

Using the Matrix: Efficacy of Extracellular Matrix in Treatment Algorithm for Recurrent Benign Esophageal Stricture Therapy

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Background

- Recurrent benign esophageal stricture (RBES) is caused by chronic inflammation from GERD, radiation, or surgery.
- Despite various therapeutic options including dilation, incision, steroid injection, and self-expandable metal stents, efficacy of these interventions remains suboptimal ranging between 20% to 63.6%.
- AIM: Propose and design a new treatment modality using an extracellular matrix (ECM) in the algorithm of treating RBES to extend duration of time and decrease frequency of treatments.

Methods

- We designed a proof-of-concept endoscopic technique that utilizes a biodegradable scaffold membrane composed of ECM as part of our stricture management algorithm to stimulate site specific tissue repair.
- Ten patients, mean age 61 years (38-80) with 6 females:4 males, presented with four types of RBES (40% peptic, 30% anastomotic, 20% post Zenker's septotomy and 10% fistula-related) were recruited.
- Mean follow up duration was 811 days (42-1726).
- Patients underwent endoscopy with placement of ECM and clip placement or stent placement with follow up EGD to ensure correct placement
- Other modalities used: Steroid injection, balloon dilation, incisional therapy, and esophageal stenting

| | Average Pre-ECM Treatment Frequency (Weeks) | Average Post-ECM treatment Frequency (Weeks) | Average Percent Reduction in Treatment Frequency | Average Percent Reduction in Mean number of Procedures | Other Modalities used |
|-------------------------------|---|--|--|--|---|
| Post Zenker's Septotomy (n=2) | 14.00 | N/A | N/A | N/A | Flexible endoscopic incisional therapy |
| Peptic Stricture (n=4) | 6.50 | 9.33 | 17% | 30% | Incision, balloon dilation, steroid Injection, Fully covered metal esophageal stent |
| Anastomotic Stricture (n=3) | 4.67 | 5.00 | 0% | 38% | Incision, Balloon dilation, steroid Injection |
| Fistula (n=1) | 4.00 | 4.00 | 0% | N/A | Sealant and fully covered metal esophageal stent |

Table 1.

- Post Zenker's septotomy strictures, there was **100% complete resolution** of symptoms at two months with no further interventions required.
- In peptic strictures, the average therapy interval was extended from **6.5 weeks to 9.3 weeks** after ECM therapy, **leading to 17% reduction in treatment frequency** following ECM.
- There was no change in therapy frequency in patients with post-surgical anastomotic esophageal strictures or fistula-related stenosis.
- The **mean number of procedures required was reduced by 30% for peptic strictures** and by **38% for anastomotic strictures**.

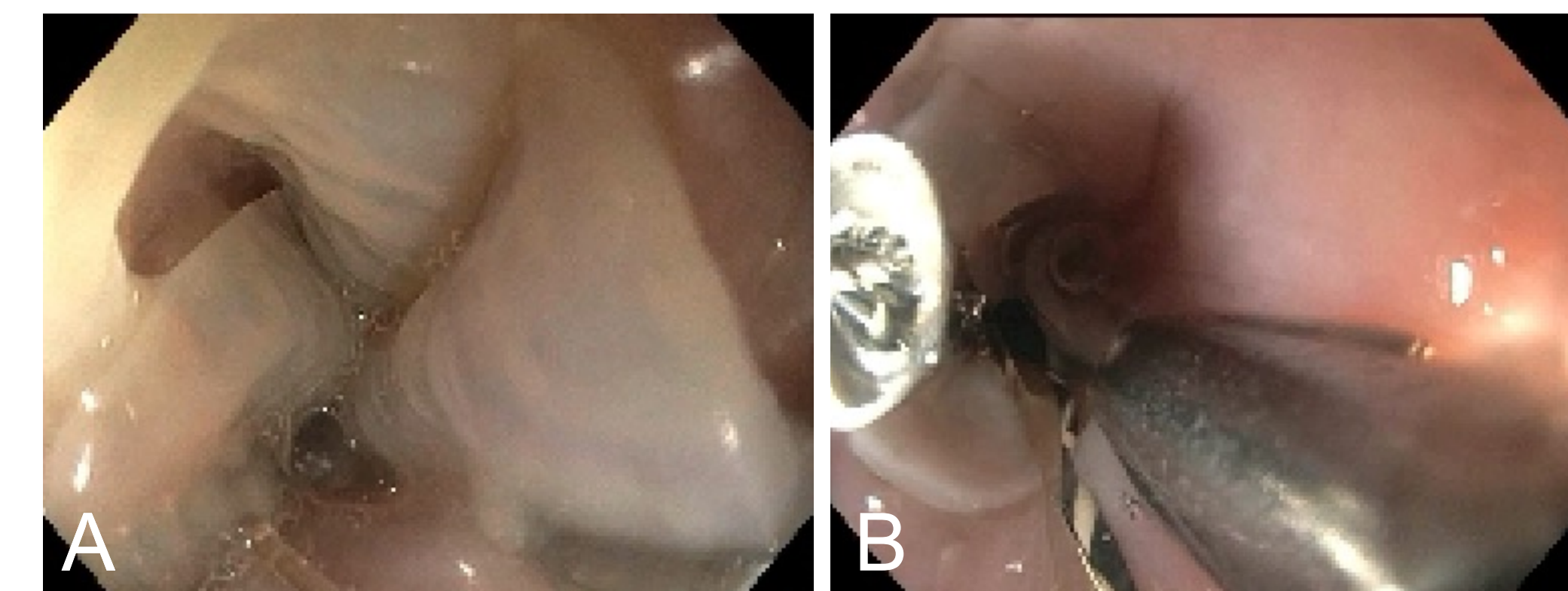


Figure 1. (A) ECM unfurling in esophagus. (B) ECM membrane being clipped into position.

Discussion

- Proposed pathophysiology: ECM degradation triggers **chemotactic and mitogenic activity for progenitor cells and inhibit proliferation of differentiated endothelial cells** slowing down the process of recurrence
- Our novel technique demonstrates that the utilization of ECM membrane as part of the treatment algorithm of RBES
 - reduces both the frequency and
 - the number of repeat interventions in select patients.
- Post septotomy and peptic strictures responded the best to ECM therapy in conjunction with other modalities compared to anastomotic strictures.
- Further larger prospective studies are required for increased understanding of ECM therapy response in various disease states.

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