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Robotic precision in lung cancer complex surgery: a video-guide on right segmentectomy using indocyanine green

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Introduction: Recent two randomized studies have demonstrated that for lung cancers peripherally and smaller <2cm, segmentectomy accompanied by intraoperative lymph node assessment is as effective as lobectomy in terms of overall survival.⁽¹⁾ The video presents a comprehensive guide to performing a right robotic segmentectomy, specifically of segments 9 of the lung.⁽²⁾ This includes a thorough hilar and mediastinal nodal dissection. Additionally, the video showcases the application of Indocyanine Green (ICG) to accurately identify the intersegmental plane, aiding in precise resection margin determination after segmental pulmonary artery and vein division.^(3,4)

Case report: A 61-year-old female patient, active smoker (10 cigarettes/day), with no previous comorbidities, was referred for evaluation by the Thoracic Surgery team due to the growth of pulmonary nodules over a 3-year period. The patient was asymptomatic. Initially, PET-CT was requested with findings of two pulmonary nodules located in the apicoposterior segment of the left upper lobe and in the lateral basal segment of the right lower lobe. Both nodules grew approximately 1.0cm over a three-year period. Thereat the sublobar resection procedure of the nodule in the lateral basal segment of the LSD was initially indicated. Therefore, preoperative exams were requested with results within normal limits and the patient was referred for the procedure. Within the surgical planning, anatomical three-dimensional reconstruction of the case was carried out. During the surgery, the patient was positioned in the left lateral decubitus position and selective intubation was performed. It began with a right videothoracoscopy to block the intercostal nerves. After this procedure, the Xi robot was docked. It began with the resection of lymph node samples from chairs 9, 10, 2+4R, 12, 11R and 13. Then we moved on to the treatment of the hilar structures: gray fillers were used for the vascular structures and purple filler for the bronchial structure. We proceeded with indocyanine green to delimit the lung parenchyma and separate it using black and purple fillers. Finally, segments 6 and 8 were sutured to the middle lobe and pleural drainage of the thoracic cavity was performed. The patient was extubated after the procedure and taken to an infirmary bed. The chest tube was removed on the first day after surgery and the patient was discharged from hospital on the second day.

Commentary: For neoplastic lung lesions, surgical planning with detailed imaging exams as well as the use of 3D reconstruction of the lesion allows for greater knowledge of the thoracic anatomy. Finally, these new tools provide the possibility of complex lung resections associated with a broad sampling of thoracic lymph nodes in an increasingly safer manner.⁽²⁾

Keywords: Robotic surgery; 3D reconstruction; Segmentectomy; Indocyanine green

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