From uniportal to multiportal approach to major pulmonary resections: a non-evidence based debate

Although the first thoracoscopic major pulmonary resections (MPR) were reported more than 25 years ago, the question of the optimal approach remains the most debated one and gives rise to an abundance of publications, every surgeon being convinced his approach (hybrid, single-port, double-port, triple-port, robotics…) is the best.

The reason of this special issue dealing with approaches is to give a glance on the most popular ones. There is no doubt that articles of this issue will be more fruitful to the younger surgeons or those who are just embarking in a VATS program of MPR, because they are still open-mind. Experienced surgeons for whom thoracoscopic MPR are routine are more reluctant changing their technique because it took them years to become proficient with one approach. Some years ago, Yim wrote that it was difficult for surgeons to evolve from open to closed chest surgery because we tend to resist changes which by their very nature introduce an element of uncertainty to the outcome (1). Finally, the same can be written once the closed chest technique has been acquired: changing one's technique comprise some uncertainty. The author of these lines does not get out of this rule.

In 2017, the different available approaches can be summarized as follows:

- The hybrid approach where surgeons are seeking reducing the size of thoracotomy with the adjunct of endoscopy (2): in these techniques, the surgeon does most of the dissection through a small incision and the endoscope is mainly used as an additional light source. The procedure is done with conventional instruments, although some prefer hybrid tools i.e., instruments whose design is based on a classical design but whose shaft has been made longer and thinned down.
- The single-port approach, where the endoscope and the instruments are introduced through the same incision (3). However, in some variant techniques, the optics is inserted into another trocar. The uniportal approach is supposed to be less painful that when multiple ports are used.
- The multiple-port anterior approach is a hilum first technique (4). Some of the users of this technique don't even open the fissure. Once the lobar bronchus and vein have been controlled, the fissure and arterial branches are stapled "en-masse", more or less as initially reported by Ralph Lewis in the 90's under the name VATS simultaneously stapled lobectomy (5).
- The multiple-port posterior approach can be summarized as a conventional technique where the surgeon stands in the patient's back and has a familiar vision, comparable to open thoracotomy (6). However, the technique can also be performed with a surgeon facing the patient. William Walker now suggests the term of "fissure-based technique", which is preferable. Indeed, the main principle of this approach is a wide opening of the fissure and an extensive dissection of the arterial branches, to minimize the risk of anatomical misjudgment (7). This technique has been judged as difficult, especially in case of fused fissure, but it has been recently demonstrated that complete fissures are not an obstacle for the use of this approach (7).

Multiple ports techniques differ by the number, size and location of ports and by the use or non-use (8) of a so-called utility incision. Many variants of this approach are being published, including the use of micro-instruments and subxiphoid incision (9), in order to reduce chest trauma to the minimum.

- Finally, the robotic approach is more or less a multiple-port posterior approach, what tends to demonstrate that when the thoracic surgeons are not limited by exposure concerns, they finally rediscover a conventional way of dissecting bronchovascular elements (10).

Surgeons who want embarking in thoracoscopic MPR are looking for consistent data in favor of a certain approach. However, there are very few data and most published results raise questions.

A recent prospective randomized study by Perna *et al.* has tried comparing single port and multiple ports approaches (11). The authors, basing on 50 patients in both groups, found no difference in postoperative pain, morphine use, chest drainage duration, complications and hospital stay. Shen *et al.* conducted a similar study which concluded to the superiority of uniportal approach, even though bleeding, duration of chest drainage, outcome and morbidity were similar in both groups. The only reported difference in favor of single port was a shorter operation time (12). Decaluwé stressed the limitations of such studies,

not only because these are underpowered but also because of some statistical insufficiency, such as the use of inappropriate statistical tests for measurement of pain relief (13). We can list the numerous variables that make a comparison "Uni-portal" versus "Multi-portal" questionable:

- In a uniportal approach: what are the length of incision, location of incision, type of instruments? Is a rib spreader used?
- In a multiportal approach: what is the exact number of ports (2, 3, 4 or 5), the diameter of ports and instruments (The larger, the more painful), their location (The more posterior, the more painful)? Is there an access incision? If so, which size? which location?
- In both approaches what is the experience of the surgeon and it's the team (a major factor as underlined by Wood (14), the duration of the procedure, the conversion rate, the type of scope (0°, 30°, 45°, deflectable) because the later factor impacts on the need of exerting pressure or torquing on trocar. How is the chest drainage managed (number, location, diameter, use or non-use of suction, duration)? Is there an intraoperative analgesia and which kind of type of postoperative analgesia is being used? This must be one of the reason why some authors claim that a minimum of science should support one approach (15,16). In addition, RCT don't take into account factors that can't be figured out: comfort of the surgeon, stiffness issues, exposure and image quality, safety, aptitude to control intraoperative problems and complications…

Eventually, as pointed out by Hansen, it seems we are forgetting we are treating patients with a very serious disease, i.e., lung cancer. This means the main concern of patients is to be cured rather than experiencing more or less pain, staying 1 or 2 days more in hospital and checking the number and length of incisions. In this matter, it is somewhat striking watching at so many presentations about single port showing a picture of the incision side by side with a rule aiming at demonstrating that incision is minimal, as if this would be the ultimate goal of the procedure.

Finally, as RCT on this topic will most likely be impossible to organize on a large and/or multicentric scale, we could suggest the following non-conventional and probably unrealistic study: gather in room 100 thoracic surgeons who will have to judge dozens of videos dealing with the same procedure, e.g., an upper lobectomy with radical lymph node dissection. These observers should be blind to the surgeon name and to the type of approach (no external views displayed). At the end, one could ask them this question: which technique did convince you the most, in terms of safety and oncological radicality?

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