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

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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]

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Fig. 1 Laparoscopic camera focusing skin.

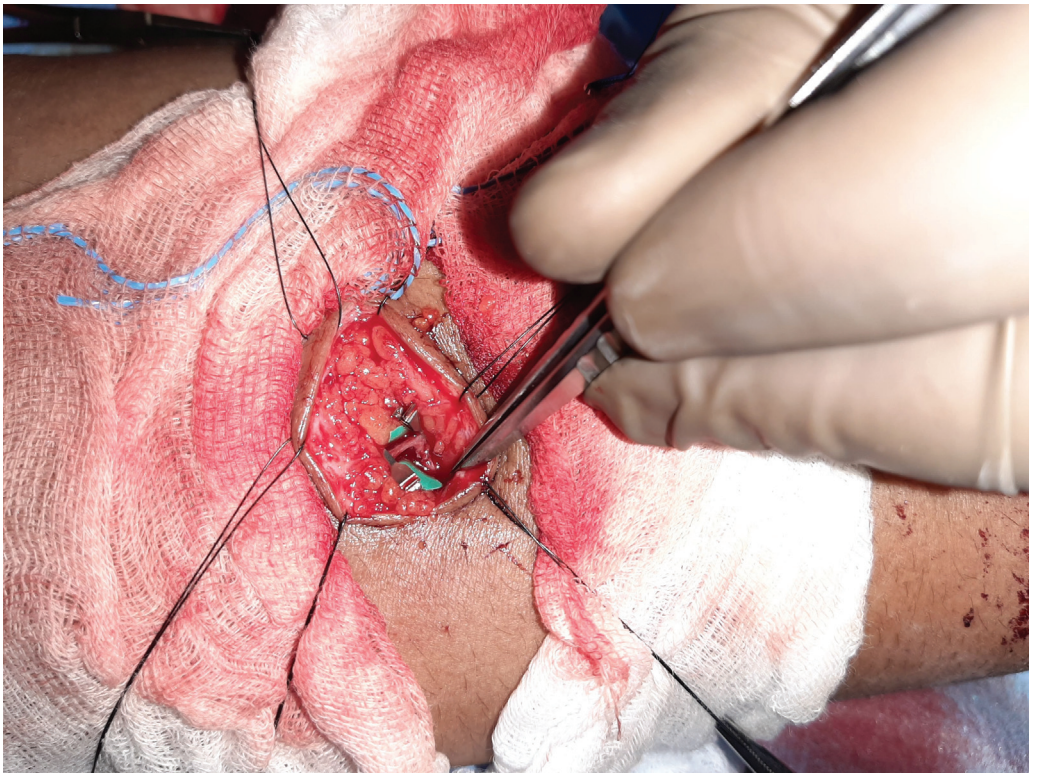

Fig. 2 Lymphatic or vein after skin opening.

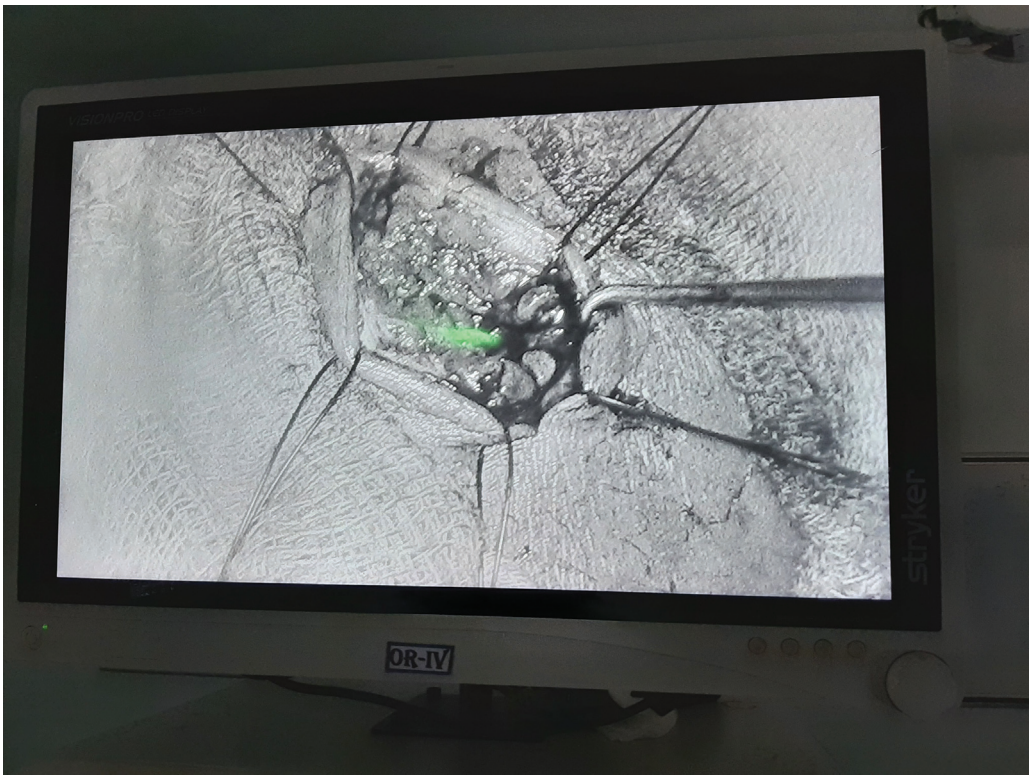

Fig. 3 Indocyanine green (ICG) fluorescence lymphatic visible on monitor.

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.

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