

## Subxiphoid video-assisted major lung resections: the Believers' speech

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Commentary from Terzi and Viti (1) on the subxiphoid lung resections papers presented by Hernandez-Arenas *et al.* (2) underlined some limitations of this approach but are those limits real and still unresolved and are they going to stop its spread? There is a natural evolution and optimisation of the new techniques; this is what we have experienced for several minimally invasive procedures including the uniportal video-assisted thoracoscopic surgery (VATS) at first indicated even by Gonzalez as suitable just for lower lobectomies (3). This is what, in contradiction with the speeches of the skeptics, we predict we will experience for the subxiphoid lung resections. Therefore, we would like to readdress the attention and reanalyze some of the points examined by the two authors.

Regarding the reproducibility in a standard volume European Center, it is true that some technical aspects, like the bimanual instrumentation from the subxiphoid port, the use of the camera and the exposure of the posterior anatomy, are more challenging than intercostal uniportal VATS approach. However, other steps like the dissection and the passage of the staplers around the vessels and the bronchus are sometimes easier and achieved with a minor distortion of the structures because of the wider angles between the port and the hilum. It is unneglectable that there is a learning curve and that the reported experience is coming from a very high volume Centre with some of the most experienced surgeons in the world as underlined by Licht in another similar commentary (4). Nevertheless, we have to consider that the paper reported the learning curve and the first steps of the development of the technique

including many early cases done before the creation and then the optimisation of the particular designed surgical tools that made easier some of the surgical steps. Although all those limitations, have been reported a gradual reduction in the operating times that start plateauing after about 50 cases which are the same number of procedures that has been suggested as necessary for the learning curve of multiport VATS lobectomy (5,6). As for multiport VATS lung resection to make smooth and safe the learning process, it is important to undertake it in a gradual way visiting Units that are already using this approach, attending courses and eventually doing the first cases under the supervision of a proctor.

It is also crucial taking into account the different grades of difficulties proceeding performing at first minor procedures to get familiar with the port placement and the different point of view of the hilar structures and passing in a second period to the major lung resection on the relatively easier right side.

Regarding the anatomical meddling, the presence of the heart makes the left sided procedures more challenging and with a stiffer learning curve. Another paper on the following experience on subxiphoid segmentectomies (7) reported a right *vs.* left sided procedures of 45:39 suggesting that, after the initial period of a learning curve, the distribution right *vs.* left tend to be closer to 50:50. It is additionally possible to reduce the difficulties experienced during the left procedures using a variable angle camera (8) as described by Liu *et al.* obtaining a reduction of the fighting between instruments,

of the pulsations transmitted to the dissectors and of the pericardial compression making the hilar dissection easier and potentially decreasing the likelihood to cause reduction of the cardiac output and arrhythmias. Nonetheless, it is important to remember the contraindication to subxiphoid approach and avoid poor heart function and obese patients.

Regarding the feasibility of this method for all the segmental resections at the beginning of the experience was not feasible to use this approach for the posterior (S2) and superior segments (S6) on the left side and the basal posterior segment (S10) on the right and left sides but with the additional experience this is no longer true, and at the moment in Shanghai Pulmonary Hospital all the possible segmental resections have been performed. The same evolution has been observed for the lymphadenectomy, and with the increased experience we achieved a comparable dissection of all the station including station 7 on the left side that, in the case of difficult anatomy can also be reached with a dissection of the space between the lower lobe vein and the bronchus from its anterior part.

Regarding the “lean population bias” in all the presented papers, one of the exclusion criteria was obese patients with a BMI higher than 30, and this is still true despite the increased experience.

Regarding the “hazard profile”, the safety issue mentioned by Terzi and Viti is not confirmed by the numbers. Morbidity rate was similar to the standard approach, the average length of stay was within four days after the operation, and the 30-day mortality rate was absent. Licht has pinpointed the overall conversion rate of 7% as relatively high but when we scrutinize the modality and the cause of conversion indicated in another paper (9) we can see that just in 7 out of 172 lobectomies (4.1%) the conversion was to thoracotomy and just in three cases due a potentially threatening bleeding. Those are numbers that indicate the safety profile of the procedure.

Not least, the randomised controlled trial (RCT) undoubtedly has a valuable place in medicine, but it is not necessarily a place of superiority. Randomization of RCT eliminates conscious and unconscious bias associated with the selection of treatments (10). Nevertheless, not every research question can be usefully investigated using the RCT. Standardising procedures, a fundamental criterion of the RCT, is virtually impossible when a highly complex intervention is involved. A further limitation of the RCT relates to sample sizes; the RCT depends on large sample sizes for its validity and reliability. Undoubtedly, the ethical problems associated with the “control population” are

well documented and certainly influenced the decision of patients who are prospective participants. Other methods have comparable value, especially when used in conjunction with the RCT and when used together, may offer both depth and breadth to research (11). On the other hand, the use of systematic reporting frameworks, such as CONSORT (12) for RCT and TREND (13) for non-RCT, may encourage more in-depth appraisal of research designs both during the planning of the study and the evaluation of results (14).

In conclusion, the evolution of techniques, especially in minimally invasive thoracic surgery, is a step by step process where the skeptics should slowly reduce because, as stated from the American poet Walt Whitman: *“I like the scientific spirit—the holding off, the being sure but not too sure, the willingness to surrender ideas when the evidence is against them: this is ultimately fine—it always keeps the way beyond open—always gives life, thought, affection, the whole man, a chance to try over again after a mistake—after a wrong guess”*.

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## Footnote

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

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