LOMA LINDA UNIVERSITY HEALTH

ENDOLUMINAL WOUND VACUUM FOR UPPER GI PERFORATIONS: A SINGLE INSTITUTION CASE SERIES

#14b052a

Ann C Lin, MD; Yoshiaki Suzuki, BS; Esther Wu, MD; Jeffrey Quigley, DO; Panicha Kittipha, MSN, RN, PHN, AGACNP-BC, CCRN; Marcos Michelotti, MD; Keith Scharf, DO; Aarthy Kannappan, MD; Daniel Srikureja, MD

Loma Linda University, Department of Surgery, Division of Minimally Invasive and Bariatric Surgery

BACKGROUND

- Upper gastrointestinal (UGI) perforations and leaks are life-threatening conditions that can lead quickly to septic shock, resulting in high morbidity and mortality. Tissue inflammation and remote anatomical location can make surgical repair challenging.[1]
- Historically, treatment has entailed a combination of prompt surgical intervention, percutaneous drainage and extended bowel rest; however, there has been a recent paradigm shift towards endoscopic interventions.[2]
- Endoluminal vacuum-assisted closure (eVAC) therapy was originally described in the setting of rectal anastomotic leaks, and has now been successfully adapted for use in treating UGI pathology as well.[3]

OBJECTIVE

This study describes our institution's experience with the use of eVAC therapy in UGI perforations and leaks, and characterizes the indications, technique, and outcomes in our patient population.

METHODS

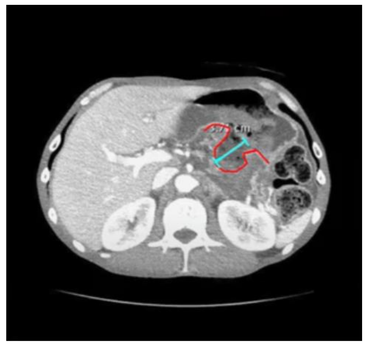
- Retrospective case series of 10 patients who underwent eVAC therapy as treatment of UGI perforation or leaks at Loma Linda University Health from 2017 to 2020.
- Demographic information, etiology of perforation, size of defects, number of wound vac changes as well as time between changes, success rate, length of stay, and complications were assessed
- Primary endpoint was successful closure of defect, as determined on EGD or UGI contrast imaging
- eVAC therapy technique:
  - Equipment needed includes: endoscope, endoscopic graspers, non-absorbable suture, 16 fr nasogastric tube (NGT), small sponge foam set, and wound vacuum machine.
  - Continuous pressure of 50-75mmhg is maintained
  - In acute phases, sponge changes are conducted every 3-4 days, then spaced out to 4-7 days in the late phase

REFERENCES

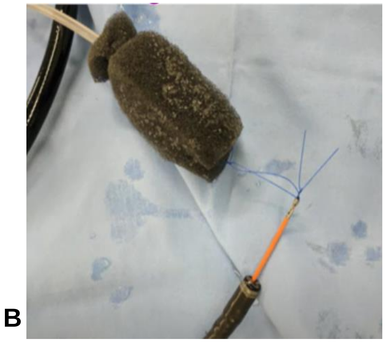
1. Biancari F, D'Andrea V, Paone R, et al. Current Treatment and Outcome of Esophageal Perforations in Adults: Systematic Review and Meta-Analysis of 75 Studies. World Journal of Surgery 2013;37:1051-11059.
2. Gurwara S, Clayton S. Esophageal Perforations: An Endoscopic Approach to Management. Current Gastroenterology Reports 2019;21:1-6.
3. Newton NJ, Sharrock A, Rickard R, Mughal M. Systematic review of the use of endo-luminal topical negative pressure in oesophageal leaks and perforations. Diseases of the Esophagus 2017;30:1-5.
4. Bludau M, Fuchs HF, Herbold T, et al. Results of endoscopic vacuum-assisted closure device for treatment of upper GI leaks. Surgical Endoscopy 2018;32:1906–14.
5. Smallwood NR, Fleshman JW, Leeds SG, Burdick JS. The use of endoluminal vacuum (E-Vac) therapy in the management of upper gastrointestinal leaks and perforations. Surgical Endoscopy 2016;30:2473–80.
6. Jung CFM, Müller-Dornieden A, Gaedcke J, et al. Impact of Endoscopic Vacuum Therapy with Low Negative Pressure for Esophageal Perforations and Postoperative Anastomotic Esophageal Leaks. Digestion 2020:1-11.
7. Leeds SG, Burdick JS. Management of gastric leaks after sleeve gastrectomy with endoluminal vacuum (E-Vac) therapy. Surgery for Obesity and Related Diseases 2016;12:1278-85.
8. Schniewind B, Schafmayer C, Voehrs G, et al. Endoscopic endoluminal vacuum therapy is superior to other regimens in managing anastomotic leakage after esophagectomy: a comparative retrospective study. Surgical Endoscopy 2013;27:3883-90.

RESULTS

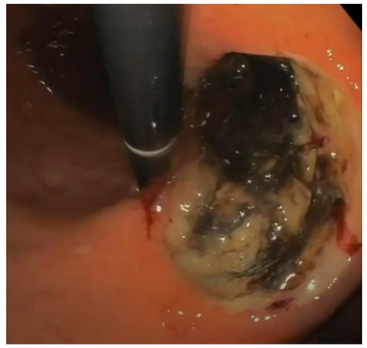
FIGURE 1:
A) Pre-operative CT for patient #9 showing posterior wall gastric perforation.
B) Example of nasogastric tube and sponge set up for eVAC therapy.
C) Initial EGD findings of large contained gastric ulcer perforation.
D) 2nd EGD (POD5) findings of healing perforation.



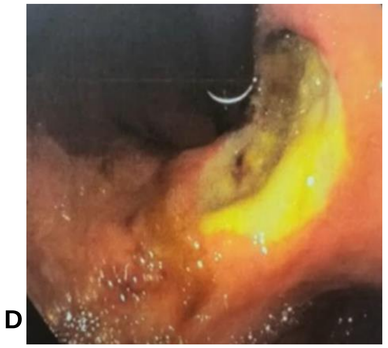
A



B



C



D

RESULTS

- Patient characteristics: Our series included 7 male and 3 female patients. Average age was 47. Average pre-operative albumin was 3.12 and Charlson Comorbidity Index was 2.3.
- Indications for treatment included gastric and esophageal perforations from ulcer disease (5), post-operative leaks (3), and iatrogenic injury from surgical procedures (2).
- Half of the patients had failed previous treatment, including endoscopic stenting, endoscopic suturing, and surgical repair.
- Size of initial defect ranged from 2 to 60mm.
- Average number of sponge changes was 3.1, and average length of stay of 26.8 days.
- Overall success rate of 90% in closure of the perforation, confirmed with endoscopy and imaging. One patient ultimately required operation for persistent fistula tract.
- Follow up available at 6 months demonstrated all patients were tolerating regular diet with no additional sequalae of their UGI pathology. Long-term follow-up was inconsistent, but overall complications low. One patient presented 7 months after treatment with abdominal wall abscess around site of original enterocutaneous fistula that required bedside incision and drainage with subsequent resolution.

DISCUSSION

- eVAC therapy was implemented successfully in a wide range of indications in our patient population, mirrored by other case series that describe use in spontaneous perforations, iatrogenic injury, and post-operative leaks. [4-8] In particular, our cohort supports the use of eVAC in the setting of post-operative complications from bariatric and foregut surgeries. Of note, the three patients presenting with post-operative leaks in our series were the result of medical tourism from bariatric operations performed outside of USA, with poor follow up after procedures.
- eVAC therapy can be used as both primary and secondary treatment of UGI perforations and leaks, and timing of intervention depends on perforation characteristics, patient physiology and hemodynamic stability.
- Our 90% success rate for closure is comparable to other case series. We also noted similar number of sponge changes, average days between changes, and total LOS. [4-7]
- We did not use adjunct interventions, though other series describe use of endoscopic self-expanding metal stents (SEMS), clips, fibrin glue alongside eVAC therapy. [4-6] Bludau (2018) suggests placement of stents after eVAC therapy allowed for shorter duration of therapy and less sponge changes. [4]
- Limitations include small number of patients as well as inconsistent length of follow up available. Multicenter randomized trials are needed to demonstrate superior outcomes in comparison to other interventions.