

The role of lymphovenous bypass in peripheral lymphatic injuries following major cardiovascular interventions

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Background:

Lymphatic complications, including lymphorrhea, lymphatic fistula, lymphocele, and secondary lymphedema, are well-recognized sequelae of vascular and cardiothoracic procedures involving groin or extremity dissection. These conditions may lead to delayed wound healing, infection, prolonged hospitalization, and considerable patient morbidity. Although conservative management and lymphatic ligation remain standard treatment options, refractory cases continue to present significant therapeutic challenges. Supermicrosurgical lymphaticovenous anastomosis (LVA) offers a physiologic approach capable of restoring lymphatic drainage while minimizing surgical morbidity.

Methods:

We reviewed five consecutive lymphatic complications managed at our institution using individualized supermicrosurgical strategies guided by preoperative lymphoscintigraphy and indocyanine green (ICG) lymphography. Clinical presentations included persistent lymphorrhea following great saphenous vein harvest for coronary artery bypass grafting, ECMO-related groin lymphatic leakage, lymphocele formation, and extremity lymphedema following vascular procedures. Surgical interventions included in-situ LVA at the site of leakage, distal LV bypass with selective lymphatic ligation, and adjunctive muscle flap reconstruction when dead space obliteration was required.

Results:

ICG lymphography allowed characterization of lymphatic flow patterns and identification of disrupted lymphatic pathways, facilitating tailored surgical planning. Depending on the underlying pathophysiology, LVAs were performed either directly at the leakage site or distal to the site. Lymphatic diameters ranged from 0.5 to 1.0 mm, demonstrating the applicability of supermicrosurgical techniques in these complex settings. All patients experienced clinical improvement, including resolution of lymphatic leakage, reduction in drainage output, improvement of limb swelling, and successful wound healing. Cases with persistent dead space benefited from adjunctive sartorius or gracilis muscle flap reconstruction.

Conclusions:

Supermicrosurgical LVA offers a physiological and minimally invasive solution for postoperative lymphatic complications. Preoperative evaluation with lymphoscintigraphy and ICG lymphography allows precise characterization of lymphatic dysfunction, distinguishing lymphatic leakage from obstructive pathology and guiding individualized treatment. Based on our clinical experience, we present a practical management algorithm that integrates modern lymphatic imaging, physiological reconstruction, and conventional treatment modalities. This comprehensive approach expands the reconstructive options available for challenging lymphatic complications and promotes tailored, mechanism-based care following cardiovascular and vascular interventions.