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IDEAS AND INNOVATIONS

Breast

Method for Flushing Surgical Drains Using a Butterfly Needle

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Summary: Surgical drains placed during breast surgery can become blocked by clots or other debris, which may lead to infection of the prosthetic and seroma or hematoma formation from improper drainage. Current methods involve stripping the drain, which does not clear the pores inside the cavity, or flushing the drain at the opposite end using a syringe with the debris going into the cavity being drained. The authors propose an easily available flushing option using a butterfly needle inserted at an angle that provides a sterile and efficient method for flushing the drain near the body cavity and clearing blockages. This creates a self-sealing valve that can be reinforced with Tegaderm and allows for the use of antibiotics or hemostatic agents through it. The primary author has performed this technique in-office in multiple patients undergoing breast augmentation, mastopexy/mammaplasty, breast reconstruction after mastectomy, and breast revision surgeries requiring implants or expanders with satisfactory results and no complications. This method is limited in that it must be performed by a health care professional, but it is easy to perform. *(Plast Reconstr Surg Glob Open 2021;9:e3714; doi: 10.1097/GOX.0000000000003714; Published online 15 July 2021.)*

INTRODUCTION

Surgical drains are medical devices used to collect blood or other body fluids using negative pressure created by a suction bulb or vacuum and can be used to mitigate the risk of lymphoceles, hematomas, and seromas in the acute postoperative period. Common uses for drains include breast surgery, abdominal surgery, draining pleural fluid, chest surgery, lymph node clearance procedures for malignancy, thyroid surgery, flap procedures in plastic surgery, and more recently, gynecomastia procedures.[1,2] A surgical drain can become clogged at the openings or along the length of the tube, and thus, prevent drainage of fluids. Different methods for unclogging the tubing can be employed based on the nature and location of the blockage.

Currently, the most common and simple method for patients, caregivers, and health professionals to unclog the drain tube is through stripping. Stripping involves squeezing one's fingers along the length of the tube and pushing down any clots and debris into the suction bulb.[3] Another method involves attaching a syringe onto the end of the tube to create a vacuum and suction the particulate matter. Lastly, a syringe filled with saline can be placed at the end of the tube and used to flush the length of the tube. Of the methods discussed so far, this is the only way to clear out a blockage at the pores of the tube inside the body of the patient, but may also increase the risk of infection due to the flushing of drain tube contents into the breast pocket, where the implant or expander is in place. Our aim is to describe a method for flushing the tube and unblocking the drain pores with greater ease.

METHOD

Informed consent is obtained from patients, and the ethical principles stated in the 2013 Declaration of Helsinki are strictly followed. A location is chosen along the length of the tube as close to the drainage site as possible while still allowing enough space along the line to work comfortably. Using sterile technique, the tube is wiped with isopropyl alcohol and a 23-gauge butterfly needle is inserted at a 15- to 30-degree angle (Fig. 1). A syringe filled with sterile saline, PhaseOne, or Bacitracin solution, is then connected to the needle. The drain tube is then clamped on the side proximal to the bulb to ensure that the solution will be flushed toward the surgical site instead of being suctioned into the bulb (Fig. 2).

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Fig. 1. Butterfly needle inserted into drain tubing at a 15–30 degree angle.

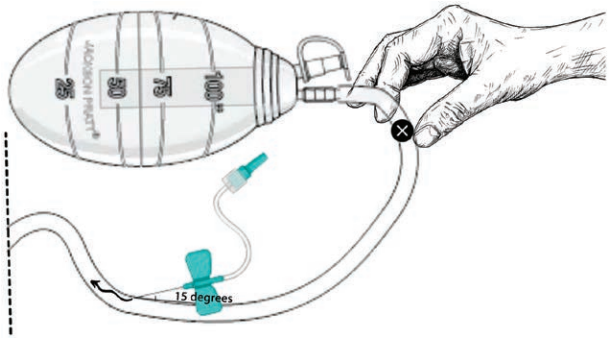

Fig. 2. Schematic showing the butterfly needle inserted proximally to the body cavity (dotted line) at a 15–30 degree angle, with clamping at a distal porting of the drain tube indicated by the "x" and arrow showing the flow of the solution.

The solution is dispensed into the drain tube and any blockage near the pores of the tube is flushed out into the surgical site (Fig. 3). The drain tube is then unclamped, allowing the bulb to suck the solution from the surgical site along the tube, collecting the clots and debris, and into the bulb. The butterfly needle can then be removed as the tubing now acts as a sealed valve due to the angle of insertion with no leakage (Fig. 4). If necessary, Tegaderm can be applied to the tubing to ensure a proper seal at the puncture site.

RESULTS

The primary author has performed this technique in multiple patients who underwent primary augmentation, revision breast surgery, or breast reconstruction after mastectomy with implants or expanders with concomitant 15 French Jackson-Pratt or Bard medium-large drain placement. This has accounted for about 15 times in the last five years. So far, no complications have been observed since this technique was adopted.

Fig. 3. Surgical drain flushed with sterile solution using a butterfly needle.

Fig. 4. Surgical drain free from debris at flushed site, with no leak after needle removal.

DISCUSSION

Seromas are a common complication after any breast or axillary surgery that can often require needle aspiration. Closed-suction drains decrease the amount of fluid and close dead space, which may reduce the rates of seromas and the requirement for needle aspiration.[2] In breast reconstruction using a TRAM flap, it has been found beneficial to use a drain in both the breast and the abdomen.[4] While not complete contraindications, there are specific non-breast surgeries where drains are not necessary and do not provide any additional benefits.[5] Placing a drain may prolong the postoperative hospital stay if one waits until it is removed before discharge—an important consideration, as it will increase the overall cost of treatment.[6]

Surgical drains can cause surrounding tissue inflammation and retrograde bacterial migration into the surgical site.[7] Drain entrapment can occur, it may become difficult to remove, or it can also become occluded by blood clots, tissue, or other debris. Consequently, this can create an environment for local bacterial growth as well as formation of a hematoma which will cause significant discomfort.[8] Although drains are made of strong material, they can break while being removed if done so carelessly. If breakage occurs, a fragment of the drain may be left

in the wound or cavity and lead to the need for further debridement or removal. If it is not retrieved, there is a possibility of a chronic inflammatory response to the foreign body and subsequent infection.[9]

This technique allows the surgeon to work inside the pocket of the tube that the clogged substance is already in, uses less sterile saline solution, and results in less drainage material in the tube being flushed back into the surgical site. Additional advantages to this technique include the option of a sterile injection of antibiotics to help minimize the risk of infection or epinephrine at a concentration of 1 cm^3 into 50 cm^3 of sterile saline solution for better bleeding control and assisting with hemostasis. Having a sterile field can be beneficial, as the overall benefit of using drains is still at question depending on the type of surgery, location of the drain, duration of time that the drain is in place, and number of drains because the drain itself can cause a surgical site infection.[10] Another advantage is related to the sealing for this draining process such that it is self-sealing, retains the seal, and makes it possible to add supplemental sealing with Tegaderm over the puncture site.

Despite all these advantages, it is important to mention a limitation in this method is that it requires a health care professional to perform it. Future studies comparing different drains, cavities, and procedures are necessary to evaluate the reproducibility of this low-cost method. Currently, the main objective of this study is to present the new technique as "Ideas and Innovations." We continue to use the technique with good results and follow the patients regarding main complications with the goal that the data will be published in a new study with a large sample and longer follow-up.

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