



# Comments on Algorithmic Approach to the Lymphatic Leak after Vascular Reconstruction: A Systematic Review

William Watfa, MD<sup>1,2</sup> Karl Sörelus, MD, PhD<sup>3</sup> Corrado Campisi, MD, PhD<sup>1</sup>  
Carlo M. Oranges, MD, PhD<sup>5</sup> Wassim Raffoul, MD<sup>1</sup> Pietro G. di Summa, MD, PhD<sup>1</sup>

<sup>1</sup> Department of Plastic, Reconstructive and Hand Surgery, University Hospital of Lausanne (CHUV), Lausanne, Switzerland

<sup>2</sup> Department of Plastic and Reconstructive Surgery, Saint George University Hospital of Beirut, Beirut, Lebanon

<sup>3</sup> Department of Vascular Surgery, Rigshospitalet, Faculty of Health and Medical Sciences, University of Copenhagen, Copenhagen, Denmark

<sup>4</sup> Department of Lymphatic Surgery, San Martino Hospital, Genova, Italy

<sup>5</sup> Department of Plastic, Reconstructive and Aesthetic Surgery, Geneva University Hospitals, University of Geneva, Geneva, Switzerland

Address for correspondence Pietro G. di Summa, MD, PhD, Department of Plastic, Reconstructive and Hand Surgery, Centre Hospitalier Universitaire Vaudois (CHUV), Rue du Bugnon 46, Lausanne 1011, Switzerland (e-mail: pietro.di-summa@chuv.ch).

Arch Plast Surg 2023;50:119–120.

We read with interest the article published in the July issue of the Journal, “Algorithmic approach to the lymphatic leak after vascular reconstruction: a systematic review.”<sup>1</sup> We would like to congratulate Dr. Nicksic and his coauthors for the overview of current literature describing lymphatic leak treatment approach after vascular reconstruction. We particularly appreciated the efforts the authors deployed to present a review of a complicated topic, where no international consensus exists between conservative or operative management.<sup>2</sup> Importantly, authors screened the literature in the aim to match patient’s conditions and preoperative risk factors to the leak treatment, defining a clear treatment algorithm.

The central theme assessed by Nicksic et al, that is, which reconstructive option is best for lymphatic leak after vascular reconstruction was neatly developed by focusing on patient comorbidities, risk factor, and presence of synthetic graft use. Literature outcomes of surgical treatment (specifically lymphatic ligation ± muscle flaps) were compared with conservative therapy. As mentioned by the authors, when the patient is a surgical candidate, ligation alone is not always

sufficient and the addition of muscle flap remains an essential part of reconstructions.

While wanting to congratulate the authors, this letter tries to challenge certain aspects in the field of groin surgery and management of lymphatic leaks that could not be included in their review, since the data search was only conducted until 2018.

In 2020 we published our experience in treating lymphatic leaks of the thigh and inguinal region,<sup>3</sup> where we investigated 14 consecutive patients with lymphatic leaks, all refractory to conservative or/and negative pressure treatment. We then elaborated a stepwise approach, combining lymphatic surgery principles and plastic surgery flap techniques, that lead to an effective treatment algorithm where surgical options were wound-tailored to guarantee the best functional outcomes. In contrast to the findings in the review by Nicksic et al, we believe that the type of flap has a critical impact on the leak, and flap surgery should not be necessarily applied to patients « at risk » in terms of comorbidities (the majority of vascular patients are smokers, diabetic, and with relevant comorbidities), but rather « at risk » in terms of wound properties.

received  
October 27, 2021  
accepted after revision  
November 17, 2022

DOI <https://doi.org/10.1055/s-0043-1761160>.  
eISSN 2234-6171.

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In our algorithm, flap choice was defined according to the specific wound features and preoperative imaging investigations (three-dimensional existing defect, need for dead space filling only, and/or associated skin resurfacing, vascular axis patency, presence of neighboring recipient vessel) and thus more on a patient-wound condition rather than global-patient condition.<sup>3,4</sup> Although we agree with the authors that the sartorius flap turnover should be the first line of treatment as primary muscle flap,<sup>2</sup> this flap's vascularization is unfortunately often jeopardized after vascular surgeries involving the superficial femoral artery and therefore is often insufficient to guarantee effective coverage of critical structures such as the femoral triangle or synthetic grafts. In our retrospective series, almost all reported patients presented a recurrent lymphatic leak with open wound despite a previous sartorius flap already attempted by our vascular surgeon colleagues, and finally needed complete soft tissue resurfacing including skin.

On the same path, the role of muscle flaps for inguinal defects is surely indicated as the muscle component may adapt better to a deep defect, but in our experience they should be reserved for cases with a subcutaneous defects only, while musculocutaneous or perforator cutaneous flap serve better in multicomposite defects where the cutaneous component has become insufficient following multiple previous procedures.<sup>3</sup>

Defect with leaks after vascular surgery carry the supplementary challenge of potentially jeopardizing the circumflex femoral artery (CFA) network, which is critical for the majority of workhorses flaps used for inguinal coverage. Consequently, we believe that flap choice for inguinal defects coverage with lymphatic leaks needs to be driven by a careful vessels assessment of the CFA and eventually of the deep inferior epigastric vascular system. We recently published in this journal how perfusion could be massively jeopardized in vascular patients and that even nonmuscular adipocutaneous flaps may be suited for inguinal coverage, if an effective lymphatic ligation or microsurgical shunt procedure has been performed.<sup>5</sup>

Finally, recent years showed a dramatic rise in lymphatic procedures, proportionally with an increase of plastic surgeons developing skills (microsurgical and supramicrosurgical) devoted to lymphatic surgery. If lymphatic ligation can be correctly reported as "efficacious," it needs to be absolutely selective (e.g., indocyanine green guided), to avoid secondary lymphedema and further increase in patient's comorbidities. We highlighted the technicalities

and specificities of surgical treatments ranging from simple lymphatic vessel ligation to microsurgical treatment of lymphatic fistulas to free tissue transfer eventually combined with microsurgical shunts. Combining flap surgery with microsurgical lymphovenous shunt (as a separate procedure or within the flap using side afferent veins) represent a recent critical addition to the inguinal reconstruction associated with lymphatic leaks, as it combines standard flap surgery with microsurgical lymphatic reconstruction.

We believe that the abovementioned concepts together with the valuable review of Nicksic et al will shed more light, on the extremely complex scenario of inguinal wounds associated with lymphatic leaks. With these lines we wanted to complete/amend the proposed algorithm, with a deeper accent on wound-tailored flap choice, and on flap-lymphatic microsurgery hybrid techniques, that are in our experience the definitive game changer when dealing with complex lymphatic leaks in the inguinal region.

#### Author Contribution

Conceptualization: C.M.O., P.G. di S. Data curation: C.C. Formal analysis: WR. Funding acquisition: Methodology: K.S. Project administration: Visualization: P.G. di S. Writing – original draft: W.W., P.G. di S.

#### Conflict of Interest

None declared.

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