Sixth International Joint Meeting on THORACIC SURGERY

Barcelona - 20th, 21st and 22nd November 2024
Auditorio Foment del Treball Nacional. Barcelona (Spain)

11th International Meeting on General Thoracic Surgery
Clínic Barcelona | Universitat de Barcelona | Hospital Universitari Sagrat Cor

5th Meeting of the Thoracic Oncology, Thoracic Surgery, Techniques & Transplant, Respiratory Nursing and Respiratory Physiotherapy Areas of the Spanish Society of Pneumology and Thoracic Surgery (SEPAR)
Sociedad Española de Neumología y Cirugía Torácica (SEPAR)

10th International Workshop on Surgical Exploration of the Mediastinum and Systematic Nodal Dissection
Hospital Universitari Mútua Terrassa | Universitat de Barcelona

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3rd Joint Meeting of the Spanish Society of Thoracic Surgery (SECT)
SECT Sociedad Española de Cirugía Torácica

30th Congress of the "Asociación Iberoamericana de Cirugía Torácica" AIACT

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CAPNOTHORAX AND ANAESTHETIC TIPS IN RATS

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Minimally invasive thoracic surgery is recommended for early-stage lung cancer due to its benefits including less pain, reduced surgical stress, systemic inflammatory response and length-of-stay. Robotic-Assisted Thoracic Surgery (RATS) presents some advantages compared to Video-Assisted Thoracic Surgery (VATS). It allows a three-dimensional view of the surgical field, its precision facilitates navigation in difficult-to-access spaces, improves work ergonomics and eliminates surgeon's tremor reducing the learning curve.

Patient positioning is paramount during RATS, as there is limited access to the patient once the robot is deployed. That has an impact on venous access and airway control and lung separation. Intravenous access should be secured and available. Lung separation can be achieved both with double lumen tubes and bronchial blockers but restricted access to the airway has to be considered because it can complicate airway device repositioning. Tubes with built-in video-camera, both double lumen and single lumen, may be helpful to monitor adequate positioning of airway devices.

During RATS, a continuous tension capnothorax is used. The intrathoracic carbon dioxide (CO_2) insufflation facilitates anatomical dissection as retracts tissues and expands the surgical field improving the view of intrathoracic structures. Nevertheless, CO_2 insufflation with intrathoracic positive pressure has a potential negative impact on cardiorespiratory physiology as it may increase the risk of hypercapnia, it may compromise the hemodynamics by the compression of the mediastinal vessels, and it may promote atelectasis. Such atelectasis increasing the risk of ventilation-induced lung injury (VILI), which is a relevant factor associated to postoperative pulmonary complications since it can result in lung damage caused by excessive lung tissue stretching when the lungs are globally or regionally over-inflated.

An optimal lung-protective ventilation strategy aiming to minimize VILI comprises low tidal volume, the performance of alveolar recruitment maneuvers and the application of positive end-expiratory pressure (PEEP). Permissive hypercapnia is recommended but strict surveillance is needed in order to avoid complications in high-risk patients.

Continous tension capnothorax can also be associated to significant hemodynamic effects. Increase in intrathoracic pressure can impair venous retorn, decreasing cardiac preload and producing significant hypotension. Establishment of capnothorax needs to be progressive under hemodynamic monitoring and fluids and vasopressors should be readily available.
There are robotic-assisted thoracic surgery approaches, such as uniportal approach, in which that the use of tension capnothorax is not needed. There are not comparative studies in terms of pulmonary repercussions between multiportal and uniportal approaches, nor about the appearance of postoperative complications. More studies are needed to assess the impact on pulmonary mechanics and associated complications.

Suggested reading: P. McCall, M. Steven and B. Shelley. Anaesthesia for video-assisted and robotic thoracic surgery. BJA Education, 19(12): 405e411 (2019) doi: 10.1016/j.bjae.2019.09.002