

“And of strong wines I drank boldly, as drink they who seek after pleasure and are brave” Konstantinos Kavafis (1863-1933), Greek poet

The development of thoracoscopic procedures have more than one-hundred years of history. In the year 1910, the Swedish physician Hans Christian Jacobaeus described the first thoracoscopic procedure to release adhesences in patients suffering from tuberculosis. Using a simple candle as a light source, Jacobaeus peered through the rigid tube to look inside the chest cavity. He used this direct thoracoscopy technique to lyse adhesions in order to collapse the lungs. This technique was adopted throughout Europe in the early decades of the 20th century. However, for many years this procedure was relegated only to diagnostics and minor therapeutic procedures.

It is only in the last two decades that interest in minimally invasive thoracic surgery was renewed by two key technological improvements: (1) The development of endoscopic cameras offering a panoramic view instead of the previous tunnel-like vision; and (2) the availability of new endoscopic instruments like the linear mechanical stapler. From these advances, Video-Assisted Thoracic Surgery (VATS) was born. In the year of 1992 Giancarlo Roviario revolutioned the thoracic surgery by performing the first anatomic lung resection through small incisions while looking at a screen and with no rib spreading. He went from an aggressive open surgery to a minimally invasive procedure to operate lung cancer. He was criticized for many years by the more traditional surgeons who claimed that this approach was not an oncological procedure. This new approach was a threat for traditional surgeons because it was a completely different way to operate, not easy to learn, with a loss of 3D vision, lack of sense of touch and dexterity and a totally different instrumentation. In the history of medicine and mankind in general, every innovation has been followed by a first phase of restriction and refusal by the hand of the more conservative minds. However, good ideas finally settle in thanks to determination, hard work and dedication. A road full of obstacles is sometimes the best stimulus to grow, improve and develop new ideas.

In the following years, the progress of VATS was slow with constant critics until studies showing clear benefits of VATS over open surgery started to be published. From that point on, the technique spread throughout the world and variations of the technique, in terms of number and placement of incisions, surgical approaches and new surgical instruments used started to emerge. Despite this, there was a common consensus for thoracoscopic major resections: no rib spreading, a maximum of 6-8 cms for the access incision, anatomic resection of the hilum and systematic lymph node dissection (identical to an open thoracotomy).

Thanks to the improvements and experience gained through the last years, nowadays thoracic surgical procedures, whether minor or major, easy or advanced cases, can be performed by VATS, therefore resulting in less pain, shorter hospital stay and with excellent surgical outcomes. The evolution of VATS is an ongoing process and challenges to the role of a VATS lobectomy will never cease to emerge. The information available on internet, live surgery events and experimental courses has contributed to the rapid learning of minimally invasive surgery during the last decade. While initially slow to catch on, the traditional multi-port approach has evolved into a single-port (uniportal approach) that mimics open surgical vantage points while utilizing a non-rib-spreading, non-thoracotomy micro-incision. The early period of uniportal VATS development was focused on minor procedures until the second phase uniportal VATS started in 2010 with the development of the technique for major pulmonary resections. In only a period of 5 years, experts have been able to apply uniportal VATS technique to encompass more complex procedures such as bronchial sleeve, vascular reconstructions or carinal resections. In contrast, non-intubated and awake thoracic surgery techniques, described since the early history of thoracic surgery, peaked in the decades before the invention of the double lumen endotracheal tube and has failed to gain widespread acceptance following its re-emergence over a decade ago thanks to the improvements in video-assisted thoracoscopic techniques.

It's interesting to realize that from the first thoracoscopic procedure done over more than a century ago, the biggest developments have taken place in the last 2 decades and especially in the last 5 years. Several factors are responsible for this: Internet has provided an invaluable platform to share knowledge. The creation of specialized websites to which videos can be uploaded and scientific journals that include videos have contributed enormously to the dissemination and learning of minimally invasive techniques. The development of modern endostaplers or specifically adapted surgical instrumentation for thoracoscopic procedures have been also other key factors for the growth of video-assisted surgery interest in the latest years. At the same time, advancements in the technology of ultra-high definition cameras, 3D systems or other precise robotic

systems have contributed to the progressive adoption of the minimally invasive surgery throughout the globe. Next to this, it is logic to think that this new and revolutionizing way of operating the thorax has found its place among the so-called “Playstation generation”. Having been born and grown up in the midst of computers and videogames has probably facilitated the fast adoption of these techniques by the newer generations.

This book offers a magnificent compilation of several articles published in the last years showing the different techniques described by some of the greatest specialists in the field of minimally invasive surgery. The topics included range from conventional VATS or robotic surgery to uniportal VATS, as well as emerging techniques such as non-intubated or subxiphoid approaches. Keeping in mind that the medical oncology advances at a neck-breaking speed through the development of new chemotherapy, with lesser toxicity and major effectiveness as well as radio therapeutic techniques such as the SBRT; the role of a surgeon is to offer the patient the best oncologic procedure with the least surgical aggressiveness and anaesthetics.

However, in order to evolve and to improve surgical techniques towards less invasive procedures, change is necessary. This only happens when we are outside of our comfort zone, requiring sacrifice and a special dedication. As Charles Darwin said... “It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change”. In our professional life sometimes we reach a road crossing where we must chose between something novel, unknown but very attractive or continue down the road of tradition and security. Following the latter will provide tranquillity and security but will limit our evolution and prevent us from offering our patients something better. At the same time, it is a dangerous road by falling into routine and monotony of the profession. When we chose to follow a new road, adopt or develop a new technique, a door to the future opens up Uncertain but with new horizons and chances of improvement.

We live in a moment in thoracic surgery where VATS and robotic approaches are creating new opportunities for collaboration with the industry to push the boundaries on minimally invasive surgery. During the last years a rapid progress in instrument design and technology have brought developments of narrower and more angulated endostaplers, sealing devices for vessels and adapted and refined thoracoscopic instruments. We truly believe in the use of the least invasive techniques combined with modern naked 3D image systems, wireless cameras and future improved robotic technology to perform major pulmonary resections. The digital technology will facilitate the adoption of minimally invasive surgery worldwide in the next coming years.

Diego Gonzalez-Rivas, MD, FECTS
Director Uniportal VATS training program
Shanghai Pulmonary Hospital, Tongji University