



Utilizing Laparoscopic Camera with Indocyanine Green Fluorescence Filters in Lymphovenous Bypass Surgery

Ramesh B. A.¹ Preetam A.¹ Singaravelu V.¹ Sathish Kumar J.¹

¹ Department of Plastic Surgery, Sri Ramachandra Medical College and Research Institute, Chennai, Tamil Nadu, India

Indian J Plast Surg 2024;57:71–73.

Address for correspondence Ramesh B.A., Mch, FRCSEd, No.1 Ramachandra Nagar, Porur, Chennai 600 116, Tamil Nadu, India (e-mail: ramesh.ba@sriramachandra.edu.in).

Indocyanine green (ICG) is a fluorescent dye commonly used in lymphovenous bypass (LVB) surgery to identify lymphatic vessels. ICG binds to proteins in lymphatic fluid and makes them visible under near-infrared light. During the surgery, a specialized near-infrared camera, built into a modern microscope, is used to visualize the lymphatic vessels that have taken up the ICG dye.¹ Additionally, ICG can be used after the surgery to assess the patency of the newly created lymphovenous connections. Our department has a Zeiss microscope (S 8) for microvascular anastomosis, lacking the capability for ICG filter integration. To circumvent the problem, we used a laparoscope camera with a built-in ICG filter (Stryker Advanced Imaging Modality Camera 1588) for our LVB procedure.

A 34-year-old female had developed lymphedema in her right upper limb after undergoing treatment for breast cancer, which was managed by compression dressing during the coronavirus disease period. Despite this, the

patient's swelling continued to gradually increase, prompting her to undergo a LVB procedure almost a year after the mastectomy. This procedure was the first of its kind to be performed at our hospital. However, the old Zeiss microscope used for microsurgery did not have a fluorescence imaging option available. To overcome this limitation, we attempted to use a laparoscopic camera with an ICG filter, which is typically used to visualize the bile duct.² The camera was adjusted for white balance and then switched to ICG filter mode. The camera is typically positioned above the surgical site and is connected to a display screen that allows the surgeon to see the images in real-time (►Fig. 1). ICG injected into the subcutaneous tissues of the distal forearm (►Fig. 2), which is absorbed by the lymphatic, results in green fluorescence on the monitor (►Fig. 3). The lymphatic channels were easily visualized during the procedure and LVB was successfully completed using the old Zeiss microscope.³

article published online
January 30, 2024

DOI <https://doi.org/10.1055/s-0044-1779470>.
ISSN 0970-0358.

© 2024. Association of Plastic Surgeons of India. All rights reserved. This is an open access article published by Thieme under the terms of the Creative Commons Attribution-NonDerivative-NonCommercial-License, permitting copying and reproduction so long as the original work is given appropriate credit. Contents may not be used for commercial purposes, or adapted, remixed, transformed or built upon. (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)
Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India



Fig. 1 Laparoscopic camera focusing skin.

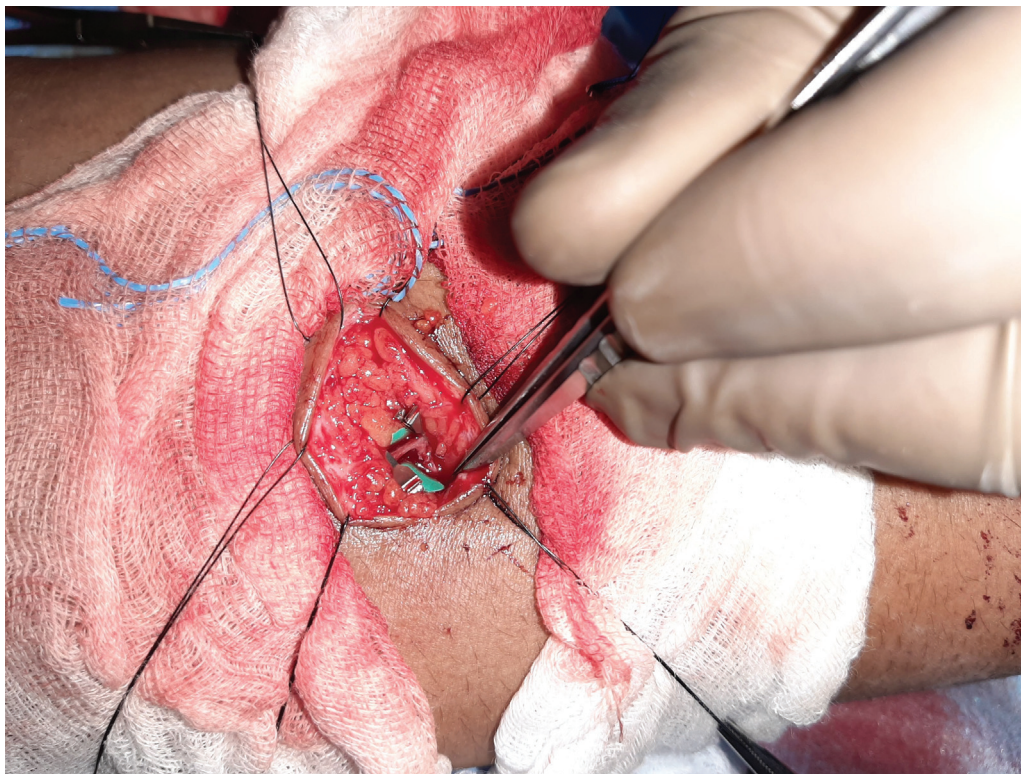


Fig. 2 Lymphatic or vein after skin opening.

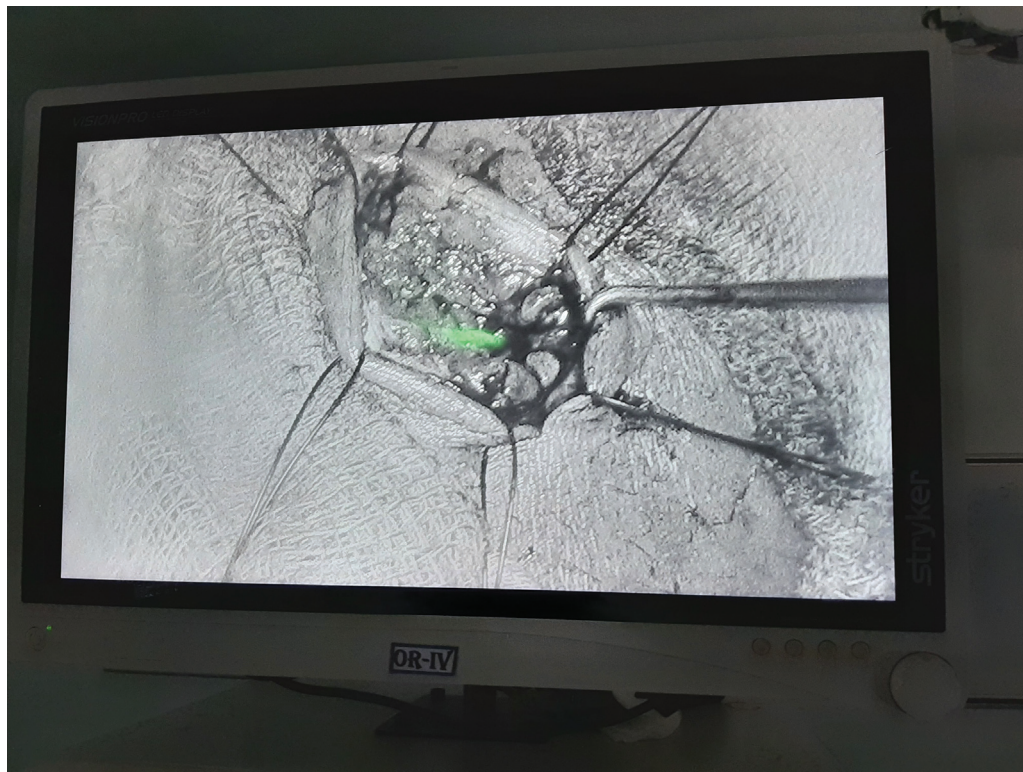


Fig. 3 Indocyanine green (ICG) fluorescence lymphatic visible on monitor.

The laparoscopic camera equipped with an ICG filter serves as a valuable tool for LVB in settings lacking access to a contemporary and costly microscope.

Conflict of Interest
None declared.

References

- 1 Garza RM, Chang DW. Lymphovenous bypass for the treatment of lymphedema. *J Surg Oncol* 2018;118(05):743–749
- 2 Sorrentino L, Sartani A, Pietropaolo G, et al. A novel indocyanine green fluorescence-guided video-assisted technique for sentinel node biopsy in breast cancer. *World J Surg* 2018;42(09):2815–2824
- 3 Gallagher KK, Lopez M, Iles K, Kugar M. Surgical approach to lymphedema reduction. *Curr Oncol Rep* 2020;22(10):97