Editorial Commentary

Access instruments for video assisted surgery: combination of mini-invasivity and universality

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Provenance: This is an invited article commissioned by the Section Editor Chunlin Ou (Cancer Research Institute of Central South University, Changsha, China).

Comment on: Raveglia F, Cioffi U, De Simone M, *et al.* Advantages of wound retractor device versus rigid trocar at camera port in video-assisted thoracic surgery-a single institution experience. J Vis Surg 2018;4:66.

Submitted Nov 12, 2018. Accepted for publication Mar 21, 2019.
doi: 10.21037/jtd.2019.03.70
View this article at: http://dx.doi.org/10.21037/jtd.2019.03.70

The idea of operating through fewer surgical incisions and, therefore, with potentially better cosmesis, less postoperative pain and paraesthesia, is becoming increasingly more preferable. For these reasons, Video-assisted thoracic surgery (VATS) came into widespread use in the early 1990s. VATS' instrumentation includes conventional thoracic or laparoscopic instruments such as a camera-linked fiber-optic scope of variable diameters.

In particular, VATS preserves tissue injuries and avoids dermal and muscle damage. This technique offers many advantages over sternotomy or thoracotomy, such as the avoidance of muscle division and bone fractures that, in turn allows for a shorter duration and intensity of pain and a quicker return to full activity, enhanced curability and lower medical costs (1,2). Some authors object that invasiveness cannot be assessed only by the degree of postoperative pain, because invasiveness is related to the tissue injury, size of exposure and retraction (3,4).

It is possible to split minimally invasive thoracic surgery into two major groups: the first category is minimally invasive open chest surgery that includes both pure VATS (multiportal and uniportal VATS) and hybrid VATS and the second one concerns mini thoracotomy (5). These small ports are advantageous because the possibility of infection and wound dehiscence are drastically reduced. Nowadays, it is not a question of whether a minimally invasive approach is better for patients but rather one of which approach to choose to offer optimal care for every patient. It is clear that each approach offers particular benefits and that the best surgical technique must be chosen and tailored to the disease, patient and surgeon. Certainly, the uniportal approach requires instrument design to be better suited to operating with multiple instruments through a single, small incision and this need has encouraged the development of specific and innovative devices (6), such as the wound retractor system (WR) (Alexis Wound Retractor, Applied Medical, Rancho Santa Margarita, CA, USA). The WR offers 360° of circumferential atraumatic protection and retraction during the extraction of specimens or organs through a small incision. WR is a cylindrical membrane sheath with two rings, moulded from a plastic material, attached to each open end. On one side, the lower ring of the WR is inserted into the thoracic cavity and on the other side, the sheath is placed in traction and folded over itself until it touches the chest wall (7). This wound retractor/protector device, also used in the laparoscopic version, avoids incision tissue damage, and assists the migration of neutrophils, thus promoting protection against wound infection (8,9). A particular use of this device has been reported in upper urinary tract surgery by Pak *et al.* who describe a homemade single port device composed of an Alexis wound retractor and a surgical glove. This specific device offers a technically feasible and safe surgical procedure (10) and was used in thoracoscopic surgery from 2013 onwards (11).

Recently, Raveglia *et al.* published their experience concerning the differences between wound retractor devices and rigid trocar at camera port in VATS. They reported that the use of this device offers many benefits in VATS compared to the use of rigid trocar in terms of postoperative pain. In addition, this technique increases the camera angulation considerably, supports surgeons' work and improves the view of the surgical field. Another remarkable finding is the decrease of morphine administration at 72 h avoiding all side effects that are linked with drug use. This result is reached because the membrane sheath gently enlarges the thoracotomy edges, thus avoiding compression of the intercostal nerve eliminating a possible postoperative neuritis (12). Encouraging input from this article is that the use of a wound retractor as a camera trocar in thoracoscopic surgery reduces the impact and damage on the skin around the port and improves clinical outcomes.

In conclusion, it is hoped that technological development will support the improvement of the mini-invasive technique by setting up new and more specialized tailored instruments such as smaller instrumentations, flexible thoracoscopes, angulated and narrower endostaplers, retractive devices and novel devices for sealing vessels or for targeting nodules and single-armed robotic devices. Similarly, the improvement of vision systems, such as targeted video-cameras, including 3D systems and a smaller 120° articulating lens, is important to obtain a better imaging system of high magnification which allows a more precise surgical management. Furthermore, a round table would also be desirable and meanwhile, new ideas should be developed to improve the mini-invasive thoracic technique and finally, the future should focus on researching the ideal procedure while technology should concentrate on making these techniques more feasible and easier for the thoracic surgeon.

Acknowledgements

The authors wish to thank Mrs. Shan Seshachalam for accurate revision of the manuscript.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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Cite this article as: De Caridi G, Massara M, Serra R, Monaco F, Benedetto F. Access instruments for video assisted surgery: combination of mini-invasivity and universality. J Thorac Dis 2019;11(Suppl 9):S1375-S1376. doi: 10.21037/jtd.2019.03.70

