

Endoscopic vacuum therapy for anastomotic leakage after upper gastrointestinal surgery

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Endoscopic vacuum therapy (EVT) is a highly effective treatment option for leaks throughout the gastrointestinal (GI) tract and is an extremely beneficial technique in visceral surgery. It represents one of the most important innovations in the management of endoscopic surgical complications in the last 20 years [1, 2]. For the management of complications in esophageal surgery, a distinction can be drawn between the pre- and post-EVT eras [3]. The technique is increasingly being used not only for therapeutic purposes but also for pre-emptive prophylaxis with the aim of protecting intraoperative anastomoses [4].

Many centers, including that of Pattynama et al. in Amsterdam, now regard EVT as the gold-standard treatment for anastomotic leaks following upper GI (UGI) tract surgery [5].

The innovative treatment approach is attracting a particularly high level of interest for anastomotic insufficiency following esophagectomy, which still has a high incidence. Because of the intrathoracic site of the anastomosis, patients are at critical risk not only of local infection but also of septic mediastinitis, which carries high morbidity and mortality.

EVT differs from all of the previously known endoscopic methods in some fundamental respects. It is a surgical wound

treatment that is initiated endoscopically. The negative pressure can be used to close the defect and simultaneously drain pathological secretions and interstitial edema toward the lumen. Closure and drainage are the two fundamental principles of the surgical treatment of defects, as originally described by the founding fathers of surgery. Drainage is one of the oldest principles of surgical treatment. As an exaggeration, one could say that EVT is an optimization of already well-known surgical treatment methods.

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At the interface of EVT, endoscopic and surgical expertise come together to treat serious complications of visceral surgery. Endoscopic dressing changes in EVT with wound assessment should be performed at regular intervals of 3–4 days. A surgically trained endoscopist will be able to draw on their negative pressure wound therapy (NPWT) experience. An endoscopist with a more gastroenterological background will need to gain an understanding of wound healing in order to assess wounds correctly. They will find that, with EVT, a disastrous looking infected wound bed can be transformed into a clean granulating and healing wound within a few days.

EVT of the UGI tract has evolved directly from its clinical application in just a few years and in the absence of any approved commercial medical devices [1, 2, 6]. For basic therapy, drains can be constructed with materials that are available in any hospital, which explains why the method has already spread worldwide in just a short time. With some manual dexterity, a piece of open-pore polyurethane foam (material used in NPWT) is attached to the distal end of a drainage tube with a suture. This modified drain is placed at the treatment site via the transoral route using standard endoscopic techniques and is connected to a negative pressure vacuum pump. A skilled endoscopist can perform this procedure and special insertion instruments are not required.

Pattynama et al. report on their experience with the introduction of the EVT method for the treatment of anastomotic leaks after UGI surgery in a tertiary referral center [5]. The primary outcome reported is a success rate of 74%, which is rather low compared with other studies, although the fact that the learning curve has certainly not yet reached its end point must be taken into account. The authors exclusively used the EsoSponge (B. Braun Surgical, Rubi, Spain) and it cannot be excluded that this also had an influence on the success rate. Since 2014, the EsoSponge has been the only approved polyurethane foam drain for EVT use in the esophagus.

In the introductory phase of the EVT method, there are numerous challenges that have to be overcome by the whole team. This makes the paper interesting for all those who also want to introduce the new treatment method.

One aspect concerns the endoscopic techniques used to place the sponge drains, with each technique and device having its advantages and limitations. After the authors experienced defect enlargement occurring with the overtube of the EsoSponge device, they abandoned the blind placement technique. They now prefer instead to insert the EsoSponge under endoscopic vision using endoscopic forceps.

Anyone who uses EVT with foam drains will probably experience the sponge breaking off owing to the strong adhesion of the open-pored sponge to the debrided wound bed. In my experience, removal is always possible, but it is a tedious process and prolongs the examination time. Therefore, it is good to know techniques to prevent this, which we have previously described [7].

Commercially available drains are suitable for many indications, but they have their limitations. It is a criterion of EVT that the user often has to be creative in order to increase the success rate, with modifications of the drains often necessary.

Reducing the size of the sponge body remains the easiest to do. In recent years, many alternative and new types of open-pore drains have been described. These include long drains for intraluminal EVT, small-lumen film drains, film-covered foam drains, drains for pull-through placement, and drains with an enteral feeding tube [2, 4, 7, 8]. These drains can overcome some of the weaknesses and shortcomings of the commercially available drains; however, they must be manufactured by the user, which is a drawback. The pre-emptive use of EVT has opened an important new chapter in esophageal surgery [4] with the aim being to minimize the future risk of UGI surgery and thereby significantly increase patient safety.

A logistical challenge is the necessary close interdisciplinary cooperation between the surgery, gastroenterology, and anesthesia teams. The team involved in post-interventional care must also be involved. The question of how to react to pump alarms or how to connect the drainage to the electronic pump when changing canisters seems trivial, but it is existential for the therapy to function without causing an interruption.

The authors' proposal to collect the technical and logistical tricks and tips in a white book is a commendable good intention. This collection of practical experience will support others in the implementation of the method, so that in future the learning curve is as flat as possible.

Competing Interests

Gunnar Loske is a consultant for Lohmann & Rauscher GmbH & Co.KG. His patents for negative pressure therapy have been transferred to Lohmann & Rauscher GmbH & Co.KG. A conflict of interest exists due to a financial interest in several negative pressure therapy products currently being launched.

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