 months ago for management of persistent mid-small bowel bleeding. He originally presented 6 years earlier with profound fatigue and Hgb of 7.5. Outside work-up included a normal colonoscopy and an EGD showing 2 duodenal angioectasias which were treated with APC with no improvement. A VCE done at the outside office showed several additional angioectasias in the proximal and mid-small bowel. Push enteroscopy was able to find and treat 3 additional AVMs with a fourth one, oozing blood “just beyond reach”. Respiratory instability was noted during both endoscopic procedures done under moderate sedation. Prior to arrival at our center, the patient was receiving 2 U PRBC approximately every 3 months as well as oral and, periodically, intra-venous iron. The patient had been on aspirin and clopidogrel for his coronary artery stent in the past; clopidogrel was discontinued due to his persistent bleeding. The patient suffered significant functional impairment at Hgb levels less than 8, essentially being confined to a wheel-chair and was referred to our center for further management.

## ENTEROSCOPY: DBE PROCEDURE

An anterograde double-balloon enteroscopy was initially performed under general anesthesia due to the patient’s frail respiratory status. The DBE found approximately 10 AVMs in the proximal and mid-jejunum, up to 100 cm from the pylorus, some with mild oozing. Advancement beyond this point showed no further angioectasias. A tattoo was placed at the point of maximal insertion which was estimated at 250cm. The patient required hospitalization for 23 hours for observation following the procedure due to the slow recovery and frequent oxygen desaturation post-anesthesia. The patient experienced significant improvement after the procedure and his hemoglobin rose above 11 while continuing aspirin. No further transfusions or iron infusions were needed in the 12 months following DBE. However, in the last 6 months, his hemoglobin started drifting again below 8 and melena recurred. He reinitiated blood transfusions and iron supplements. Consideration was given to repeating the DBE, however the requirement for general anesthesia and post-procedure recovery history created logistical concerns.

## ENTEROSCOPY – NEW BALLOON TECHNIQUE

Since most AVMs were relatively proximally located in the jejunum, but beyond the reach of push enteroscopy, a decision was made to employ a new FDA-cleared balloon device, which facilitates deep enteroscopy and ileoscopy with standard endoscopes (NaviAid™ AB; SMART Medical Systems Ltd., Ra'anana, Israel). The device is a unique balloon catheter, which is inserted through a standard endoscope’s operative channel, advanced ahead of the scope and inflated to anchor in the small-bowel. The endoscope slides over the anchored catheter which is gently tensioned, to produce a push-pull advancement step. Repetitive steps advance the standard endoscope deep in the small bowel. Since the catheter is inserted through the instrument channel of the endoscope, it can be introduced at any point during the procedure and no special assembly is required.

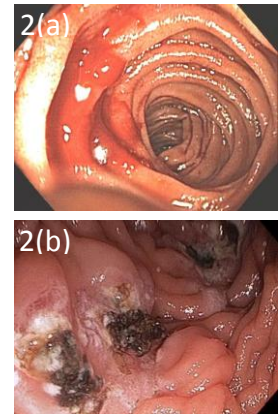
In this case, an Olympus CF H-180AL video-colonoscope was used (Length: 160 cm; Operative channel: 3.7 mm). The anesthesia used was moderate conscious sedation with midazolam and fentanyl.

The first angioectasia was reached at approximately 60 cm from the pylorus, after the first “reduction” in approximately 5 minutes from the start of the procedure. The balloon catheter was replaced with an APC catheter with successful ablation of the lesion. The balloon catheter was then re-inserted to facilitate further advancement.

Upon further push-pull maneuvers, seven additional AVMs were found within 100 cm from the pylorus, including one with active bleeding. All were successfully treated with APC. The point of maximal insertion estimated at 140 cm was reached in approximately 17 minutes (including the time required for therapy). The previously placed DBE tattoo was not reached. The procedure ended after 25 minutes. No desaturation and no hemodynamic instability were encountered.



*Figure 1: Balloon catheter advancing through the operative channel ahead of the endoscope*



*Figure 2: 80cm post-pyloric bleeding angioectasia (a) prior to, and (b) following APC of lesions*

## CONCLUSIONS

The presented new technique provided relatively easy advancement of the scope beyond the reach achieved with traditional push enteroscopy. The balloon was felt to be fairly limber and caused little trauma even with blind advancement. After inflation, the balloon provided a stable platform for pleating the small bowel. Several maneuvers were possible including withdrawal of the balloon towards the scope or “on-block” reduction of the scope-balloon ensemble.

There was adequate visualization behind and around the balloon, and reasonable visualization “through” the inflated balloon; this actually splays out the small bowel folds which may improve the detection of some vascular lesions.

The use of an auxiliary irrigation port (Waterjet® device) allowed performance of lavage while advancing the scope and/or balloon. The balloon controller was easy to use (foot-operated) and the interchange of the NaviAid™ balloon with other devices (needle, APC) was relatively easy and quick.

Overall the device appeared safe and well tolerated and has supplanted the need for DBE and general anesthesia by providing access beyond the reach of traditional push enteroscopy in a relatively short period of time and with only moderate sedation.

