Tubeless thoracic surgery? Yes, the future is today

The cardiothoracic surgery unit and the heart month

Uniportal video-assisted thoracic surgery (Tubeless-VATS) is a minimally invasive surgery that involves reaching the thorasic cavity through a single incision, withpout the need for a general anaesthesia.

During the Tubeless-VATS procedure, the surgeon creates a single 3cm incision, several centimeters wide, no endotracheal tube, no urinary catheter, no central vein and no epidural.

This single cut serves as a port for both traditional surgical instruments and the thoracoscope, a long, thin rod attached to a fiber-optic video camera. The thoracoscope allows the surgeon to visualize the thoracic cavity and conduct the surgery without needing to open the chest wall. Through this single, small incision, the surgeon can perform intensive cardiac procedures.

The main advantage of this procedure is that the patient doesn't need to be intubated as is the case with a general anesthesia, avoiding perioperative morbidity due to the harmful effect of general anaesthesia and single-lung mechanical ventilation. Added to this are the benefits of spontaneous breathing in a non-intubated patient.

Criteria for a non-intubated Uniportal procedure, includes all selected patients for whom the morbidity associated with conventional thoracotomy and the risk involved with intubated general anesthesia could be reduced or avoided.

The choice of a single incision technique in a patient that is awake or on a non-intubated patient could minimise even more the invasiveness of the surgery and anesthesia.

We consider it very important to avoid general intubated anaesthesia, in high risk patients, such as the elderly or those with poor pulmonary function. It is advisable to perform a careful selection of the patients, especially during the learning curve. The contraindications for major resections while the patient is awake are, an expected difficult airway management, obesity (body mass index>30), dense and extensive pleural adhesions, hemodynamically unstable patients, ASA>II and big tumors (>6 cm).

Thanks to the possibility of avoiding intubation, mechanical ventilation and muscle relaxants, the anaesthetic side effects are minimal, permitting most patients to be included in a fast hospital discharge protocol avoiding the need to be admitted to an intensive care unit. Moreover, the perioperative surgical stress involved could be attenuated in non-intubated patients undergoing Uniportal VATS as a result of the reduced postoperative stress hormones and pro-inflammatory mediators related to mechanical ventilation. Oxygen (6-9 l/min) is supplied via a facial mask. The pharmacological management is based on a target-controlled infusion of remifentanyl and propofol, with a premedication of midazolam (0.15-0.25 mg/kg) and atropine (0.01 mg/kg) 15 minutes before anesthesia, adjusting real-time rate of infusion with the aggressiveness of each period during the surgery. The use of an intraoperative vagus blockade is recommended to suppress coughing that could be troublesome when performing lung traction and hilar manipulation during dissection.

During an Uniportal approach in a non-intubated patient, the recommendation is to perform a paravertebral blockade or an intercostal infiltration under thoracoscopic view. The importance of avoiding epidural thoracic blockade (avoiding opioids) will result in a faster recovery and return to daily activities.

Tubeless thoracic surgery is currently evolving, challenging former exclusion criteria and expanding indications to major lung resections or even tracheal and carinal resections to provide better intraoperative results and promote a minimal recovery period.

This text was written by **Prof. Javier Gallego** and **Prof. Diego Gonzalez Rivas**, both extraordinary surgeons of the **Cardiothoracic Surgery Unit** of the **HPA Health Group**.

Prof. Javier Gallego is Coordinator of the Specialty of the HPA Health Group in the Algarve and has gained extensive experience in both cardiac surgeries, in pathologies such as aortic stenosis, and in thoracic surgery, in situations such as lung cancer and chest deformities (pectus excavatum and carinatum).

Prof. González Rivas, one of the most eminent cardiothoracic surgeons in the world is forerunner in this area. In 2010 González Rivas was a pioneer in performing unilateral anatomical resection by video-assisted thoracoscopy (with only one incision), having in 2014 performed the first lung surgeries, also with a single incision in patients without intubation and in spontaneous breathing. He was also pioneer in performing uniport resections using an articulated robotic arm, without the need for an assistant surgeon (first case in 2016).