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To cite this article: Virginia Figgiaconi, Giorgio Bogani, Federico Piccioni, Valentina Chiappa & Francesco Raspagliesi (2019): Investigating the Role of Minimally Invasive Surgery in Patients with Chronic Pulmonary Disease, Journal of Investigative Surgery, DOI: [10.1080/08941939.2019.1584653](https://doi.org/10.1080/08941939.2019.1584653)

To link to this article: <https://doi.org/10.1080/08941939.2019.1584653>



Published online: 25 Mar 2019.



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COMMENTARY

Investigating the Role of Minimally Invasive Surgery in Patients with Chronic Pulmonary Disease

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In the recent years, the role of minimally invasive surgery (e.g., laparoscopic or robotic assisted surgery) has emerged for the treatments of several benign and malignant conditions [1–4]. Growing data underlined that patient having minimally invasive surgery experience better peri-operative outcomes than patients having open abdominal procedures [1–4]. Minimally invasive surgery correlates with improved peri-operative quality of life (QoL), shorter length of hospital stay and lower complication rates in comparison to open surgery [1–4]. Furthermore, the adoption of minimally invasive surgery improves patients workflows and reduces costs for the healthcare system [5].

However, there are still concerns on the utilization of minimally invasive surgery in several categories of patients including elderly and obese patients as well as patients affected by severe pulmonary disease [5]. The increase of intra-abdominal pressure is the source for these concerns. In the article published in the present issue, the authors investigated the role of minimally invasive surgery in patients affected by chronic obstructive pulmonary disease (COPD) [6]. Patients with COPD have a greater risk of developing postoperative complications including pneumonia, unplanned reintubation, renal insufficiency and sepsis [6, 7].

Detractors of minimally invasive surgery advocate possible detrimental effects of high pneumoperitoneum pressures in patients having laparoscopy. Notwithstanding, the role of increased intra-abdominal pressure in patients undergoing minimally invasive surgery is well investigated. Several studies underlined that using low pneumoperitoneum pressure (less than 12 mmHg) resulted in less

postoperative pain and improved cardiopulmonary dynamics [7, 8]. High level of intra-abdominal pressures, during laparoscopic surgery, might impair cardiovascular or pulmonary functions, decreasing the cardiac output or pulmonary compliance. Another interesting point, is that, the abdominal insufflation might lead to carbon dioxide retention and subsequent hypercarbia. The flow of CO₂ used to maintain pneumoperitoneum, might be absorbed through the vessels of the peritoneum thus increasing the risk of acidosis or hemodynamic alteration. Moreover, the high pressures in the abdominal cavity are transmitted to the thorax by pushing up the diaphragm, thus, reducing the power of mechanical ventilation in a already compromised lungs. Physiologic changes that accompany COPD during pneumoperitoneum include reduction in dynamic compliance and reduction in functional residual capacity, increasing risk of atelectasis, hypoxemia and subsequent respiratory failure [9–11]. By another point of view, although, open surgery has probably a less impact on cardiopulmonary function during the operative time in comparison to minimally invasive surgery, postoperative course of patients having open surgery is highly demanding. In comparison to laparoscopy open surgery results in higher postoperative pain levels, longer length of hospital stay as well as the higher risk of developing postoperative complications [5]. All these points might impact on the outcomes of frail patients, thus, increasing the overall morbidity.

As demonstrated in the study considered, patients having laparoscopy experience better outcomes than patients having open surgery for various surgical indications. Using a propensity matching

Received 15 February 2019; accepted 15 February 2019.

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algorithm the Authors performed a fair comparison between groups, thus, reducing the risk of possible allocation biases. The present study highlighted that COPD should not be considered a contraindication for laparoscopic surgery. In fact, patients with COPD having laparoscopy have improved outcomes in comparison to patients with COPD having open procedures [6]. Similar conclusions have been recently reported in another large retrospective study focusing on hysterectomy [12]. Obviously, the choice to have an approach rather than another should include a careful evaluation of patients' risk factors. As the Author reported laparoscopy should not be denied in patients with COPD. Further evidence is needed to better understand changes in cardiopulmonary functions in patients' submitted to minimally invasive surgery and to assess pros and cons regarding the utilization of minimally invasive surgery.

DECLARATION OF INTEREST

The authors report no conflict of interest. No funding sources supported this investigation.

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