

# Combined Colonoscopy and Three-Quadrant Hemorrhoidal Ligation: 500 Consecutive Cases

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**PURPOSE:** This study was designed to evaluate the safety and efficacy of combining outpatient colonoscopy with simultaneous three-quadrant hemorrhoidal ligation in patients with symptomatic internal hemorrhoidal disease. **METHODS:** A four-year analysis of patients undergoing combined colonoscopy and synchronous three-quadrant hemorrhoidal ligation was performed. Indications for the procedure were patients with symptomatic internal hemorrhoids who had failed conservative management and who also required colonoscopy. Conventional colonoscopy was performed under moderate sedation, immediately followed by synchronous three-quadrant hemorrhoidal ligation, using a TriView™ anoscope and Short-Shot™ hemorrhoidal ligator. Patients undergoing this procedure were entered in a computer database, and outcomes were tracked. Patients requiring repeat ligation, surgical intervention, or readmission within 30 days were identified and further analyzed. **RESULTS:** Five hundred patients underwent colonoscopy with simultaneous three-quadrant internal hemorrhoid ligation during the study period. Four hundred sixty-seven patients (93.4 percent) had complete resolution of their symptoms and required no further treatment. Thirty-three patients (6.6 percent) required repeat ligation, and 11 (2.2 percent) required completion surgical hemorrhoidectomy for persistent symptoms. Fifty-two patients (10.4 percent) required incidental biopsy/polypectomy during the colonoscopy. Two incidental colon carcinomas were identified, and ligation was deferred. No patients required admission for bleeding after the procedure. There were no cases of pelvic sepsis, and

no patients required emergent surgical intervention. **CONCLUSIONS:** Combining colonoscopy with three-quadrant hemorrhoidal ligation is a safe and effective method of treating symptomatic internal hemorrhoids. The procedure is convenient for both physician and patient and makes more efficient use of time and resources. [Key words: Internal hemorrhoids; Hemorrhoidectomy; Nonsurgical treatment; Hemorrhoidal ligation; Colonoscopy]

The ligation of internal hemorrhoids is a well-established method of treating patients with symptomatic hemorrhoidal disease. Blaisdell<sup>1</sup> first reported ligation of internal hemorrhoids using a surgical “slip knot,” and the procedure was modified by Barron,<sup>2</sup> using rubber bands cut from a rubber urinary catheter and fired from a modified umbilical ligator. Since these early reports, rubber band ligation has been demonstrated to be the most effective means of addressing symptomatic internal hemorrhoids compared with other modalities, such as injection sclerotherapy or infrared coagulation.<sup>3–10</sup> Rubber band ligation of internal hemorrhoids also has been demonstrated to have fewer complications, is less expensive, and is associated with less patient discomfort than traditional surgical hemorrhoidectomy.<sup>11,12</sup> Sepsis after ligation is a rare but recognized complication,<sup>13–17</sup> and patients with immunosuppressive disorders are at higher risk.

The established technique of rubber band ligation consists of ligation of a single hemorrhoidal bundle, followed by repeat ligations as necessary after a period of several weeks. Lau *et al.*<sup>18</sup> and Lee *et al.*<sup>19</sup> investigated the practice of ligating multiple hemor-

Dr. Armstrong has a patent-licensing agreement with Cook Endoscopy for the TriView™ anoscope.

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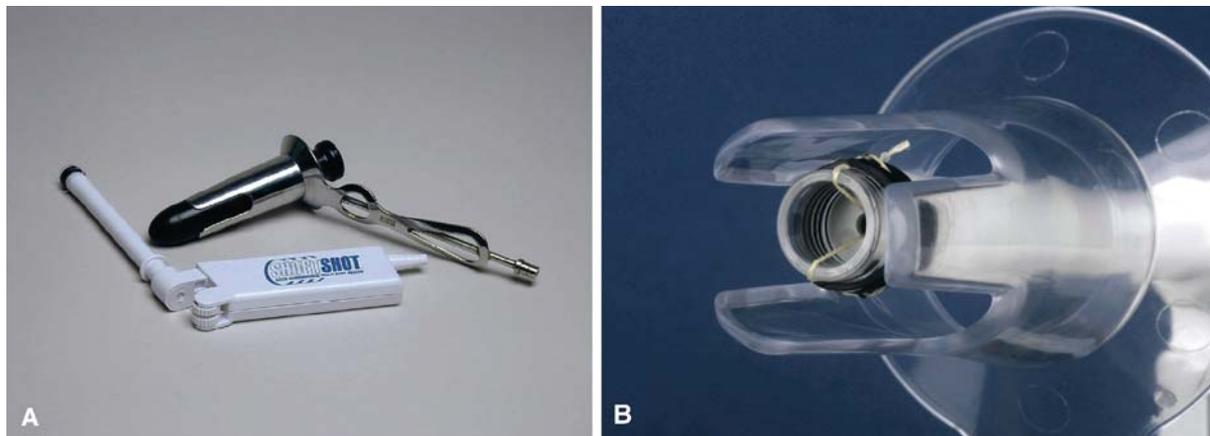
rhoidal bundles at the same setting and demonstrated that this was a safe, convenient, and a cost-effective practice. The senior author<sup>20</sup> described synchronous three-quadrant hemorrhoidal ligation by using a modified three-quadrant anoscope, with apertures at left lateral, right anterior, and right posterior quadrants, the usual anatomic hemorrhoidal locations. This modified anoscope allows for three-quadrant ligation without reinserting the anoscope three separate times, thereby facilitating the procedure and resulting in less discomfort for the patient. This modification is as equally effective at symptom resolution as were three separate ligations in addressing hemorrhoidal symptoms.

Patients with symptomatic internal hemorrhoids commonly present with complaints of lower gastrointestinal bleeding and often lack previous total colonic evaluation before seeking surgical evaluation for their hemorrhoids. The clinician is thereby faced with the dilemma of which problem to address initially, and one procedure is delayed based on clinical suspicion or physician preference. The most convenient method would be to perform synchronous hemorrhoidal ligation immediately after colonoscopy, because the patient has undergone a bowel preparation, is under moderate sedation, and is under constant hemodynamic monitoring. We present our experience with 500 patients treated with concurrent colonoscopy and ligation of three hemorrhoidal bundles.

## PATIENTS AND METHODS

Patients presenting with symptomatic internal hemorrhoids and requiring total colonic evaluation were prospectively enrolled to undergo colonoscopy combined with three-quadrant hemorrhoidal ligation between January 2003 and January 2007. Indications for the procedure were patients with symptomatic internal hemorrhoids (bleeding or prolapse) who also required colonoscopy. Colonoscopy was performed based on standard indications, most commonly rectal bleeding and the age of the patient. Patients with external hemorrhoidal disease or other anorectal pathology, such as fissure, fistula, or patients with Crohn's disease, were excluded. Patients with known coagulopathy or profound immunosuppression also were excluded. Patients taking oral anticoagulant or nonsteroidal medications were instructed to discontinue the medications for ten days before the procedure and to resume ten days after the procedure.

All patients underwent standard mechanical bowel preparation the day before the procedure. Colonoscopy was performed with moderate sedation by using Meperidine (25–50 mg) and Midazolam (2–5 mg). The procedure was performed with the patient in the left lateral position and using continuous hemodynamic monitoring. On completion of the colonoscopy, and with the patient still in the left lateral position, the TriView™ anoscope (Cook Endoscopy, Winston



**Figure 1.** A. The TriView™ anoscope is inserted into the anal canal with apertures located at the left lateral, right anterior, and right posterior quadrants—the usual hemorrhoidal locations in man. B. The multiple hemorrhoidal suction-ligator (Short Shot™) is then used to ligate all three internal hemorrhoids without the need to reinsert the anoscope three times.

Salem, NC; Fig. 1 A) was inserted in the anal canal, exposing the left lateral, right anterior, and right posterior internal hemorrhoids above the dentate line. Using the disposable multiple hemorrhoidal suction-ligator (Short Shot™; Fig. 1 B), routine three-quadrant hemorrhoidal ligation was performed, approximately 1 cm proximal to the dentate line.

Patients were instructed to perform warm soaks as needed, to take oral supplemental fiber, and increase their fluid intake for two weeks after the procedure. Patients were given written instructions to take acetaminophen as needed for discomfort and to call if they experienced excessive pain, bleeding, fever, or urinary dysfunction. All patients were followed up in an outpatient setting between two and four weeks after the procedure and thereafter as clinically indicated.

Outcomes and follow-up were tracked by using a prospectively maintained computer database of patients undergoing colonoscopy and ligation. Patients requiring repeat ligation, surgical hemorrhoidectomy, or 30-day hospital readmission were identified and further analyzed.

## RESULTS

Five hundred patients underwent synchronous three-quadrant internal hemorrhoid ligation during the study period (Table 1); 467 patients (93.4 percent) reported symptomatic relief after the procedure and required no further intervention. Thirty-three patients (6.6 percent) required repeat ligation for persistent symptoms, and four patients (0.8 percent) required a total of three ligations. Repeat ligation was performed at a mean of six weeks after the original procedure, and therefore represents a technical failure, rather than long-term hemorrhoidal recurrence.

**Table 1.**

Results of Three-Quadrant Internal Hemorrhoidal Ligation	
Results	
Colonoscopy-ligation	500 (100)
Symptomatic resolution	467 (93.4)
Repeat ligation	33 (6.6)
Polypectomy/biopsy	52 (10.4)
Surgical hemorrhoidectomy	11 (2.2)

Eleven patients (2.2 percent) required surgical hemorrhoidectomy for persistent symptoms of bleeding or prolapse. Surgical hemorrhoidectomy was performed at a median of six weeks after the original procedure, again a representation of technical failure rather than recurrent disease or complication. The earliest hemorrhoidectomy was performed two weeks after the procedure. No patient required emergency hemorrhoidectomy. In addition, 14 patients (2.8 percent) required surgical excision of thrombosed external hemorrhoids subsequent to hemorrhoidal banding.

Fifty-two patients (10.4 percent) required incidental biopsy or polypectomy during the colonoscopic evaluation. Two unsuspected colonic carcinomas were identified in the series, and the planned ligation was deferred. There were no incidences of urinary retention and no patients required admission for bleeding after the procedure. In addition, there were no cases of pelvic sepsis in the study population.

## DISCUSSION

Rubber band ligation is a safe and effective modality to treat symptomatic internal hemorrhoidal disease. The traditional practice of ligating a single hemorrhoid at a time and repeating the procedure on three separate occasions is needlessly time-consuming and inconvenient for the patient. The practice of multiple hemorrhoidal ligations has been previously demonstrated to be safe and has not been associated with any greater morbidity than individual hemorrhoidal ligation.<sup>16,17</sup> Synchronous ligation of all three internal hemorrhoids, using a modified three-aperture anoscope, makes multiple hemorrhoidal ligation easier to perform and patients experience less discomfort than with conventional ligation.<sup>20</sup> The practice of combining hemorrhoidal ligation with colonoscopy has the added advantage of eliminating the possibility of serious colonic pathology, as well as addressing symptomatic internal hemorrhoids at the same setting. Colonoscopy-ligation is technically easier because of the disposable suction ligator (Short Shot™), which facilitates ligation, compared with the traditional McGiveny ligators that are widely used in the office setting. Additionally with the performance of hemorrhoidal ligation at the same setting as colonoscopy,

the patient has undergone a mechanical bowel preparation and is under moderate sedation, making this procedure easier for the surgeon to perform and more comfortable for the patient compared with office ligation without sedation. The addition of intravenous analgesia also may facilitate ligation of the internal hemorrhoids compared with the nonsedated state, as a result of enhanced visualization with the TriView™ anoscope. In addition, management of the occasional vagal episode is safer and more objective with a patient under constant hemodynamic monitoring than in the unmonitored office setting. In addition, the TriView™ anoscope provides better visualization of all three internal hemorrhoids compared with conventional anosopes.

In the current study, 93.4 percent of patients reported resolution of their internal hemorrhoidal symptoms within four weeks of the procedure. Patients described minimal discomfort after the procedure, other than mild cramping, which was usually attributable to sphincter spasm and responded to warm soaks and fiber supplements. Repeat ligation was required in only 6.6 percent of the study population. The need for repeat ligation was recognized early after the procedure, and repeat ligation was performed usually within six weeks of the first procedure. This indicates that these failures were a result of persistent, rather than recurrent disease, and represent failed procedures. Overall only 2.2 percent of the current study population required surgical hemorrhoidectomy. Surgery was performed on an elective basis for persistent prolapse or edematous external components, obviously not addressed with rubber band ligation. No patient required emergency or urgent hemorrhoidectomy or other surgical procedure. The small number of patients presenting with thrombosed external hemorrhoids after this procedure likely represent an alteration in local blood flow after the ligation of all three internal hemorrhoidal columns rather than the traditional single-column or double-column ligation. Patients should be informed of this risk preoperatively.

Colonoscopy with synchronous three-quadrant hemorrhoidal ligation is demonstrated as a safe, convenient, and cost-effective method of treating symptomatic internal hemorrhoids. The procedure is simple to perform, results in minimal discomfort, and is associated with few serious complications. Combining the two procedures is convenient for patients

and physicians and is economically beneficial in terms of manpower and resources.

## CONCLUSIONS

Combining colonoscopy with synchronous three-quadrant hemorrhoidal ligation is a safe, convenient, and cost-effective method of treating symptomatic internal hemorrhoids. Colonoscopy-ligation, performed under moderate sedation, and after mechanical bowel preparation is effective, convenient, and well tolerated. The technique excludes serious colonic pathology while addressing symptomatic hemorrhoidal disease at one setting

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