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Indocyanine green and the delimitation of the intersegmental plane in sublobar resections

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Introduction: Colorectal cancer (CRC) is the leading cause of cancer death worldwide.⁽¹⁾ It is estimated that about 50% of patients with CRC develop metastasis during follow-up, most commonly in the liver followed by the lung. Lung metastasis is seen in approximately 10 - 15% of patients diagnosed with CRC.^(1,2) Pulmonary metastasectomy is the treatment with the best survival rate.⁽³⁾ Due to the high incidence of lung recurrence, in approximately 50% of cases, parenchyma-sparing lung resections were required.⁽¹⁾ Video-assisted thoracoscopy is the access route of choice for lung resections. However, the delimitation of the vascular, tracheobronchial, and intersegmental plane anatomy is a critical point in sublobar resections. As a result, there was a need to implement new technologies in the preoperative period,

such as 3D reconstruction, and in the intraoperative period, such as the use of indocyanine green for better characterization of the intersegmental plane.^(4,5) With the advent of indocyanine green, complex sublobar resections became feasible, with precise delimitation of the intersegmental plane, thus ensuring adequate oncological margins and a lower rate of vascular lesions.^(4,5) **Objective:** Therefore, the present report aims to demonstrate the benefit of the use of indocyanine green in sublobar resections of RCC lung metastases.

Case report: A 55-year-old female patient diagnosed with Colorectal Adenocarcinoma in 2021 underwent surgical treatment and adjuvant therapy to control the primary disease. In a follow-up imaging exam, a lesion was identified in the left lower lobe, and she was then submitted to SBRT in June 2022, with local control of the disease. During follow-up with imaging tests, two new lesions were identified: one in the left lower lobe and the other in the lateral segment of the lingula, thus pulmonary metastasectomy treatment was proposed. In the preoperative period, three-dimensional reconstruction was performed using a computed tomography scan of the chest. The patient underwent video-assisted thoracoscopy with wedge resection of the lesion in the lower lobe, and anatomical resection of the left segment of lingula was performed. It started by releasing the inferior pulmonary ligament, followed by opening the pulmonary fissure, with identification of the interlobar artery, as well as identification of lingular branches (A4 + A5). Dissection of the hilar lymph node chain was performed with identification of the lingular bronchus. After that, the mediastinal pleura was opened, with identification of the lingular veins (V4 + V5) and the vein of the anterior segment of the left upper lobe - V3. Next, indocyanine green (0.05 mg/kg) was administered to delimit the intersegmental plane, with subsequent stapling of the lung parenchyma. The patient was extubated while still in the operating

room and referred for anesthetic recovery. The chest tube was removed on the 1st postoperative day with a serous flow rate of 100ml, without air leakage, and the patient was discharged from the hospital on the second postoperative day without the need for the use of opioids.

Commentary: With the development of minimally invasive surgical techniques, it is necessary to develop technologies that assist in the planning and during the surgical procedure, thus reducing complication rates, surgical time and the need for conversion to exploratory thoracotomy. After administration of indocyanine green, the delimitation of the intersegmental plane is greater than 94%.⁽⁴⁾ The use is safe for the patient, with positive intraoperative outcomes. Thus, the need for implementation and diffusion of technologies in the routine of specialized services is concluded.

Keywords: Indocyanine green; Intersegmental plane; Sublobar resection; lung metastasis

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