



# Recent advances in non-intubated robotic-assisted thoracic surgery (NiRATS) for tracheal/airway resection and reconstruction

Volkan Kösek, Eyad Al Masri, Bassam Redwan

Department of Thoracic Surgery, Klinik am Park, Klinikum Westfalen, Lünen, Germany

Correspondence to: Bassam Redwan, MD. Department of Thoracic Surgery, Klinikum Westfalen, 44536 Lünen, Germany. Email: [bassam.redwan@gmail.com](mailto:bassam.redwan@gmail.com).

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Li *et al.* report their initial experience with non-intubated robotic-assisted thoracic surgery (RATS) for tracheal/airway resection and reconstruction (1).

A total of 5 patients underwent RATS tracheal/airway surgery under the non-intubated setting. The authors conclude that the described technique represents a safe and feasible approach for tracheal and airway surgery in well-selected patients.

In a previous work of the same group, non-intubated video-assisted thoracic surgery (NiVATS) for resection of a tracheal mass and reconstruction of the trachea was described with satisfying results (2).

Early recovery after surgery (ERAS) is a very important issue in thoracic surgery. Implementation of minimally invasive surgical techniques supports this concept and accelerates the patient recovery. Over the last decade, a substantial evolution of the minimally invasive thoracic surgical techniques was marked. The utilization of the uniportal video-assisted thoracic surgery (uVATS) represents one of the most important milestones in thoracic surgery. Numerous studies have reported the safety and efficacy of this approach in a wide spectrum of thoracic surgical procedures (3-5).

Gonzalez-Rivas and colleagues reported their experience in bronchovascular, tracheal and carinal sleeve resections using the uniportal approach (4). The authors concluded that complex procedures such as tracheal resections may be performed safely in the hands of an experienced team. The minimally invasive approach minimizes the disadvantages of the open-surgical approach and facilitates postoperative

recovery.

Robotic-assisted thoracic surgery (RATS) represents a further milestone of minimally invasive thoracic surgery. Safety and efficacy of RATS in anatomical lung resections and mediastinal tumor resections has been shown in several studies (6-8) and a reduction of postoperative pain was reported (9). However, regarding cost effectiveness, RATS does not seem to have an advantage over VATS (10).

A further important factor supporting ERAS is the implementation of NiVATS. Numerous thoracic surgical procedures are performed in the non-intubated setting with very promising results and growing acceptance among physicians and patients (11-14). In well-selected patients, this approach is associated with shorter hospital stay and more rapid recovery from surgery when compared with the intubated setting (15).

In the current case series by Li *et al.* the both RATS and the non-intubated setting were combined for tracheal/airway resections and reconstructions (1). The authors reported operative times of 5 h 5 min to 9 h 55 min and postoperative hospital stays of 4 to 14 days. These reported times are longer than equivalent procedures when performed by VATS under the non-intubated setting (4,16) and therefore lack advantage in terms of ERAS after tracheal surgery. This might be due to the initial difficulties encountered while implementing a new technique. Nevertheless, the combination of RATS and the non-intubated approach is a novel and innovative concept, which surely should be performed and further validated in a larger, patient cohort, to identify the patient subgroup, which

would benefit the most of this novel concept.

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