Free Flap Salvage after Recurrent Venous Thrombosis by Means of Large-Scale Treatment with Medical Leeches

Kensuke Tashiro, MD
Masahide Fujiki, MD
Masaki Arikawa, MD
Yu Kagaya, MD
Shimpei Miyamoto, MD

Summary: An anterolateral thigh flap was salvaged using 110 medical leeches in the absence of an available vein for reanastomosis. After surgical construction of the flap for full-thickness thoracic wall reconstruction, the patient developed complete venous occlusion. Specifically, the anastomotic vein developed complete occlusion, and the internal jugular vein had a thrombus. In addition, because the lung was posterior to the flap, the angiogenic area of the flap was very small. When the medical leeches were first applied, the flap showed prominent venous congestion. However, the congestion began to resolve by day 6 of leech use, leading to complete survival of the flap. (Plast Reconstr Surg Glob Open 2016;4:e1157; doi: 10.1097/GOX.0000000000001157; Published online 13 December 2016.)

From the Department of Plastic and Reconstructive Surgery, National Cancer Center Hospital, Tokyo, Japan.

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The patient underwent forequarter amputation, thoracic wall resection (including the clavicle, scapula, and the first to fourth ribs), partial pneumonectomy, and reconstruction of the defect using a free ALT flap (Fig. 1). An ALT flap with a 9- × 23-cm skin paddle, including the iliotibial tract, was harvested from the right thigh. The microvascular anastomosis was performed using the internal mammary artery and vein in the right thoracic cavity. Thereafter, the thoracic cage was reconstructed with the iliotibial tract.

The patient underwent a second surgery for intrathoracic hematoma on the following day, and a venous thrombosis was found. The thrombosis occurred because the anastomotic vein was compressed by the expanded lung and the sternum. The arterial inflow into the flap was no longer in evidence. A reanastomosis of the vessels to the internal mammary artery and vein was performed. Three days after the second surgical procedure, the flap again showed venous congestion. Enhanced computed tomography detected the occlusion of the flap vein, and no other vein in the thoracic cavity was available for anastomosis. Therefore, medical leech therapy was started on the same day to salvage the flap (Figs. 2, 3). Intravenous heparin (Mochida Pharmaceutical Co., Ltd., Tokyo, Japan) and urokinase (Wakamoto Pharmaceutical Co., Ltd., Tokyo, Japan) were also administered.

The flap initially showed severe congestion, but improvement in the appearance of the flap was observed within 6 days of the implementation of the medical leech therapy. The patient developed mild anemia, and 8 units of blood were transfused. Ten to 25 leeches were applied each day, resulting in a total application of 110 leeches. The wounds healed without surgical-site infection, and

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the patient’s respiratory pattern was normal without paradoxical respiration at 1 month after surgery (Fig. 4).

**DISCUSSION**

In this case report, the use of medical leeches salvaged a reconstructive flap in which a venous thrombosis could not be surgically corrected. For this patient, flap necrosis would have been fatal as the defect involved the full thickness of the thoracic wall. The anastomotic vein was completely occluded, and no other recipient vein was available in the thoracic cavity, making reanastomosis of the vein difficult. Reconstruction with a pedicled flap was impossible because the size of the defect was too large. When the medical leeches were first applied, the flap showed prominent venous congestion.

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**Fig. 1.** Intraoperative appearance of the defect after tumor resection.

**Fig. 2.** The appearance of the flap at day 4. The flap showed congestive appearance.

**Fig. 3.** The appearance of the flap during medical leech therapy.

**Fig. 4.** Patient appearance 1 month after surgery.
However, the congestion began to resolve by day 6 of medical leech therapy, leading to complete survival of the flap.

Medical leeches suck a quantity of blood equal to 5 times their body weight and simultaneously inject hirudin to cause persistent bleeding. Whitaker et al. examined 279 cases in their systematic review evaluating leech therapy for venous congestion after reconstructive or replantation surgery. According to their review, medical leeches salvaged the reconstructed flaps in 216 of the 279 cases. If only free flaps are considered, the leeches salvaged 61 of 74 cases. Nguyen et al. reported the use of medical leeches for free flaps and successfully salvaged the flaps in 9 of 13 cases. In our case, the survival conditions of the flap seemed to be worse than those of previously reported cases because the lung was behind the flap, and the route of neovascularization was limited to the perimeter of the flap. In contrast, the thinness of the flap was a factor that favored survival.

We salvaged the flap under difficult conditions using 110 medical leeches. The successful use of the leeches was critical as surgical anastomosis was not an option. Medical leeches are likely useful as a final management option in cases wherein a reconstructed flap has surgically uncorrectable venous congestion.

**CONCLUSION**

The use of 110 medical leeches successfully salvaged a case of thoracic wall reconstruction with total occlusion of vein despite the difficult situation that the area behind the flap was lung.

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