



Endoscopic clip therapy in the gastrointestinal tract: Bleeding lesions and beyond

AUTHORS: Jonathan Cohen, MD, Irphan Gaslightwala, MD

SECTION EDITOR: John R Saltzman, MD, FACP, FACG, FASGE, AGAF

DEPUTY EDITOR: Anne C Travis, MD, MSc, FACG, AGAF

All topics are updated as new evidence becomes available and our [peer review process](#) is complete.

Literature review current through: **Sep 2023**.

This topic last updated: **Mar 14, 2023**.

INTRODUCTION

In 1975, two Japanese groups developed a method by which to deploy a hemostatic metal clip through a flexible endoscope for the purpose of hemostasis [1,2]. The early clips were cumbersome and difficult to use, complicated by frequent misfire rates and technical difficulties in positioning the clip during endoscopy. However, their use spread rapidly through Japan initially and then in Europe. More recently, endoscopic clipping technology has also gained greater acceptance in the United States.

Endoscopic clips are used widely not only for the treatment of gastrointestinal bleeding but also for a variety of other gastrointestinal problems. In this review, we will describe the various clips currently available along with basic principles of clip application. The practical aspects of particular applications and the evidence supporting their role will also be presented.

AVAILABLE CLIPS

The most recent iterations of endoscopic clips are a marked improvement over earlier models. They are available in multiple sizes and some can be rotated or reopened while being deployed through the endoscope [3]. Four companies produce disposable endoscopic clips for use in the United States market.

- Olympus USA, Corp. produces the QuickClip2, which is a rotatable clip device ([picture 1](#)). These devices are produced in two sizes, 8 mm or 12 mm in width when opened and 165 cm to 230 cm in length, allowing deployment through a colonoscope.
- Boston Scientific, Inc. produces the Resolution Clip, which cannot be rotated but can be reopened after closure if repositioning is required ([picture 2](#)). The Resolution Clip has an opening width of 11 mm and is available in lengths of 165 cm and 235 cm.
- Cook Medical produces the Instinct Endoscopic Hemoclip. It opens to a width of 16 mm and allows for 360 degree bidirectional rotation. In addition, the jaws can be reopened to reposition the clip ([picture 3](#)).
- ConMed produces the DuraClip repositionable hemostasis clip. It comes in 11 and 16 mm opening widths and is rotatable.
- Micro-Tech produces the rotatable 8, 11, and 16 mm SureClip, and the newer Lockado, which is also a rotatable, repositionable clip with a short tail. It comes in three opening widths: 11, 16, and 22 mm. These can be used with a side-viewing endoscope. They also make a twin grasping hemoclip forceps called the Dual Action Tissue Clip, in which each arm can independently be opened to a width of 7.5 mm. This design allows the user to apply traction to each edge of a mucosal defect to allow for closure of mucosal defects.
- Ovesco Endoscopy AG manufactures a large over-the-scope clip device that deploys similarly to band ligation. It is used for hemostasis or to close mucosal defects. Opposing sides of tissue are suctioned and/or grabbed via special accessories and pulled into a cap-like cylinder attached to the tip of the endoscope ([picture 4](#)).
- STERIS Endoscopy produces the Padlock Clip, which is another over-the-scope clip device that can be used for hemostasis or to close mucosal defects.

All clips apart from the over-the-scope clip fit through the standard 2.8 mm biopsy channel of an endoscope or colonoscope, so they can be used with both "diagnostic" and "therapeutic" (large-channel) endoscopes. There are no endoscopic clips that are long enough to be deployed through a standard push enteroscope longer than 180 cm. The specifications of clip devices commercially available in North America are summarized in table 1 ([table 1](#)).

Reusable clip deployment devices from Olympus are still available but used infrequently in the United States mainly because they are difficult to clean and sterilize. In Europe the reusable deployment devices (EZ Clip) are used more commonly; they are available in six different models and sizes of endoscopic clips.

PRINCIPLES OF HEMOSTASIS, TISSUE APPPOSITION, AND RETENTION

Endoscopic clips are steel, mechanical devices that cause hemostasis by grasping vessels or surrounding tissue. Although they cause tissue compression, they do not cause inflammation or acute tissue injury such as occurs with sclerosants or thermal coagulation.

Control of bleeding is generally successful when endoscopic clips are used for bleeding acute ulcers, or lesions such as Mallory-Weiss tears. By contrast, control of bleeding is less successful for lesions that are fibrotic (such as chronic ulcers), especially when using smaller endoscopic clips or those that cannot be rotated. A failure rate as high as 20 percent has been described with chronic ulcers [4,5].

Apposition of the sides of lesions such as ulcers, tears, or acute perforations is a fundamental surgical principle for tissue repair and healing that is often possible with endoscopic clips. Repair and healing are possible if the endoscopic clip can be placed across the lesion into soft, normal-appearing tissue. There is some evidence that ulcer healing is accelerated when the sides are apposed and that ulcers heal more rapidly with endoscopic clips compared with thermally-treated ulcers [6].

Retention rates (the duration that endoscopic clips remain in position until sloughing into the lumen) on ulcers vary remarkably. Studies in a porcine model suggest that the Resolution device may remain attached for a longer duration (four to five weeks) than the other commercially available devices [7], but this observation has not been confirmed in humans. To be successful, endoscopic clips must remain in place at least until collagen deposition occurs, which may take several weeks. Longer, rotatable, grasp and release endoscopic clips or clips with interlocking jaws appear to be the most promising for these indications. TriClip models have the lowest retention rate on acute or chronic ulcers (<25 percent at one week), whereas the other endoscopic clips have >50 percent retention after one week and may actually stay on longer than ulcer healing time.

GENERAL PRINCIPLES OF APPLICATION

The specifics of deploying the different brands of endoscopic clips are different for each type. However, the general principles for effective deployment remain the same and many of the basic techniques are used for deployment regardless of the lesion being treated. Endoscopists and assistants should be trained in the specifics of several models.

- For Olympus QuickClip models, the handle of the endoscopic clip device is partially closed until the jaws are opened to their maximal opening. The endoscopic clip is then pressed into the soft tissue and the handle of the clip device is fully closed, deploying the clip into the tissue.
- Boston Scientific Resolution clips are deployed in a similar method, although the jaws can be reopened after closing them on the lesion.
- The Cook TriClip deployment involves closing the handle to the desired force of clip grasp and then releasing the clip by opening the handle.
- The Cook Instinct Clip is fully rotational and also allows for the jaws to be opened and closed to reposition the clip prior to fully closing to deploy.

Effective intervention requires good visualization of the lesion, whether it is an ulcer, a tear, or a perforation. Once the lesion is identified, the endoscope is stabilized with the target lesion in view. The endoscopic clip is then passed through the suction channel of the endoscope and extended into the field of view. The endoscopic clip is primed for firing and maneuvered into position. Some endoscopic clip models can be rotated to improve positioning. Once the endoscopic clip is positioned adequately, it is extended so that the jaws are across the target of interest and pressed into the adjacent tissue. The endoscopic clip is then fired, causing the jaws to close and tightly appose the tissue. The Boston Scientific and Cook Medical Instinct Endoscopic Hemoclip jaws close on the target before deployment of the endoscopic clip. As a result, the jaws on these clips can be reopened and repositioned before deployment. Several endoscopic clips may be required for complete intervention.

USES FOR THROUGH-THE-SCOPE ENDOCLIPS

Bleeding peptic ulcers — Before endoscopic clips, the mainstay of hemostasis was injection therapy or various thermal coagulation methods. More recently, at least nine randomized controlled trials have evaluated the efficacy of endoscopic clips used alone or in combination with other methods. The majority used the standard sized Olympus endoscopic clips (8 mm open) and were conducted outside of the United States. The comparator groups differed among the trials, trial quality was variable, and in many the sample size may have been too small to detect important differences.

Despite these limitations, the data considered together suggest that Olympus endoscopic clips have similar efficacy as thermal coagulation methods [8]. There are no randomized studies of newer endoscopic clips for emergency hemostasis, or comparisons of different types of

endoscopic clips. Also, there are no comparisons of different sizes of endoscopic clips. More randomized studies by experienced and trained endoscopists will be needed to study the newer endoscopic clips, the grasp and release improvement, and whether larger size makes a difference for emergency hemostasis.

Clinical trials — The following summarizes the range of findings in the controlled trials. Two compared endoscopic clips to thermal coagulation [4,9], five to injection monotherapy [10-14], and two to combination therapy with injection and coagulation [15,16].

- Studies comparing the endoscopic clip to the heater probe have shown mixed results for initial control of bleeding and rebleeding rates [4,9]. One report of 113 with major stigmata of ulcer hemorrhage found no difference in hemostasis, 30-day mortality, or need for emergency surgery [9]. Patients randomized to the endoscopic clip group had significantly lower rebleeding rates (2 versus 21 percent). However, only 60 percent of active bleeders were successfully treated with the heater probe, a rate much lower than in previous reports.
- Another study of 80 patients found a higher rate of control of initial bleeding with the heater probe compared with the Olympus endoscopic clip (100 versus 85 percent) [4]. Rebleeding rates were not significantly different.
- Rebleeding rates were significantly lower with the endoscopic clip compared with distilled water injections (10 versus 28 percent) in high-risk bleeding ulcers in a single study [10].
- In one trial, recurrent bleeding was decreased with endoscopic clips compared with hypertonic saline-epinephrine injection (2 versus 15 percent) while combination therapy was no more effective than endoscopic clip alone [11]. By contrast, treatment failure was significantly higher in the endoscopic clip group compared with epinephrine-polidocanol injection therapy (34 versus 6 percent) or a combination therapy arm (25 percent) in another study [12].
- No significant differences in procedure duration, initial hemostasis, or rebleeding rates in a study of 47 patients comparing combination therapy with epinephrine injection plus monopolar electrocoagulation versus endoscopic clips [16]. As a potential confounding issue, more than 22 percent of the endoscopic clip patients were pretreated with epinephrine.

Few studies have compared the various clips to one another. One such study, comparing the Hemoclip to the TriClip in patients with high-risk bleeding peptic ulcers, found superior hemostasis with the Hemoclip, particularly in sites that were difficult to approach [17].

Special situations — There are some clinical settings in which endoscopic clips may be preferred to other hemostatic methods:

- They may be particularly useful in the treatment of ulcers in patients who are coagulopathic or require ongoing anticoagulation. In such patients, electrocoagulation will increase the size, depth, and healing time of treated lesions.
- Endoscopic clips may have an advantage in the retreatment of lesions that rebleed after initial thermal hemostasis. Animal studies support reduced injury after ulcer hemostasis with endoscopic clips versus thermal coagulation [6]. Similarly, animal data suggest that healing may be accelerated with endoscopic clips compared with thermal methods [6].

In addition, over-the-scope clips may be more effective than standard endoscopic clips for achieving hemostasis in patients with recurrent peptic ulcer bleeding. In a randomized trial with 66 patients with recurrent peptic ulcer bleeding following initially successful hemostasis, patients treated with over-the-scope clips were less likely than patients treated with standard endoscopic clips to have persistent bleeding (6 versus 42 percent, $p=.001$) [18]. Rates of recurrent bleeding within seven days were not statistically different between the groups (9 versus 16 percent, respectively, $p=.468$).

Technique — Visualization of the target bleeding site is a prerequisite for accurate deployment. Ulcers on the lesser curvature, the posterior duodenum, or the cardia increase the difficulty of deployment and clip failure rates.

For acute ulcers, the endoscopic clip should be placed so that the jaws extend beyond the ulcer edge and are embedded into the surrounding soft tissue. Multiple endoscopic clips may be required to close the walls of the lesion and achieve initial hemostasis ([picture 5](#)).

For chronic, fibrotic, or large ulcers, the endoscopic clip should be placed on the major stigmata of hemorrhage, which is usually in the base of the lesion. Whether to use clips as a single modality therapy for active bleeding and visible vessels or in combination with [epinephrine](#) injection therapy warrants further study.

Common errors to avoid:

- Deployment with clip tip too far away from the endoscope tip, leading to lack of control and precision
- Bumping of partly open clip against bowel lumen wall to displace previously placed clips (QuickClip2 or TriClip)

- Premature closure of the clip due to improper manipulation of the handle by the assistant (QuickClip2 or TriClip)
- Insufficient clips available to complete hemostasis

Mallory-Weiss tears — Endoscopic clips have theoretical advantages compared to other hemostatic techniques in actively-bleeding Mallory-Weiss tears, although they have not been extensively compared. They do not cause significant tissue damage, permit rapid tissue apposition, and have a low risk of perforation.

A few reports have described experience with endoscopic clips with Mallory-Weiss tears [19-21]. Hemostasis was successful in all patients in a study of 26 patients with active bleeding or an adherent clot [20]. In another study, Olympus endoscopic clips were compared to [epinephrine](#) injection for hemostasis of an actively bleeding Mallory-Weiss tear in 35 patients [21]. There was no difference in rebleeding rates between the two groups. There have been no studies conducted comparing the efficacy of endoscopic clips with electrocoagulation or combination therapy for the treatment of Mallory-Weiss tears. (See "[Mallory-Weiss syndrome](#)".)

Technique — The application of endoscopic clips in Mallory-Weiss tears is similar to treatment of acute ulcers or acute postpolypectomy bleeding (see '[Postpolypectomy bleeding](#)' below). Endoscopic clips should be extended so that the opened jaws are perpendicular to the long axis of the tear and applied to close the sides of the tear and stop the active bleeding. Multiple endoscopic clips may be required if the Mallory-Weiss tear is long or wide.

Dieulafoy's lesions — A Dieulafoy's lesion is defined as active arterial bleeding or an adherent clot on an underlying vessel in the absence of an ulcer. At least two controlled trials suggested that endoscopic clips can control acute bleeding and may reduce recurrent bleeding compared with injection therapy but there are no studies comparing it with thermal coagulation used alone or in combination with other methods [22,23]. Lesions in these studies were predominantly in the stomach and duodenum. Thermal coagulation has been considered the treatment of choice for hemostasis of bleeding Dieulafoy's lesions despite rebleeding rates as high as 50 percent. Other endoscopic methods have also been described.

- One report found that endoscopic mechanical hemostasis was more effective for hemostasis of bleeding Dieulafoy's lesions than injection therapy alone [22]. Although the study included band ligation in three patients in the mechanical hemostasis arm, the majority underwent endoscopic clip therapy. Mechanical hemostasis was more effective in initial hemostasis (92 versus 75 percent), recurrent bleeding (8 versus 33 percent), and emergency surgery (0 versus 17 percent) [22].

- A second trial comparing endoscopic clips to [epinephrine](#) injection found similar rates of initial hemostasis but dramatically lower rates of rebleeding in the endoscopic clip arm (0 versus 35 percent) [23].

Technique — For bleeding Dieulafoy's lesions, the bleeding artery must be identified precisely so that the endoscopic clip can be accurately placed on the bleeding point. If the orientation of the bleeding vessel can be identified, the jaws of the endoscopic clip should be placed perpendicularly across the vessel. It is important to grasp enough soft tissue around the bleeding vessel to mechanically compress it.

The TriClip is well suited to perpendicular deployment, although the longer Resolution Clip may allow for more tamponade with soft tissue and longer retention rates. There are no randomized comparisons of different endoscopic clips for bleeding Dieulafoy's lesions.

Diverticular bleeding — Only case series have described experience with endoscopic clips in diverticular bleeding [24-26]. These have suggested that they may provide as effective hemostasis as thermal coagulation, but there is decreased perforation risk, particularly for lesions at the base of the diverticulum where the wall is thin. An additional benefit of endoscopic clip application is the potential to serve as a marker if rebleeding occurs and repeat colonoscopy, angiography, or surgery is required. However, other methods (such as tattooing) may be more reliable if permanent marking is desired. (See "[Tattooing and other methods for localizing gastrointestinal lesions](#)".)

Technique — Most of the reports described the application of endoscopic clips either directly to bleeding vessels within the diverticula or across the mouth of the diverticulum to pinch it closed. Endoscopic clips placed at the base of the diverticulum may pose less of a risk of perforation compared with thermal coagulation therapy.

There are settings in which the bleeding point or stigmata cannot be clipped directly or where the stigmata is at the mouth or neck of the diverticulum. In such cases, the diverticulum can be closed with endoscopic clips. There are several methods to accomplish this. As a general rule, the jaws of the endoscopic clip should be able to traverse the width of the diverticulum. However, if the diverticulum is large, longer endoscopic clips may be used or endoscopic clips may be initially applied in a sequential fashion from one side of the diverticulum, gradually "zipping" the mouth closed. Several endoscopic clips, in order to close the diverticulum effectively, are usually required. Injection of dilute [epinephrine](#) (eg, 1:20,000 in normal [saline](#)) prior to the application of an endoscopic clip may assist with hemostasis and by everting the base of the diverticulum, thereby making stigmata more accessible ([picture 6](#)).

Postpolypectomy bleeding — Endoscopic clips have been used for postpolypectomy bleeding and to prevent postpolypectomy bleeding in high-risk settings. However, there have been few studies.

Endoscopic clips were effective in controlling immediate postpolypectomy bleeding in most patients in two series with a total of 119 patients [27,28]. Despite these excellent results, there are no comparative studies of clipping versus thermal modalities. Prophylactic use of endoscopic clips prior to polyp removal for prevention of immediate bleeding has also been proposed, but its efficacy is unclear, and this technique may carry a risk of mucosal burn or perforation. A randomized controlled trial showed a reduction in rates of immediate bleeding when clips were applied to the stalks of large pedunculated polyps prior to resection, suggesting that prophylactic clipping may be useful for removal of pedunculated polyps >2 cm with stalk diameter >4 mm [29]. (See "[Endoscopic removal of large colon polyps](#)".)

Delayed postpolypectomy bleeding is usually caused by ulceration at the site of the polypectomy. These bleeding lesions can be treated similarly to ulcers as described in the previous sections [28,30]. Studies have been mixed regarding the potential benefit of prophylactic clipping in preventing delayed post-polypectomy bleeds [31-33], although this may be secondary to inclusion of patients in the study populations who have a low risk of bleeding. Two randomized controlled trials have demonstrated decreased bleeding rates for polyps >2 cm located in the proximal colon resected by endoscopic mucosal resection when clipped prophylactically [34,35], while a third study of polyps >1 cm failed to show a difference [36]. It seems likely that there is a subset of patients where clipping is indicated, and that factors such as polyp size, proximal location, and patient age should be considered by the endoscopist. It is our practice to consider using clips for closure following removal of large right-sided sessile polyps when feasible, particularly in patients who need to resume anticoagulation.

Technique — When clipping is performed to prevent bleeding, an attempt should be made to close the polypectomy defect. This may be limited by patient factors such as angle of approach or size of the polypectomy defect, and one study showed that 43 percent of defects after large polypectomy could not be closed even when performed by expert endoscopists [35].

In acute postpolypectomy bleeds, there are several possible approaches to the effective application of an endoscopic clip. When the bleeding is from the stump of a pedunculated polyp, the endoscopic clip is usually most effective when placed across the stalk base. This ligates the feeding vessels responsible for the bleeding. For bleeding from sessile polyps that were resected via piecemeal or saline-assisted polypectomy, the endoscopic clip is applied directly to the bleeding site first. After control of hemorrhage, endoscopic clips can be used to close the mucosal defect, if it is large or oozing ([picture 7](#)).

Perforations and fistulas — Endoscopic clips have been used successfully in patients with gastrointestinal perforations from various causes. Case reports include treatment of perforations from fish bone ingestion [37], Boerhaave's syndrome [38], endoscopic mucosal resection [39-42], biliary sphincterotomy [43,44], duodenal polypectomy [45], and colonoscopies ([picture 8](#)) [46-48]. Endoscopic clips have also been used to manage postoperative leaks and fistulas [49].

Technique — Perforations should be closed as quickly as possible to prevent contamination. The first clip is usually deployed at one end of the perforation, with subsequent clips applied sequentially across the mucosal defect. Multiple endoscopic clips are usually required if through-the-scope clips are employed.

Although endoscopic clips may have a role in the closure of acute perforations, surgery is still the mainstay of clinically significant perforations that are chronic or complicated by contamination or infection. Surgical intervention should be considered strongly if the perforation cannot be closed quickly. Management of such patients is often best done in coordination with a consulting surgeon.

Miscellaneous — Endoscopic clips have been used creatively in a variety of other situations that are not yet widely accepted or attempted. Case reports have described the use of endoscopic clips to secure jejunal feeding tubes and other stents [50]. They may also have a role as a marker to permit identification of a lesion as described above.

USES FOR OVER-THE-SCOPE ENDOSCOPIC CLIPS

Over-the-scope clip systems involve deploying a nitinol clip using a cap that is attached to the distal tip of the endoscope and applying suction in a technique that is similar to variceal ligation. The two over-the-scope clips currently available are the Ovesco clip and the Padlock clip. Over-the-scope clips have generally been used in the setting of recurrent or refractory bleeding that cannot be controlled using through-the-scope endoscopic clips ([picture 4](#)) or to close fistulas, anastomotic leaks, acute perforations, and to help secure endoscopic stents [51-53]. Higher rates of hemostasis and lower rates of rebleeding were noted in a meta-analysis of studies comparing over-the-scope clips with standard endoscopic therapy for treatment of non-variceal upper GI bleeding in patients at high risk for rebleeding [54]. Although there are concerns regarding the generalizability of these findings, over-the-scope clips may be an effective first-line therapy when used by experienced endoscopists.

Over-the-scope clips also are being studied for initial hemostasis in patients with nonvariceal upper gastrointestinal bleeding (NVUGIB) [55-58]. In a trial with 190 patients with NVUGIB, patients were treated either with over-the-scope clips or standard endoscopic therapy. Patients treated with over-the-scope clips were less likely than those treated with standard therapy to experience rebleeding within 30 days (3.2 versus 14.6 percent, risk difference -11.4 percent, 95% CI -3.3 to -20.0 percent). Limitations of over-the-scope clips in this setting include the high-cost for the clips, high rates of bleeding after clip misfire, and difficulty achieving hemostasis when bleeding persists following over-the-scope clip application due to the presence of the clip [59].

Over-the-scope clips have also been used to facilitate endoscopic full thickness resection. When used in this way, a clip is applied to the intestinal wall to create serosa-to-serosa apposition prior to resection of a lesion. This technique is useful as an alternative to endoscopic submucosal dissection for removal of subepithelial lesions or neoplasia with extension beyond the mucosa. (See "[Overview of endoscopic resection of gastrointestinal tumors](#)", section on '[Endoscopic resection techniques](#)' and "[Endoscopic removal of large colon polyps](#)", section on '[Endoscopic mucosal resection techniques](#)'.)

The use of over-the-scope clips can be limited by difficulty in obtaining a good en-face view of the target lesion. In addition, in our experience, successful closure of chronic fistulas or anastomotic leaks is often more difficult than closure of an acute perforation and often requires multiple treatment modalities.

While over-the-scope clips cost considerably more than standard through-the-scope metal clips, cost comparisons need to include efficacy of treatment and the frequent requirement of using multiple standard clips to close a mucosal defect. While the over-the-scope clips have not yet been compared directly with through-the-scope clips for the closure of acute perforations, in a prospective study of 36 perforations in various parts of the gastrointestinal tract, over-the-scope clip placement successfully closed the defect in 29 of 33 cases attempted with a mean of 1.06 clips [60]. By contrast, a retrospective review looking at the use of through-the-scope clips to close colonic perforations reported a mean of 7.5 clips per closure to achieve similar levels of technical success [61]. When a single metal clip will suffice such as in a post polypectomy bleed of a clearly visualized stalk, the standard clip will likely be the cost-effective modality.

SUMMARY AND RECOMMENDATIONS

- **Overview** – Endoscopic clips are a mechanical clamping method that has many potential therapeutic applications. While currently available clips are relatively easy to use, they require specific practice on the part of both the endoscopist and the assistant.

- **Specific applications**

- **Peptic ulcers** – Effective hemostasis with endoscopic clips depends on the ulcer location, ulcer size and type, and the operator and assistant expertise. (See '[Bleeding peptic ulcers](#)' above.)
 - Grasp and release endoscopic clips are easier to use in emergencies.
 - For severe active bleeding, target irrigation and [epinephrine](#) injection aid in visualization of the bleeding point before endoscopic clipping.
 - Ulcers on the lesser curvature, the posterior duodenum, or the cardia increase the difficulty of deployment and clip failure rates.
 - Larger endoscopic clips have advantages over smaller endoscopic clips for hemostasis of chronic ulcers and closure of larger lesions.
 - Over-the-scope clips may have a role in the treatment of recurrent bleeding, deep chronic ulcers for which standard clip application may be difficult, and failure of standard modalities to achieve immediate hemostasis (see '[Uses for over-the-scope endoscopic clips](#)' above).
- **Mallory-Weiss tears** – Endoscopic clips can be used to control active bleeding from Mallory-Weiss tears as effectively as injection therapy in Mallory-Weiss tears. Although there have been few studies, they have theoretical advantages compared with other methods. They do not cause significant tissue damage, they permit rapid tissue apposition, and have a low risk of perforation. (See '[Mallory-Weiss tears](#)' above.)
 - The endoscopic clip should be applied so that the sides of the tear are closed and the bleeding stops.
 - If endoscopic clips cannot be effectively placed, thermal and/or injection techniques should be used for hemostasis.
 - Larger or multiple endoscopic clips may be necessary for closure and hemostasis of longer or deeper tears.
- **Dieulafoy's lesions** – Endoscopic clips can control acute bleeding from Dieulafoy's lesions and may reduce rebleeding rates compared with injection therapy. There are no large studies comparing it to thermal or combination therapies. (See '[Dieulafoy's lesions](#)' above.)

- Good positioning is vital for effective clip placement on the bleeding artery. Effective endoscopic clip deployment will be less likely if the jaws are in a tangential position.
 - The jaws of the endoscopic clip should be placed across the bleeding Dieulafoy lesion whenever possible.
 - There should be enough tissue grasped around the bleeding vessel, so that strong mechanical hemostatic pressure can be applied.
 - Grasp and release of larger endoscopic clips are easier to deploy and appear to be more effective for actively bleeding Dieulafoy's lesions.
- **Diverticular bleeding** – Compared to thermal coagulation, endoscopic clips may provide similar hemostasis for diverticular bleeds and decreased risk of perforation, particularly for stigmata of hemorrhage located at the base of the diverticulum. (See ['Diverticular bleeding'](#) above.)
 - [Epinephrine](#) injection therapy prior to clip deployment should be considered, particularly for active bleeding or adherent clots.
 - To close the mouth of the diverticulum, the jaws should be extended so that sufficient soft tissue on either side of mouth can be grasped when the endoscopic clip is deployed.
 - In larger diverticula, long clips can be used or the mouth of the diverticulum may be closed in a sequential zipper fashion from one side of the diverticular opening to the other.
 - If retained, endoscopic clips may act as markers if surgery or angioembolization are required. However, other methods should also be applied via colonoscopy for longer term marking.
 - **Postpolypectomy bleeding** – Endoscopic clips are an effective method to control acute postpolypectomy bleeding, as well as potential mucosal defects from the initial procedure. (See ['Postpolypectomy bleeding'](#) above.)
 - For acute bleeding from a pedunculated polyp stalk, the endoscopic clip is most effective when deployed across the stalk to ligate the feeding vessels.

- For bleeds arising from sessile polyps removed via polypectomy, the point of bleeding should be endoscopically clipped first. Then closure of the mucosal defect can also be done if there is oozing, bleeding, or a concern about delayed healing.
- **Perforations and fistulas** – Endoscopic clips have been used successfully in patients with gastrointestinal perforations from various causes. Perforations should be closed as quickly as possible to prevent contamination. Surgery is still the mainstay of clinically significant perforations that are chronic or complicated by contamination or infection. (See '[Perforations and fistulas](#)' above.)
 - Endoscopic clips should be placed in a sequential fashion starting from one end of the perforation and extending across the perforation
 - For appropriate, accessible lesions, use of over-the-scope endoscopic clips for closure of a defect can be considered (see '[Uses for over-the-scope endoscopic clips](#)' above)
 - Prompt closure of an acute perforation is essential to prevent contamination of adjacent organ spaces
 - On occasion, clips may be used in combination with other modalities to manage postoperative leaks or fistulas
 - If endoscopic clips cannot be effectively deployed or the perforation is chronic, large, or contaminated, early surgical intervention should be considered strongly

ACKNOWLEDGMENT

The authors and UpToDate thank Ilseung Cho, MD, who contributed to earlier versions of this topic review.

Use of UpToDate is subject to the [Terms of Use](#).

REFERENCES

1. Hayashi T, Yonezawa M, Kawabara T. The study on staunch clip for the treatment by endoscopy. *Gastroenterol Endosc* 1975; 17:92.
2. Kuramata H. Evaluation of gastrofiberscope for treatment (TGF proto-type by Olympus Co). *Stomach Intestine* 1974; 9:355.

3. Daram SR, Tang SJ, Wu R, To SD. Benchtop testing and comparisons among three types of through-the-scope endoscopic clipping devices. *Surg Endosc* 2013; 27:1521.
4. Lin HJ, Hsieh YH, Tseng GY, et al. A prospective, randomized trial of endoscopic hemoclip versus heater probe thermocoagulation for peptic ulcer bleeding. *Am J Gastroenterol* 2002; 97:2250.
5. Jensen DM, Machicado GA, Hirabayashi K. Hemoclippping (CLIP) of chronic ulcers: A randomized prospective study of initial success, CLIP retention rates, and ulcer healing. *Gastrointest Endosc* 2005; 61:AB174.
6. Jensen DM, Machicado GA, Hirabayashi K. Randomized controlled study of 3 different types of hemoclips for hemostasis of bleeding canine acute gastric ulcers. *Gastrointest Endosc* 2006; 64:768.
7. Shin EJ, Ko CW, Magno P, et al. Comparative study of endoscopic clips: duration of attachment at the site of clip application. *Gastrointest Endosc* 2007; 66:757.
8. Sung JJ, Tsoi KK, Lai LH, et al. Endoscopic clipping versus injection and thermo-coagulation in the treatment of non-variceal upper gastrointestinal bleeding: a meta-analysis. *Gut* 2007; 56:1364.
9. Cipolletta L, Bianco MA, Marmo R, et al. Endoclips versus heater probe in preventing early recurrent bleeding from peptic ulcer: a prospective and randomized trial. *Gastrointest Endosc* 2001; 53:147.
10. Chou YC, Hsu PI, Lai KH, et al. A prospective, randomized trial of endoscopic hemoclip placement and distilled water injection for treatment of high-risk bleeding ulcers. *Gastrointest Endosc* 2003; 57:324.
11. Chung IK, Ham JS, Kim HS, et al. Comparison of the hemostatic efficacy of the endoscopic hemoclip method with hypertonic saline-epinephrine injection and a combination of the two for the management of bleeding peptic ulcers. *Gastrointest Endosc* 1999; 49:13.
12. Gevers AM, De Goede E, Simoens M, et al. A randomized trial comparing injection therapy with hemoclip and with injection combined with hemoclip for bleeding ulcers. *Gastrointest Endosc* 2002; 55:466.
13. Ljubicic N. Efficacy of endoscopic clipping and long-term follow-up of bleeding Dieulafoy's lesions in the upper gastrointestinal tract. *Hepatogastroenterology* 2006; 53:224.
14. Shimoda R, Iwakiri R, Sakata H, et al. Evaluation of endoscopic hemostasis with metallic hemoclips for bleeding gastric ulcer: comparison with endoscopic injection of absolute ethanol in a prospective, randomized study. *Am J Gastroenterol* 2003; 98:2198.

15. Lin LF, Siau CP, Ho KS, Tung JC. Endoscopic hemoclip treatment of gastrointestinal bleeding. *Chang Gung Med J* 2001; 24:307.
16. Saltzman JR, Strate LL, Di Sena V, et al. Prospective trial of endoscopic clips versus combination therapy in upper GI bleeding (PROTECCT--UGI bleeding). *Am J Gastroenterol* 2005; 100:1503.
17. Lin HJ, Lo WC, Cheng YC, Perng CL. Endoscopic hemoclip versus triclip placement in patients with high-risk peptic ulcer bleeding. *Am J Gastroenterol* 2007; 102:539.
18. Schmidt A, Gölder S, Goetz M, et al. Over-the-Scope Clips Are More Effective Than Standard Endoscopic Therapy for Patients With Recurrent Bleeding of Peptic Ulcers. *Gastroenterology* 2018; 155:674.
19. Yuan Y, Wang C, Hunt RH. Endoscopic clipping for acute nonvariceal upper-GI bleeding: a meta-analysis and critical appraisal of randomized controlled trials. *Gastrointest Endosc* 2008; 68:339.
20. Yamaguchi Y, Yamato T, Katsumi N, et al. Endoscopic hemoclippping for upper GI bleeding due to Mallory-Weiss syndrome. *Gastrointest Endosc* 2001; 53:427.
21. Huang SP, Wang HP, Lee YC, et al. Endoscopic hemoclip placement and epinephrine injection for Mallory-Weiss syndrome with active bleeding. *Gastrointest Endosc* 2002; 55:842.
22. Chung IK, Kim EJ, Lee MS, et al. Bleeding Dieulafoy's lesions and the choice of endoscopic method: comparing the hemostatic efficacy of mechanical and injection methods. *Gastrointest Endosc* 2000; 52:721.
23. Park CH, Sohn YH, Lee WS, et al. The usefulness of endoscopic hemoclippping for bleeding Dieulafoy lesions. *Endoscopy* 2003; 35:388.
24. Hokama A, Uehara T, Nakayoshi T, et al. Utility of endoscopic hemoclippping for colonic diverticular bleeding. *Am J Gastroenterol* 1997; 92:543.
25. Rino Y, Imada T, Iwasaki H, et al. Hemostasis of colonic diverticular bleeding with hemoclips under endoscopic control: report of a case. *Hepatogastroenterology* 1999; 46:1733.
26. Simpson PW, Nguyen MH, Lim JK, Soetikno RM. Use of endoclips in the treatment of massive colonic diverticular bleeding. *Gastrointest Endosc* 2004; 59:433.
27. Binmoeller KF, Thonke F, Soehendra N. Endoscopic hemoclip treatment for gastrointestinal bleeding. *Endoscopy* 1993; 25:167.
28. Parra-Blanco A, Kaminaga N, Kojima T, et al. Hemoclippping for postpolypectomy and postbiopsy colonic bleeding. *Gastrointest Endosc* 2000; 51:37.

29. Soh JS, Seo M, Kim KJ. Prophylactic clip application for large pedunculated polyps before snare polypectomy may decrease immediate postpolypectomy bleeding. *BMC Gastroenterol* 2020; 20:68.
30. Sobrino-Faya M, Martínez S, Gómez Balado M, et al. Clips for the prevention and treatment of postpolypectomy bleeding (hemoclips in polypectomy). *Rev Esp Enferm Dig* 2002; 94:457.
31. Liaquat H, Rohn E, Rex DK. Prophylactic clip closure reduced the risk of delayed postpolypectomy hemorrhage: experience in 277 clipped large sessile or flat colorectal lesions and 247 control lesions. *Gastrointest Endosc* 2013; 77:401.
32. Zhang QS, Han B, Xu JH, et al. Clip closure of defect after endoscopic resection in patients with larger colorectal tumors decreased the adverse events. *Gastrointest Endosc* 2015; 82:904.
33. Qumseya BJ, Wolfsen C, Wang Y, et al. Factors associated with increased bleeding post-endoscopic mucosal resection. *J Dig Dis* 2013; 14:140.
34. Pohl H, Grimm IS, Moyer MT, et al. Clip Closure Prevents Bleeding After Endoscopic Resection of Large Colon Polyps in a Randomized Trial. *Gastroenterology* 2019; 157:977.
35. Albéniz E, Álvarez MA, Espinós JC, et al. Clip Closure After Resection of Large Colorectal Lesions With Substantial Risk of Bleeding. *Gastroenterology* 2019; 157:1213.
36. Feagins LA, Smith AD, Kim D, et al. Efficacy of Prophylactic Hemoclips in Prevention of Delayed Post-Polypectomy Bleeding in Patients With Large Colonic Polyps. *Gastroenterology* 2019; 157:967.
37. Shimamoto C, Hirata I, Umegaki E, Katsu K. Closure of an esophageal perforation due to fish bone ingestion by endoscopic clip application. *Gastrointest Endosc* 2000; 51:736.
38. Raymer GS, Sadana A, Campbell DB, Rowe WA. Endoscopic clip application as an adjunct to closure of mature esophageal perforation with fistulae. *Clin Gastroenterol Hepatol* 2003; 1:44.
39. Shimizu Y, Kato M, Yamamoto J, et al. Endoscopic clip application for closure of esophageal perforations caused by EMR. *Gastrointest Endosc* 2004; 60:636.
40. Tsunada S, Ogata S, Ohyama T, et al. Endoscopic closure of perforations caused by EMR in the stomach by application of metallic clips. *Gastrointest Endosc* 2003; 57:948.
41. Yoshikane H, Hidano H, Sakakibara A, et al. Endoscopic repair by clipping of iatrogenic colonic perforation. *Gastrointest Endosc* 1997; 46:464.
42. Minami S, Gotoda T, Ono H, et al. Complete endoscopic closure of gastric perforation induced by endoscopic resection of early gastric cancer using endoclips can prevent

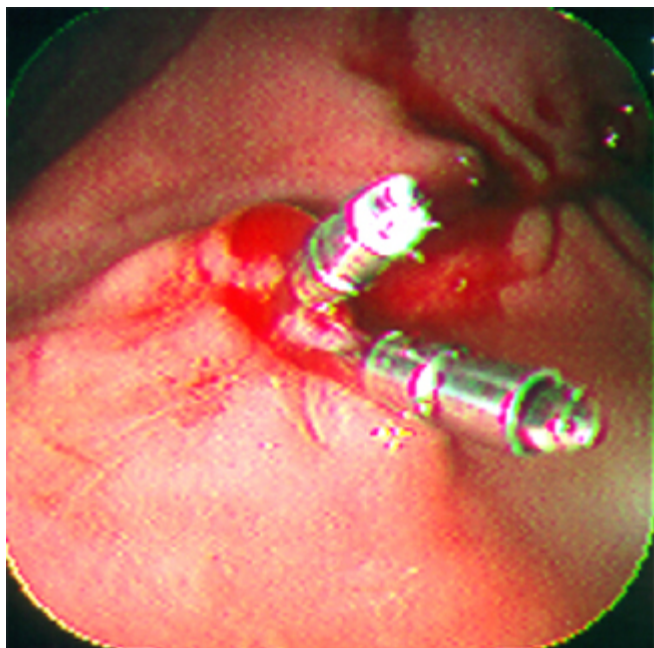
- surgery (with video). *Gastrointest Endosc* 2006; 63:596.
43. Baron TH, Gostout CJ, Herman L. Hemoclip repair of a sphincterotomy-induced duodenal perforation. *Gastrointest Endosc* 2000; 52:566.
 44. Katsinelos P, Paroutoglou G, Papaziogas B, et al. Treatment of a duodenal perforation secondary to an endoscopic sphincterotomy with clips. *World J Gastroenterol* 2005; 11:6232.
 45. Charabaty-Pishvaian A, Al-Kawas F. Endoscopic treatment of duodenal perforation using a clipping device: case report and review of the literature. *South Med J* 2004; 97:190.
 46. Heldwein W, Dollhopf M, Rösch T, et al. The Munich Polypectomy Study (MUPS): prospective analysis of complications and risk factors in 4000 colonic snare polypectomies. *Endoscopy* 2005; 37:1116.
 47. Mana F, De Vogelaere K, Urban D. Iatrogenic perforation of the colon during diagnostic colonoscopy: endoscopic treatment with clips. *Gastrointest Endosc* 2001; 54:258.
 48. Taku K, Sano Y, Fu KI, Saito Y. Iatrogenic perforation at therapeutic colonoscopy: should the endoscopist attempt closure using endoclips or transfer immediately to surgery? *Endoscopy* 2006; 38:428.
 49. Merrifield BF, Lautz D, Thompson CC. Endoscopic repair of gastric leaks after Roux-en-Y gastric bypass: a less invasive approach. *Gastrointest Endosc* 2006; 63:710.
 50. Frizzell E, Darwin P. Endoscopic placement of jejunal feeding tubes by using the Resolution clip: report of 2 cases. *Gastrointest Endosc* 2006; 64:454.
 51. Baron TH, Song LM, Ross A, et al. Use of an over-the-scope clipping device: multicenter retrospective results of the first U.S. experience (with videos). *Gastrointest Endosc* 2012; 76:202.
 52. Manta R, Galloro G, Mangiavillano B, et al. Over-the-scope clip (OTSC) represents an effective endoscopic treatment for acute GI bleeding after failure of conventional techniques. *Surg Endosc* 2013; 27:3162.
 53. ASGE Technology Committee, Wong Kee Song LM, Banerjee S, et al. Emerging technologies for endoscopic hemostasis. *Gastrointest Endosc* 2012; 75:933.
 54. Bapaye J, Chandan S, Naing LY, et al. Safety and efficacy of over-the-scope clips versus standard therapy for high-risk nonvariceal upper GI bleeding: systematic review and meta-analysis. *Gastrointest Endosc* 2022; 96:712.
 55. Lau JYW, Li R, Tan CH, et al. Comparison of Over-the-Scope Clips to Standard Endoscopic Treatment as the Initial Treatment in Patients With Bleeding From a Nonvariceal Upper Gastrointestinal Cause : A Randomized Controlled Trial. *Ann Intern Med* 2023; 176:455.

56. Jensen DM, Kovacs T, Ghassemi KA, et al. Randomized Controlled Trial of Over-the-Scope Clip as Initial Treatment of Severe Nonvariceal Upper Gastrointestinal Bleeding. *Clin Gastroenterol Hepatol* 2021; 19:2315.
57. Meier B, Wannhoff A, Denzer U, et al. Over-the-scope-clips versus standard treatment in high-risk patients with acute non-variceal upper gastrointestinal bleeding: a randomised controlled trial (STING-2). *Gut* 2022; 71:1251.
58. Chan S, Pittayanon R, Wang HP, et al. Use of over-the-scope clip (OTSC) versus standard therapy for the prevention of rebleeding in large peptic ulcers (size ≥ 1.5 cm): an open-labelled, multicentre international randomised controlled trial. *Gut* 2023; 72:638.
59. Barkun AN, Alali AA. What Is the Current Role of an Over-the-Scope Clip Used as First-Line Endoscopic Hemostasis in Patients With Nonvariceal Upper Gastrointestinal Bleeding? *Ann Intern Med* 2023; 176:576.
60. Voermans RP, Le Moine O, von Renteln D, et al. Efficacy of endoscopic closure of acute perforations of the gastrointestinal tract. *Clin Gastroenterol Hepatol* 2012; 10:603.
61. Cho SB, Lee WS, Joo YE, et al. Therapeutic options for iatrogenic colon perforation: feasibility of endoscopic clip closure and predictors of the need for early surgery. *Surg Endosc* 2012; 26:473.

Topic 2668 Version 25.0

GRAPHICS

Treatment of a bleeding gastric ulcer with endoclips

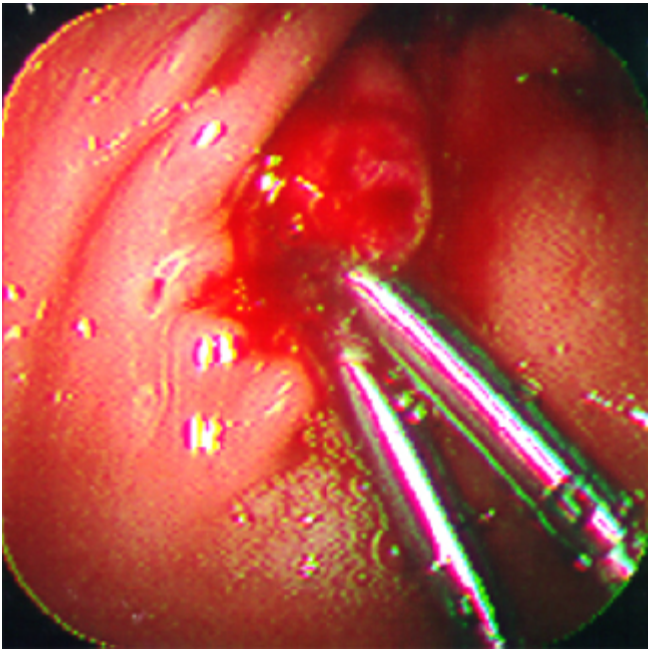


Bleeding gastric ulcer following placement of Olympus QuickClip2 endoclips.

Courtesy of Dennis M. Jensen, MD.

Graphic 52806 Version 3.0

Treatment of a bleeding gastric ulcer with endoclips



Treatment of an actively bleeding gastric ulcer using Boston Scientific Resolution Clips.

Courtesy of Dennis M. Jensen, MD.

Graphic 67534 Version 3.0

Instinct Endoscopic Hemoclip

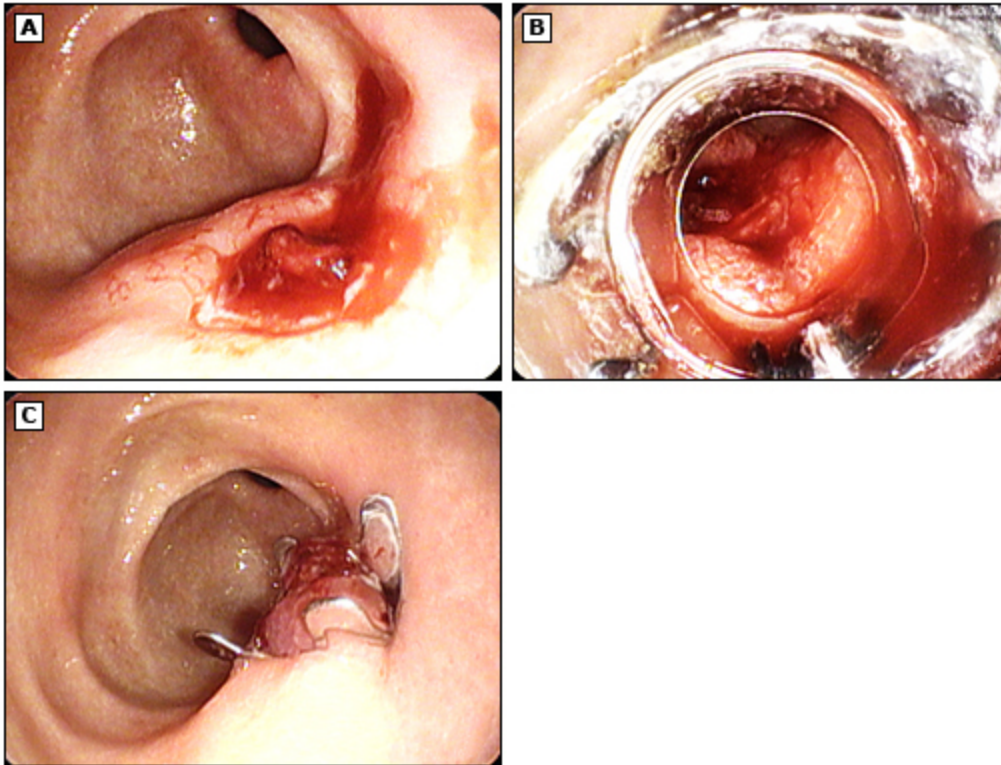


The Instinct Endoscopic Hemoclip opens to a width of 16 mm and allows for 360 degree bidirectional rotation. In addition, the jaws can be reopened to reposition the clip.

Permission for use granted by Cook Medical Incorporated, Bloomington, Indiana. Copyright © 2013.

Graphic 91689 Version 1.0

Treatment of a gastric ulcer with an over-the-scope endoclip



- (A) Bleeding ulcer with a visible vessel in the gastric antrum.
(B) Placement of an over-the-scope endoclip.
(C) Image of the ulcer after endoclip placement.

Graphic 91499 Version 1.0

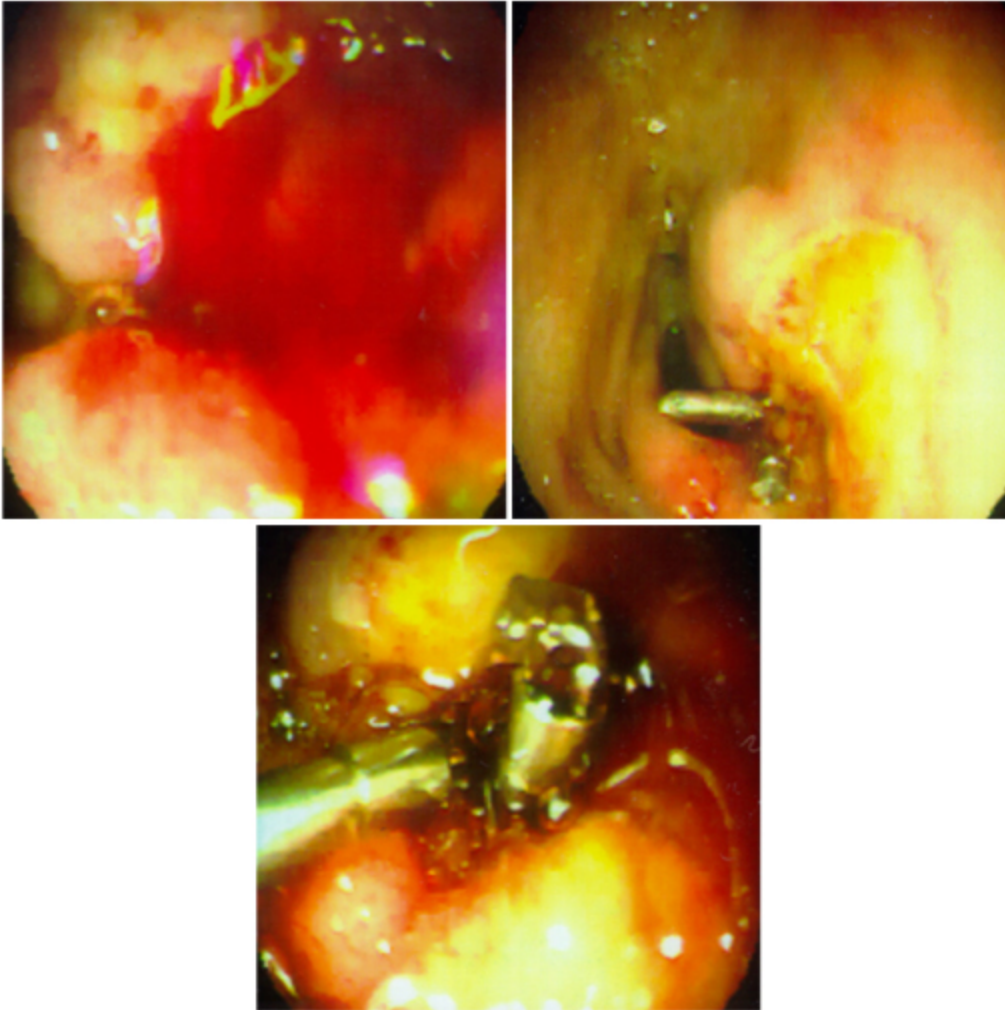
Through-the-scope endoclips

Manufacturer	Name	Open clip size (mm)	Minimum endoscope channel size (mm)	Special characteristics	MRI compatibility
Olympus	QuickClip2	8	2.8	Rotatable. Available in 165 cm and 230 cm lengths.	Conditional approval
	QuickClip2 Long	12	2.8	Rotatable. Available in 165 cm and 230 cm lengths.	Conditional approval
	QuickClip Pro	11	2.8	Rotatable. Jaws can be re-opened to reposition. Available in 165 cm and 230 cm lengths.	Conditional approval
Boston Scientific	Resolution	11	2.8	Jaws can be re-opened to reposition. Available in 155 cm and 235 cm lengths.	Conditional approval
	Resolution 360	11	2.8	Rotatable. Jaws can be re-opened to reposition. Available in 155 cm and 235 cm lengths.	Conditional approval
Cook Medical	Instinct	16	2.8	Rotatable. Jaws can be re-opened to reposition. Available in 230 cm length.	Conditional approval
ConMed	DuraClip	11	2.8	Rotatable. Jaws can be re-opened to reposition. Available in 165	Conditional approval

				cm and 235 cm lengths.	
	DuraClip	16	2.8	Rotatable. Jaws can be re-opened to reposition. Available in 235 cm length.	Conditional approval
Micro-Tech	SureClip ^{MINI}	8	2.8	Rotatable. Jaws can be re-opened to reposition. Available in 235 cm length.	Conditional approval
	SureClip	11	2.8	Rotatable. Jaws can be re-opened to reposition. Available in 235 cm length.	Conditional approval
	SureClip ^{PLUS}	16	2.8	Rotatable. Jaws can be re-opened to reposition. Available in 235 cm length.	Conditional approval

Graphic 57403 Version 5.0

Bleeding duodenal ulcer

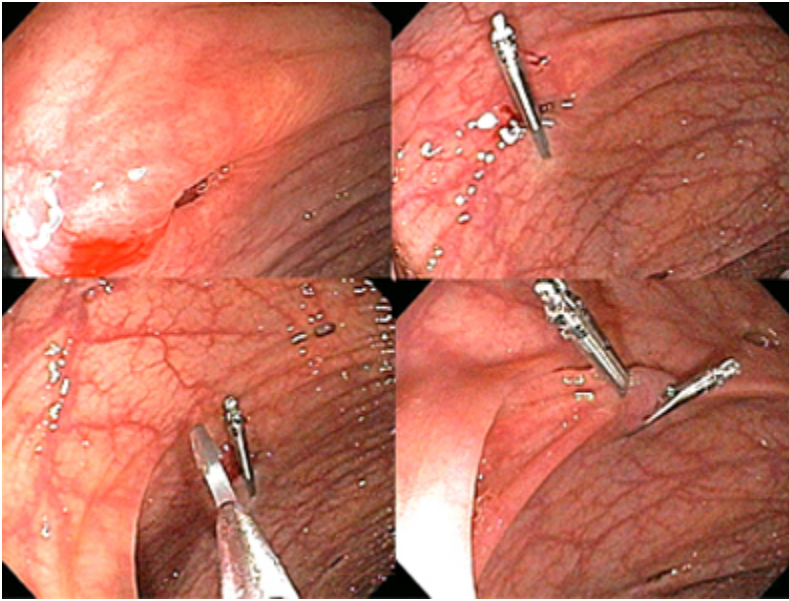


Endoclip hemostasis of a bleeding duodenal ulcer after epinephrine injection. This patient began to bleed while an inpatient and required six units of packed RBC transfusion for resuscitation. After the combination hemostasis (epinephrine and hemoclips) he was treated with 72 hours with high dose proton pump inhibitor (PPI) (pantoprazole 80 mg IV bolus and 8 mg/hr IV drip, followed by twice daily oral PPI. He did not rebleed.

Courtesy of Dennis M. Jensen, MD.

Graphic 63669 Version 1.0

Diverticular bleeding



Closure of a diverticular bleed with two Resolution endoclips. Active bleeding was found initially in a hepatic flexure diverticulum in a patient presenting with severe hematochezia. The upper left image shows the bleeding diverticulum following injection with dilute epinephrine (1:20,000). Clockwise image show deployment of the two clips. The area was subsequently tattooed with India ink. There was no rebleeding with six months of follow-up.

Courtesy of Dennis M. Jensen, MD.

Graphic 60007 Version 1.0

Endoclip placement at gastric polypectomy site

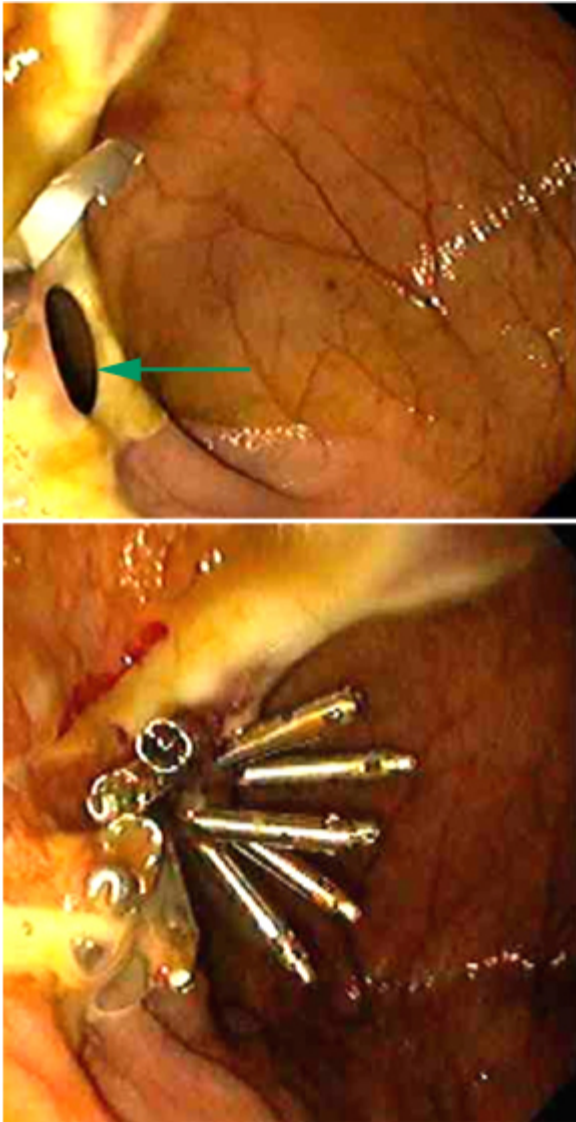


A 52 year old male was referred for nausea and vomiting. After initial evaluation, an endoscopy was performed which revealed a 3cm long pedunculated gastric polyp. The polyp originated in the pre-pyloric region of the stomach and prolapsed through the pylorus into the duodenal bulb. The polyp was resected using a hot snare. After the resection, a large secondary ulcer exposing the submucosa remained. Though there was no active bleeding, two endoclips were placed to close the defect completely. The patient was placed on twice daily esomeprazole and was given instructions to avoid NSAIDs and aspirin. No bleeding or other complications were noted during follow up. The pathology showed that this was an inflammatory polyp with features of high grade dysplasia.

Courtesy of Ilseung Cho, MD.

Graphic 75449 Version 2.0

Treatment of ileocolonic anastomosis fistula with endoclips



This patient developed ischemic colitis following an aspirin overdose and required a subtotal colectomy and temporary ileostomy. Following creation of an ileal-sigmoid anastomosis he developed a large abscess and was found to have a large post-operative fistula at the anastomotic site as shown above. In addition to percutaneous abscess drainage, twelve Resolution clips were placed during colonoscopy to close the defect. Subsequently, the abscess drainage subsided and the patient was able to tolerate refeeding within two weeks without the subsequent need for reoperation.

Courtesy of Jonathan Cohen, MD.

Graphic 77061 Version 3.0

Contributor Disclosures

Jonathan Cohen, MD Equity Ownership/Stock Options: GI Windows [Magnetic anastomosis]; MD Medical Navigators [Advocacy and consulting]; ROM-Tech, Inc [Joint rehab]; Virtual Health Partners [Obesity]. Consultant/Advisory Boards: Micro-Tech [Endoscopy accessories]; Olympus [Gastrointestinal endoscopy, ERCP, NBI]. Other Financial Interest: Wiley [Textbook royalties]. All of the relevant financial relationships listed have been mitigated. **Irphan Gaslightwala, MD** No relevant financial relationship(s) with ineligible companies to disclose. **John R Saltzman, MD, FACP, FACG, FASGE, AGAF** No relevant financial relationship(s) with ineligible companies to disclose. **Anne C Travis, MD, MSc, FACG, AGAF** No relevant financial relationship(s) with ineligible companies to disclose.

Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting through a multi-level review process, and through requirements for references to be provided to support the content. Appropriately referenced content is required of all authors and must conform to UpToDate standards of evidence.

[Conflict of interest policy](#)

→