



# Minimally invasive thoracic surgery the price of the chase for innovation? – Or a real functional and oncological improvement?

François Montagne<sup>^</sup>, Lotfi Benhamed

Department of Thoracic Surgery, Hospital of Valenciennes, Valenciennes, France

Correspondence to: François Montagne. Department of thoracic surgery, Hospital of Valenciennes, Avenue Désandrouin CS 50479, 59322 Valenciennes Cedex, France. Email: montagne-f@ch-valenciennes.fr.

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The analysis of the past is necessary in order to build the future, for always providing better cares for our patients.

In this editorial, about the review of Tamas F. Molnar untitled “*Dark side of the Moon: the price to pay in minimally invasive thoracic surgery*” (1), we will discuss about the minimally invasive thoracic surgery with a focus on lung cancer surgery. Lung cancer surgery represents a very important activity for us thoracic surgeons.

What definition can we give to thoracic surgery? Thoracic surgery covers numerous pathologies, both functional and vital, such as thoracic oncology. But there is a common point: (I) the association of a procedure performed on an organ as the lung, the pleural layers, the mediastinum or the chest wall, and performed through a particular approach; (II) and with the objective of a curative treatment, whether vital, oncological or functional, or only a symptomatic treatment and also as a diagnostic management (2). For curative oncological lung cancer surgery, distinction is made between 2 operative steps. First, the anatomical resection and the lymph node dissection, which allow a definitive histological staging of the lung cancer. Then, the surgical appropriate approach, according to the lung cancer stage and the expertise of the surgeon and her/his team. Nevertheless those 2 steps need to be performed according to the international oncological and surgical guidelines (3-7).

But looking back, we realize that thoracoscopy goes back already more than 100 years for the management

of tuberculosis. Tuberculosis surgery is the mother of our specialty. The Jacobaeus operation, for the curative management of tuberculosis consisted of the creation of a pneumothorax through a minimally invasive approach. Then, thoracoscopy was widely used as an approach for infectious pathologies and diagnostic procedures, but its development and especially its diffusion for oncological pulmonary resection are more recent (8). Video-assisted pulmonary lobectomy has spread widely since the end of the 2000s and the beginning of the 2010s. Concerning the robot-assisted approach, its development and diffusion have been much faster since the middle of the 2010s.

In his review, Tamas F. Molnar has assumed the role of devil’s advocate about minimally invasive surgery in order to identify mistakes committed by the chase of novelty. This makes it different from other historical reviews as one of the first from Braimbridge (9) and now published almost 30 years ago. If Tamas has “falsely” assumed the role of devil’s advocate, we will see in this editorial that the development of minimally invasive surgery has been more virtuous.

By analyzing the surgical evolutions of these last decades, one word, one qualifier, can be highlighted, “less”. Resecting less tissue, with the rise of segmentectomy (10) for example, and through a less “disabling” or “traumatic” approach thanks to the development of minimally invasive procedures (2). But, paradoxically, this “less” is permitted because there is “more”. More medical knowledge, this is growing up day by day and the sharing of this knowledge

<sup>^</sup> ORCID: 0000-0001-8182-2695.

seems to be also progressing (11) and more advanced technologies and surgical tools and devices are available and there is a trend towards a more serious, effective and tailored evaluation of these tools and devices.

The minimally invasive surgery debate has often pitted the student against the teacher, with their respective “convictions”, the defender of a minimally invasive approach, which is safe, efficient and allows surgery in accordance with international guidelines (3-7) and according oncological rules, against the defender of an open approach, which is the only approach that allows resection in accordance with guidelines and oncological rules. This could be summarized as: “Any innovation and adaptation of procedure can potentially lead to a loss of chance for the patient”. Innovation is not an easy process. But getting an innovation adopted, whether it’s a new surgical approach and/or a new tool, is even more difficult even if it is beneficial. Thus, the impacts of these innovations must be measured over time to be justified as a therapeutic alternative to current procedures and tools. This has been highlighted recently by Wilson *et al.* (12) as there is sometimes a lack of standardization, but also sometimes a lack of relevance, hindering safe and effective evaluation.

Positioning oneself as the “devil’s advocate” should not be a pretext for “beating around the bush”. It is important to note that the surgical community strives to advance surgical management through very regular evaluation of its practices. Nevertheless, it is true that in surgery, there is a lack of randomized controlled trials. Those trials bring strong results from a methodological and statistical point of view, but they are hard to build in surgery and are also sometimes far from the daily practice and the clinical reality (13,14). Thus, the surgical literature is essentially composed of retrospective series, contrary to the medical literature, but assisted by propensity-matched study and systematic reviews of the literature and meta-analyses. This lack of methodologically reliable data has contributed to the misconception that the surgical literature is less reliable than the medical literature.

Nevertheless, we could read in the surgical literature, a progression, of articles dealing with minimally invasive surgery that have participated in the adoption of these video and robot-assisted minimally invasive approaches today.

First of all, there were the feasibility and safety studies, with historical, retrospective, and often single-center series about few patients (15,16).

Then, there were studies dealing with the short-term outcomes’ benefits, including postoperative complications,

and studies on the oncological efficiency and the much-discussed studies on lymph node up-staging (17,18). In those studies, a comparison to the historical approach, the thoracotomy (19) was often made.

The oncological goal of curative surgical treatment of lung cancer is to allow the patient to have a prolonged overall survival, and disease-free survival. But it takes time to have enough hindsight, to deal with long-term survivals, including 5-year survivals, with a sufficient number of patients. This literature is therefore more recent (20,21). Over the years, with the accumulation of data, systematic analyses of the literature and meta-analyses (22,23) have been published and have made it possible to “validate” minimally invasive approaches in the management of early-stage lung cancer within international recommendations and guidelines (3-7). But concerning advanced-stage lung cancer, minimally invasive approaches are not validated and those approaches are only done by experts’ surgeons.

Pursuing this objective of minimizing parietal trauma, by reducing the number of parietal accesses, Diego Gonzales-Rivas popularized the uniportal approach. First the video-assisted uniportal approach and now the robotic-assisted uniportal approach (24). Nevertheless, those uniportal approaches are still quite exclusives, because they are difficult to learn and are actually performed by expert surgeons.

Currently, new themes and area are explored around and above minimally invasive surgery approaches, including the patients’ quality of life of (25), medico-economic data (26), but also the education and training of young surgeons to those approaches.

If Tamas F. Molnar was the “devil’s advocate”, it is not for “beating around the bush”. Reading our surgical literature, we can see that the surgical community, also helped by the medical community, have bought innovation in surgery, with the objective of always treating our patients better, if not curing them. The evaluation of our innovative practices, was and is continuous and virtuous.

Let us always have in mind to bring the best, to our patients, the best quality of care, by adopting the best technic, approach, device for their pathology and recognized by the medical and surgical community, and let us keep a critical sense and open to innovations. These values improve the health of everyone.

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