Endoscopic Clipping Devices

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Through-the-scope clipping devices

Over-the-scope clipping devices
Evolution of through-the-scope clipping devices

A
QuickClip2
QuickClip Pro
Olympus

B
Resolution clip
Resolution 360
Boston Scientific

C
Instinct clip
Cook Medical
Main indications of TTS clips

- Hemostasis
- Tissue approximation
- Marking & Anchoring
Prophylactic clipping of a peri-appendiceal orifice EMR base

Optimal clip quality required: wide clip arm opening span, reopen and reclose, rotatable, strong
Bleeding ulcer or ulcer with a visible vessel

Optimal clips for this situation: rotatable, long clip arms, and can penetrate the ulcer base with strength
A 15 mm – 20 mm submucosal gastric nodule

Now what?
Optimal clips for this situation: rotatable, long clip arms, and can close the base with strength, retain longer
What are we looking for among different clipping devices
Instinct clips are inherently the strongest.
Are these clips agile? Do they rotate well?

Instinct clips and QuickClip 2 rotate well

Instinct clip’s rotational ability and agility
Device catheter flexibility

Images showing different device-in-endoscope retroflection angles (DIERA). QuickClip2 long (A), resolution clip (B), instinct clip (C), without any device (D)
Comparative study of clip retention rates in pig models

Clip retention rates and rates of residual polyp at the base of retained clips on colorectal EMR sites

Indiana University Hospital

Colorectal polyps (≥ 20 mm) over a 9 years period. EMR sites were closed with a mean of 4 clips

Of 1407 Resolution clips (BS) placed, 59 (4.2%) were retained at follow-up. Of 532 Instinct clips (Cook) placed, 46 (8.6%) were retained at first follow-up (p = 0.0001)

There was no difference in follow-up interval for the two clips

No patient had residual polyp by biopsy at the base of a retained clip

Ponugoti & Rex. GI Endosc 2017;85:
Instinct clips placed months ago after polypectomy
Outcomes after endoscopic clip application of bleeding peptic ulcers have proved similar, if not better, than other endoscopic treatment modalities. Clips are excellent in controlling the bleeding, with significantly lower rebleeding rates compared with a combination of epinephrine injection and heater probe cautery (5% vs. 33%, P<0.05).


<table>
<thead>
<tr>
<th>RCT (n=47)</th>
<th>Clips</th>
<th>Injection + bipolar</th>
<th>p values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary hemostasis</td>
<td>100%</td>
<td>95%</td>
<td>0.45</td>
</tr>
<tr>
<td>Re-bleeding</td>
<td>15%</td>
<td>24%</td>
<td>0.49</td>
</tr>
</tbody>
</table>

Raju et. al. GI Endosc 2007;66:774-785
Endoscopic mechanical hemostasis of GI arterial bleeding (Technical Review)

<table>
<thead>
<tr>
<th></th>
<th>RCT (n=124)</th>
<th>Clips (n=41)</th>
<th>Injection (n=41)</th>
<th>Injection + clips (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary hemostasis</td>
<td>98%</td>
<td>95%</td>
<td>98%</td>
<td></td>
</tr>
<tr>
<td>Complication</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Re-bleeding</td>
<td>2.4%</td>
<td>14%</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Permanent hemostasis</td>
<td>95%</td>
<td>85%</td>
<td>95%</td>
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</tbody>
</table>

The combined method does not provide substantial advantage over use of the hemoclip method alone in the hemostatic management of bleeding peptic ulcers.


Raju et. al. GI Endosc 2007;66:774-785
When is clipping a good hemostatic solution

- Visible vessel or actively bleeding vessel
- Bleeding lesion within a mucosal defect
  - Post EMR
  - Post polypectomy
  - Fistula and leak
- Continuing bleeding after hemostasis failed to be achieved with other devices
- Anatomically weak location
  - Diverticular bleeding
  - Cecal and small bowel pathologies
When is clipping a good hemostatic solution

- Refractory post-sphincterotomy bleeding
- Active bleeding ulcer where optimal view is not possible and prompt hemostasis is required
- The endoscopic view is poor with other hemostatic devices
- Fresh anastomotic or stomal bleeding
- Clip-assisted diverticulotomy
- Endoscopic marking of the bleeding site to assist subsequent angioembolization
Bleeding Culprits

MW tear
Post-EVL ulcer bleeding
Ulcer bleeding
Dieulafoy’s lesion

Injection + Thermal coagulation APC

Clipping
Bleeding Culprits

- Vessel of larger caliber
- True arteriovenous malformation
- Diverticular bleeding
- Post-EVL ulcer bleeding
- Post EMR and polypectomy bleeding
- Refractory post-sphincterotomy bleeding
- Hemostasis failed to be achieved with other devices
- Urgent hemostasis is needed
- Endoscopic view is suboptimal

Clipping
Are these clips cost-effective

- We are probably using less clips per case
- Overall, we are using more clips due to
  - Their expanded applications and indications
  - Good clinical outcomes
  - Time saved compared with using other hemostatic devices
Clipping a large vessel
(true arteriovenous malformation)
- Post sphincterotomy bleeding
Post polypectomy bleeding
Prophylactic clipping prior to polypectomy
Prophylactic clipping after colon EMR?

In a non randomized trial of 463 pts, prophylactic clipping when possible significantly reduced delayed bleeding risk from 9.9% to 1.8% after colon EMR >2 cm

Liaquat, Rex DK. GIE 2013;77:401-7.

Large colon EMR was performed in 155 patients and prophylactic clipping performed in all lesions greater than 3 cm. Delayed bleeding risk 2%, all but one of EMR > 2 cm

Raju et. al. GIE 2016;84:315-325.
Post band ligation EMR bleeding
TTS clip closure endoscopic perforations: only for small ones (< 1 cm)?


Esophageal, duodenal and colonic perforations ≥ 1 cm in size should undergo surgery


TTS clip placement is considered a reasonable treatment option for closure of small (<1 cm), while more robust closure methods, such as endoscopic suturing or an over-the-scope clip, for large gaping perforations

Law & Wong Kee Song. (Editorial) Closing the lid on iatrogenic colonic perforations. GIE 2016;84:503-505.
Comparison of endoscopic closure modalities for standardized colonic perforations in a porcine colon model

OTSCs, TTS clips, and both flexible staplers produced leak test results (85-98 mmHg) comparable to hand-sewn colotomy closure in this ex vivo porcine colonic model

Endoscopic closure of post ESD colonic perforations

935 ESD (1998 – 2013)
Perforation (5 mm ± 3mm) occurred in 25 cases (2.7%)
Clip closure was successful in 23/24 (96%) attempted cases
Number of clips used: 7 (1-15)

Takamaru et al. GIE 2016;84:494–502
Zipper clip closure of large colonoscopic perforations

Case 1

Case 2

Tang. GIE 2017;85:867-69
Zipper clip closure of large endoscopic perforations

Case 1

Tang. GIE 2017;85:867-69
Zipper clip closure of a sigmoid colon perforation
Closing endoscopic perforations: TTS clips should be the first option

1) TTS clips can be easily apply to the perforation site without the need of using or changing to special endoscopes, and re-inserting the endoscopes

2) TTS clips are available in every endoscopy lab, easy to learn and use, expedient in application

3) Newer generations of TTS clips have larger clip arm opening span (16 mm), stronger, and are more easily controlled

4) Zipper clipping with TTS clips can be used to close small and large perforations

Tang. GIE 2017;85:867-69
Marking & Attachment
Instinct clip placed one year ago

Instinct clips placed 4 months ago
Fully covered Evolution stenting for GE anastomotic leak-clip anchoring