Clinical Note

Subcutaneous Lymphatic Drainage (Lymphcentesis) for Palliation of Severe Refractory Lymphedema in Cancer Patients

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Abstract
Subcutaneous lymphatic drainage has been reported to be an effective treatment for severe refractory lymphedema in patients with lymphatic accumulation because of obstructive cancer. We review published techniques for lymphatic drainage and describe two cases where these techniques were modified with good results.

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Key Words
Subcutaneous lymphatic drainage, lymphedema

Introduction
When no further active treatments for malignancy are available and traditional lymphedema treatments, such as massage and compression stockings, have failed, palliative drainage of subcutaneous fluid may be attempted.1,2 Subcutaneous lymphatic drainage is a new approach to the management of severe acute lymphedema, and the optimal method for performing drainage has not been established.

In a case series of eight patients that used a closed lymphedema drainage system, 16-gauge intravenous catheters were inserted subcutaneously both medially and laterally along the extremity and connected together with Y-shaped tubing, which drained into an enclosed bag.1 Six catheters were placed on each affected limb, remained in the skin for several days, and drained 1–8 L of fluid. After catheter removal, there was ongoing drainage of fluid from the puncture sites in four of eight cases.

A second report described several modifications to the procedure:2 1) needles were positioned medially as this seemed to maximize drainage and 2) after the removal of the needles and drainage tubing, sites that continued to drain were covered with a colostomy bag. We report on two cases where this approach was again modified with good results.

Case 1
A 41-year-old man with metastatic urethral squamous cell carcinoma and a history of a radical right-sided inguinal lymph node dissection and palliative radiation to the inguinal region presented with severe scrotal and right-sided lower extremity edema that was associated
with pain and difficulty ambulating. Lower extremity noninvasive testing excluded the diagnosis of deep vein thrombosis.

The patient had a limited response to conservative lymphedema treatments, including elevation and compression wrappings, and a trial of subcutaneous lymphatic drainage was attempted. The patient was informed about the experimental nature of the procedure and provided consent that acknowledged the risk of infection associated with inserting a catheter into an area of lymphedema. Six 20-gauge intravenous catheters were inserted circumferentially around the patient’s upper thigh and allowed to drain into a bucket on the floor. After about an hour, approximately 250 cc of fluid had collected in the bucket. The needles were then removed, and the puncture sites closed spontaneously.

The patient experienced significant relief from the procedure and asked permission to perform it on himself in the home setting. He was equipped with intravenous catheter needles and educated about sterile techniques for insertion. He performed his own drainage several times a week for three months until his death, at times leaving the catheters in place for up to four hours. He did not experience any negative side effects or sequelae from the procedure.

Case 2
A 48-year-old woman with metastatic breast cancer presented for management of lower extremity pain and swelling. Imaging showed multiple enlarged lymph nodes in the abdomen and pelvis that were progressive despite chemotherapy and localized radiation to the pelvis. Lower extremity noninvasive testing excluded the diagnosis of deep vein thrombosis. The albumin level was 2.3.

The patient’s examination was notable for edema extending from the upper groin to toes bilaterally. From the groin to midthigh, the skin was taut and nonpitting. There was skin breakdown in the groin, with some drainage of serous fluid. The patient’s pain was only partially relieved with a morphine patient-controlled analgesia system. At her request, a trial of furosemide was initiated without success.

A decision was made to attempt subcutaneous drainage. A total of six intravenous catheters (four 20-gauge and two 18-gauge) were placed circumferentially into the patient’s midthigh. Approximately 400 cc were drained for more than 90 minutes into a bucket on the floor. The catheters were then removed.

Over the following week, the holes created by the catheters continued to drain fluid. The area was wrapped with absorbent gauze to contain the drainage, but the excessive drainage was unhygienic and worried both the patient and nursing staff. The patient experienced significant relief from the procedure and from the subsequent persistent drainage, and there was a visible decrease in the area of swelling. The medially placed puncture sites were observed to drain the most fluid. After about a week following the initial procedure, the puncture sites closed spontaneously.

At the patient’s request, the procedure was performed two additional times. The second time, two 22-gauge intravenous catheters were inserted about two inches apart in her medial groin and immediately removed. An ostomy bag was placed over the site of the two punctures, and the site drained lymphedema fluid for just over a week (Table 1, Fig. 1). The ostomy bag was well tolerated by the patient, who was still ambulatory. A third procedure was done in a manner similar to the second with essentially the same results and was also well tolerated.

Discussion
We describe two cases in which subcutaneous lymphatic drainage (lymphcentesis) was performed without the use of drainage tubing. Overall, we found that a cluster of two to three punctures located on the medial side of the

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<th>Day</th>
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<td>2</td>
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limb and covered with an ostomy bag provided the most effective controlled drainage of lymphedema. The procedure was easy to perform and well tolerated by the patient. Because this approach avoids the use of indwelling catheters or tubing, it requires minimal training and nursing care and can be performed in a variety of settings, including in nursing facilities and at home. Messy and inconvenient dressing changes are avoided because leaking from puncture sites is anticipated and controlled. Through a process of trial and error, medial placement of skin punctures was found to be the most efficient for drainage. A review of the anatomy of the deep and superficial lymph node systems supports this approach because lymph vessels of the upper and lower extremities run medially following the arteries of the limb.3

Pathologic Considerations
Before attempting subcutaneous lymphatic drainage, lymphedema that occurs because of lymphatic obstruction from rapidly progressive cancers must be differentiated from chronic lymphedema. Chronic lymphedema, which commonly occurs after lymph node dissection or radiation treatment, results from chronic poor function of a damaged lymphatic drainage system.4 When lymphatic drainage is impaired, the production of lymphatic fluid exceeds lymphatic transport and an abnormal amount of protein-rich fluid collects in the tissue. This stagnant protein-rich fluid causes decreased oxygen availability, interferes with wound healing, provides a culture medium for bacteria, and causes lymphatic tissue channels to increase in size and number.5 Over months to years, the tissue of the limb becomes swollen (nonpitting) and fibrotic.6 As a result of these changes, limbs affected by chronic lymphedema are at increased risk for infection and poor wound healing and should not be punctured or drained. These limbs should be managed with complete decongestive therapy, which includes manual massage of the lymph node basins, compression bandaging, compression garments, and exercise.7

Although chronic lymphedema is characteristically described as nonpitting, we present a case of rapidly progressive (acute) nonpitting edema (Case 2). We suspect that this patient’s edema appeared nonpitting because of the tension created by the large amount of edema in the limb. Given the rapid development of the edema, it was unlikely that the limb had time to undergo the extensive fibrotic changes associated with chronic lymphedema. Indeed, we found that the nonpitting edema was transformed to soft pitting edema with lymphatic drainage.

Ethical Considerations
Even at the end of life, when treatment options are limited and comfort is the priority, performing untested or evolving procedures on patients can cause clinicians to feel uneasy. Procedures that have not been performed frequently can have unanticipated consequences or side effects. Patients at the end of life also are recognized as having special vulnerabilities because they have few options, and may, therefore, be willing to try untested medications or procedures, even if there is a low likelihood of benefit, for the chance to do something.8,9

Because there are few published data on lymphatic drainage (one case series with eight patients and a second case report), it was difficult to counsel patients about the risks and benefits. Although we suspected that patients with lymphatic obstruction who underwent needle drainage would be at significant risk for infection, the actual rates are unknown. In addition, neither did we anticipate nor did we counsel our patients about the possibility that the puncture wounds would not close in a timely manner and that the patient could be left with the problem of ongoing drainage from the extremity. Given the experimental
nature of this procedure, we could not advise patients about the benefits of the procedure compared with traditional treatments for lymphedema, such as manual massage and compression bandages.

Credentialing for this new procedure was also a concern. After discussion with our in-house counsel, it was our view that the procedure of subcutaneous lymphatic drainage should be considered in the same way as the off-label use of medications; special training or credentialing is not required, but physicians should clearly communicate the uncertainties in risk and benefit. Largent et al. provides a framework for off-label prescribing that can be applied in this situation. The framework differentiates types of off-label use based on the available evidence and links the level of evidence to specific requirements for ethical prescribing, such as the level of informed consent, documentation requirements, and recommended data collection.

**Conclusion**

These cases illustrate two variations on a lymphatic drainage procedure. In the first case, a modified procedure using intravenous catheters without tubing was performed at home, by the patient, for ongoing palliative lymphedema removal. In the second case, this procedure was again modified so that puncture sites were clustered and drainage occurred into an ostomy bag. Before attempting subcutaneous lymphatic drainage, clinicians must differentiate rapidly progressive (acute) lymphedema from chronic lymphedema, which should not undergo needle drainage. Because the physical examination finding of nonpitting edema is not specific to chronic lymphedema, careful consideration should be given to the clinical history and the time course for the development of lymphedema. To date, this procedure has only been described for the lower limb. However, a similar modified method seems applicable to upper limb lymphedema. Before initiating treatment, patients and family should be informed of the uncertain risks and benefits of the procedure. Future work should include formal quality-of-life testing to more objectively evaluate the benefits of this procedure and controlled studies to compare with standard approaches for refractory lymphedema in cancer patients.

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**References**


