Benign Strictures: Dilate, Cut, or Stent?

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What is the common between this miniskirt and the presentation??

“A good speech should be like a woman's skirt; long enough to cover the subject and short enough to create interest.”

WINSTON S. CHURCHILL
In Esophageal Stricture, Dysphagia starts to occur when the lumen diameter is less than:

A. 10mm  
B. 12mm  
C. 13mm  
D. 15mm  
E. 17mm
Esophageal Strictures starts to be labeled as complex when the diameter and the length start to measure more than:

A. 10*20mm
B. 12*20mm
C. 14*20mm
D. 14*15mm
E. 16*15mm
Tolerable Diet Consistency and lumen diameter

<table>
<thead>
<tr>
<th>Esophageal Lumen</th>
<th>Type of Diet</th>
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<tbody>
<tr>
<td>7mm</td>
<td>Liquid/Pureed</td>
</tr>
<tr>
<td>10mm</td>
<td>Pureed/Soft</td>
</tr>
<tr>
<td>13mm</td>
<td>Soft</td>
</tr>
<tr>
<td>15mm</td>
<td>Modified with exclusions “of tough meat, hard raw vegetables, hard fresh fruits,…”</td>
</tr>
<tr>
<td>18mm</td>
<td>Regular, with care</td>
</tr>
</tbody>
</table>
Strictures of Upper GI Tract

• Esophageal Strictures

• Gastric-Outlet-Obstruction “GOO” from Gastric & Duodenal Strictures

• Crohn’s Disease Strictures
Esophageal Strictures

- Are categorized by structural anatomy as being simple or complex.

- Simple strictures are concentric (with a luminal diameter of $\geq 12$ mm) or symmetric (easily allow passage of a diagnostic upper endoscope).

- Complex strictures are defined as having a luminal diameter of $\leq 12$ mm, as being asymmetric with angulation, or as not having the ability to pass a diagnostic upper endoscope.
Simple Esophageal Strictures

• Causes: Peptic strictures (up to 70% of cases), Schatzki’s ring, anastomotic strictures, pill induced strictures and membranous webs.

• Simple strictures are amenable to the standard technique of bougie or through-the-scope balloon dilation.

• In most cases, 1-3 dilations are required for symptomatic relief.

• For dilation of a Schatzki’s ring, which does not contain any muscularis propria, the results of a single dilation (15–18 mm dilator) are typically sufficient.
Complex esophageal strictures

• Causes: caustic ingestion, radiation, surgical anastomosis (with related local vascular compromise), photodynamic or sclerotherapy, and severe peptic injury.

• Require the use of **fluoroscopic guidance** in order to plan and execute safe and effective dilation.

• Require **repeat dilations** for symptomatic relief.

• Are associated with **high recurrence rates**.
## Characteristics of simple versus complex strictures.

<table>
<thead>
<tr>
<th></th>
<th>Simple</th>
<th>Complex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allow for passage of endoscope</td>
<td>Yes</td>
<td>No (typically)</td>
</tr>
<tr>
<td>Length</td>
<td>Short (&lt;2 cm)</td>
<td>Long (&gt;2 cm)</td>
</tr>
<tr>
<td>Focal</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Angulation/irregularity</td>
<td>No</td>
<td>Yes (typically)</td>
</tr>
<tr>
<td>Etiology</td>
<td>Peptic</td>
<td>Caustic ingestion</td>
</tr>
<tr>
<td></td>
<td>Shatzki’s ring</td>
<td>Malignancy</td>
</tr>
<tr>
<td></td>
<td>Anastomotic</td>
<td>Photodynamic therapy</td>
</tr>
<tr>
<td></td>
<td>Pill-induced</td>
<td>Radiation</td>
</tr>
<tr>
<td>Preferred dilation method</td>
<td>Balloon or rigid dilator</td>
<td>Rigid dilator</td>
</tr>
<tr>
<td>Fluoroscopy</td>
<td>Rarely needed</td>
<td>Recommended</td>
</tr>
<tr>
<td>Dilations</td>
<td>1–3 (typically)</td>
<td>≥3</td>
</tr>
<tr>
<td>Risk of recurrence</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>
Refractory & Recurrent Strictures:

**Refractory:** inability to successfully dilate the stricture to diameter of 14 mm over 5 sessions at 2-week intervals.

**Recurrent:** inability to maintain a satisfactory luminal diameter for 4 weeks once the target diameter of 14 mm achieved.

Not include patients with inflammatory Strictures or those with neuromuscular dysfunction.

Recurrent Strictures are **more common** than Refractory Strictures
Options for Management of Refractory Strictures:

1. **Steroid injection** into refractory, benign strictures immediately before or after dilation has been shown to increase the post-dilation diameter.

2. **Temporary esophageal stent placement** is an adjunct to dilation in the management of patients with refractory, benign, esophageal strictures.

3. **Self-bougienage** is another option for patients who require multiple frequent dilations.
Types of Esophageal Dilators:

- Bougie dilators exert both radial & axial forces along the entire length of the stricture.

- Balloon dilators exert only radial force along the length of the stricture. The opposing static force of the stricture creates an hourglass waist in the balloon.

- A larger balloon that exerts a higher radial force requires less pressure for dilation but may be associated with a higher risk for perforation.
(a) Bougie dilator. (b) Wire-guided polyvinyl dilator. (c) Through-the-scope balloon dilator.
“Rule of Dilatation”

• The degree of dilation in a session should be based on the severity of the stricture.

• The initial dilator is selected based on the stricture diameter; the same size or not >1 - 2 mm larger than the lumen of the stricture.

• The first dilator that causes resistance to passage counts as “one.”

• Incremental dilations of > 3 mm may be safe for simple strictures.
Included 5 (RCTs), totalizing 461 patients. Among them, 151 were treated with bougie dilation and 225 underwent balloon dilation.

Conclusion: We conclude that there is no difference between bougie and balloon dilation of BESs regarding symptomatic relief, recurrence rate at 12 months, bleeding, and perforation.

Patients undergoing balloon dilation present less severe postprocedure pain.
Intralesional Steroid Injection

- Used to soften scars and keloids owing to the local inhibition of inflammatory responses, which results in the reduction of fibrotic tissue.

- Used to treat recurrent or refractory benign strictures.

- Endoscopic intralesional injections into all four quadrants of the strictures.

- Usually used in combination with balloon dilation where it increase the intervals between dilations and decrease their frequency.

Needle Knife Incision

• Was first reported for the treatment of Schatzki rings.

• The optimal stricture for this procedure is short, shelf-like, and membranous, rather than long and tapered.

• Incisional therapy added to balloon dilation, or incisional therapy using a polypectomy snare with additional argon plasma coagulation, were shown to be effective.

• Hordijk, et al., included 68 patients with anastomotic strictures that were refractory to dilation, and demonstrated that incisional therapy was safe and effective in simple, short strictures (<10 mm).
ESGE recommends against the use of SEMSs as first-line therapy for the management of benign esophageal strictures because of the potential for adverse events, the availability of alternative therapies, and costs.

ESGE suggests that FCSEMSs be preferred over PCSEMSs for the treatment of refractory benign esophageal stricture, because of their lack of embedment and ease of removability.

ESGE does not recommend permanent stent placement for refractory benign esophageal stricture; stents should usually be removed at a maximum of 3 months.

Corrosive esophageal stricture

A. Esophagogram shows focal stricture (arrow) at distal esophageal level.
B. Severe tight stricture precluded dilation with 10-mm-diameter balloon.
C. Placement of retrievable covered metallic stent (arrowheads) at stricture.
D. Esophagogram immediately after stent placement shows good contrast passage through stent.
E. Esophagogram five years after temporary stenting for two months shows stricture improvement was maintained (arrow).
Conclusions: In this small case series, esophageal self-dilation was found to be successful 94% of patients when conducted under strict guidance.
Patient with caustic stricture performing esophageal self-bougienage using a 16 mm Savary bougie dilator
"You're not allowed to use the sprinkler system to keep your audience awake."
Strictures of Upper GI Tract

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- Crohn’s Disease Strictures
Gastric outlet obstruction (GOO)

- Includes obstruction in the antropyloric area or in the bulbar or post bulbar duodenal segments.

- Malignancy remains a common cause of GOO in adult.

- Benign causes are peptic ulcer disease, caustic ingestion, post-operative anastomotic state and inflammatory causes such as Crohn’s disease and tuberculosis.

- Less often, chronic pancreatitis, annular pancreas and NSAIDs-included strictures result in GOO.

Endoscopic balloon dilation for benign gastric outlet obstruction in adults
World J Gastrointest Endosc 2015 January 16; 2(1): 29-35
Post-Gastric Sleeve Strictures

- Prevalence is 0.7-4%.

- Classified as Early <6weeks vs late > 6weeks.

- The incisura angularis is the site most prone to stricture development.
Causes of Post-Sleeve Strictures

Causes are either mechanical or functional:

1) **Mechanical**
   - Imbrications of the staple line
   - Over-retraction of the cavity during stapling
   - Progressive rotation of the staple line
   - Scarring of the sleeve in a kinked rotation

2) **Functional stenosis** which are transient and derive from edema or hematomas at the staple line
Post-Sleeve Strictures Treatment

- Endoscopy Balloon dilatation is the **first line** treatment for short-segment strictures with multiple sessions in 4-6 week intervals.

- **Stents are not effective** for post-LSG strictures.

- **Long-segment strictures are not amenable to endoscopic dilation.**

- Long strictures and strictures that have failed endoscopic treatment require surgical intervention.
Balloon Dilatation for sleeve Strictures

- Pneumatic Balloon Dilatation performed **under direct vision and fluoroscopy** with continuous inflation up to a maximal diameter of 30mm in each session, where the balloon is held inflated for 1 minute.

- Through the scope TTS balloon dilatation, gradually inflated first to 18mm for few seconds then to 20mm and held inflated for 1 minute.

- The Pneumatic Balloon is **preferred** over the TTS balloon for its higher rigidity.
Peptic ulcer-induced duodenal stricture

A. Upper gastrointestinal series shows peptic ulcer-induced stricture (arrow) in second portion of duodenum.

B-E. Under fluoroscopic guidance, stricture was initially dilated with 8-mm-diameter balloon. Because dilation was easily achieved, caliber of balloon catheter was increased to 15 mm.

F. Upper gastrointestinal series one year after balloon dilation shows improvement of luminal diameter (arrow).
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CD Strictures

- Symptomatic intestinal strictures develop in >1/3 of patients with Crohn’s disease (CD) within 10 years of disease onset.

- Strictures can be inflammatory, fibrotic or mixed.

- Treatment options for fibrostenotic strictures are limited to endoscopic and surgical therapy.

- **EBD is considered as first-line therapy for non-complex stricture that are less than 5 cm in length.**

- Serious complications are rare and occur in less than 3% of procedures.
## Practical considerations for Dilation in CD strictures

<table>
<thead>
<tr>
<th>Predictors favoring successful dilation</th>
<th>Risk factors for complications</th>
</tr>
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<tbody>
<tr>
<td>Symptomatic predominantly fibrotic stricture</td>
<td>Predominantly inflammatory stricture without medical optimization</td>
</tr>
<tr>
<td>Short (≤ 5 cm) stricture</td>
<td>Stricture greater than 5 cm</td>
</tr>
<tr>
<td>Single straight stricture</td>
<td>Multiple small bowel strictures</td>
</tr>
<tr>
<td><strong>Stricture distal to the duodenum</strong></td>
<td>Tortuous or tethered small bowel</td>
</tr>
<tr>
<td>First dilation</td>
<td>Significant stricture angulation</td>
</tr>
<tr>
<td>Anastomotic stricture more favorable than de novo stricture</td>
<td>Strictures caused by extrinsic compression</td>
</tr>
<tr>
<td>Fistulization within 5 cm of the area to be Dilated</td>
<td>Fistulization within 5 cm of the area to be Dilated</td>
</tr>
<tr>
<td>Adjacent perforation or intra-abdominal collection</td>
<td>Complete small bowel obstruction</td>
</tr>
<tr>
<td><strong>Duodenal stricture</strong></td>
<td></td>
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</tbody>
</table>

Metal Stent Insertion in CD Strictures

- **Major complications** such as bowel perforation, stent migration and fistulization was reported in 67% of patients.

- To avoid stent impaction, **most studies suggest removing the stent after one month**.

- One small prospective cohort study concluded the **risk for complications was too high** to suggest the use of endoscopic metal stents as a treatment option for CD strictures.

The use of biodegradable instead of metal stents has been evaluated recently in a case-series. Although technical success was good, premature stent failure occurred in all of the patients.
Intralesional injection of steroids in CD !!!

- Only two small randomized placebo controlled studies have been performed versus saline injection after failing medical therapy and EBD.

- The first study conducted in 2007, included 13 adults. There was no significant difference with respect to success of the procedure between groups.

- A review conducted in 2013 summarizing the findings from 5 retrospective case-series, concluded: contradictory and limited results.

Strong evidence for the use of intralesional injection of steroids in CD is lacking

Intra-lesional Injection of Anti-TNF

• One small case series evaluated the effect of a 90-120 mg intralesional injection of infliximab in three symptomatic patients with colonic CD strictures.

• All three patients had an improved endoscopic appearance of the stricture as well as relief of their obstructive symptoms for at least four months following the injection.

• Another small case series evaluating intralesional injections of 40 mg of infliximab into small bowel CD strictures combined with EBD in six patients was associated with improved symptoms and a reduction in their modified simple endoscopic score for Crohn’s disease (SESCD).

Still Controversial

## Take Home Message

### Esophageal strictures:
- Simple: Balloon dilatation
- Complex: dilators (bougies)
- Refractory strictures: FCSEMS
- Recurrent strictures: Steroids injections with ED
- Needle knife incision:
  Anastomotic strictures that were refractory to dilation

### GOO:
- A wire-guided balloon is preferred over a non-wire guided balloon
- Start Dilatation from 18 mm and increase to 30 mm

### CD:
- Efficacy of Endoscopic adjuvant techniques: metal stent insertion and intralesional injection of steroids and anti-TNF
“DECIDING WHAT NOT TO DO IS AS IMPORTANT AS DECIDING WHAT TO DO.”

STEVE JOBS