



Improving Clinical Outcomes



Managing Cost of Care



Ensuring Staff Satisfaction



Enhancing Patient Experience

Protective Ventilation in the Operating Room

The discussion on how to ventilate surgical patients intraoperatively to minimize postoperative pulmonary complications (PPCs) has recently been a hot topic. While some parameters of ventilation are proven as levers for protecting patients' lungs during surgery, some remain unclear and require further research. However, most are in agreement that general anesthesia impairs lung function and ventilation plays a significant role in causing these impairments.¹ Although results from research conducted on this topic are ambiguous, the evidence gained during the past years should encourage the use of lung protective strategies in surgical patients.

The question is how current approaches can be implemented effectively. In the discussion on intraoperative lung protection, research focuses on specific parameters that are expected to have an influence on the incidence of PPCs, either individually or in conjunction with each other. Two very popular practices under discussion are the size of tidal volumes (Vt) and the use and the level of positive end expiratory pressure (PEEP).

Tidal volume

High Vt has been described for quite some time to be particularly dangerous for ARDS patients, and low Vt ventilation has become a standard of care for these patients in ICU (as evidence has demonstrated a clear reduction of mortality). Evidence has not only demonstrated the benefits of low Vt for ARDS patients, but also for critically ill patients without lung injury. However, for these patients, low Vt strategies have not yet become a standard of care.²

In the Operating Room (OR), clinical trials have suggested that lung protective strategies encompassing reduced Vt have a positive effect on lung function and the incidence of PPCs. Three RCTs have demonstrated positive effects of low Vt in patients undergoing abdominal surgery and spinal surgery. Tidal volumes in these trials were as low as 6-7ml/kg predicted bodyweight (PBW).²

PEEP

Some authors mention that an appropriate PEEP has to be chosen, but leave the question open what an appropriate PEEP is. In a recent commentary, Pelosi and Ball have asked the question as to whether it is time to talk about tailored protective ventilation, and demand further studies in particular on the role of patient-tailored PEEP settings.³ This is also backed by a recent comprehensive review stating that PEEP should be chosen according to the patient's particular characteristics, the specifics of the surgical approach, and the patient's position.⁵ From a clinical routine perspective, Dr. Chris Thompson (Senior Staff Specialist at Royal Prince Alfred Hospital and Clinical Lecturer at the University of Sydney, Australia), has commented on this topic in his lecture at the ANZCA Congress 2015 in Australia. In his lecture, he gave practical insights into his approaches to protective ventilation including patient individual PEEP titration.⁴ You can watch the lecture by clicking [here](#).

INSIGHTS by Dräger:
ideas and innovations to help hospitals and health systems achieve Improved Outcomes, Streamlined Data Capture, Exceptional Devices and Optimized Workflows & Workspaces.

Other considerations

While the two areas of focus above were on Vt management and PEEP, they are by no means the only areas of consideration for protective ventilation in the OR. Applied oxygen fraction,² recruitment maneuvers, and recently the plateau-driving pressures³ are also being discussed. Please look for future communications from Dräger on these topics.

References

1. Karcz, Marcin, Papadakos. *Respiratory Complications in the postanesthesia care unit: A review of pathophysiological mechanisms*. Can J Resp Ther 2013 Winter. 49(4): 21–29 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4456822/>
2. Serpa Neto A, Schultz MJ, Gama de Abreu M. *Intraoperative ventilation strategies to prevent postoperative pulmonary complications: Systematic review, meta-analysis, and trial sequential analysis*. Best Pract Res Clin Anaesthesiol. 2015 Sep;29(3):331-40.
3. Ball L, Pelosi P. *Intraoperative mechanical ventilation in patients with non-injured lungs: time to talk about tailored protective ventilation?* Ann Transl Med. 2016 Jan;4(1):17.
4. Dr. Chris Thompson, Senior Staff Specialist at Royal Prince Alfred Hospital, Clinical Lecturer at the University of Sydney, Australia, lecture at the ANZCA Congress 2015 in Australia, "Ventilation Techniques – A Practical Workshop"; URL: <https://www.youtube.com/watch?v=sU7sgTH2seA&feature=youtu.be>; viewed 14.05.2016.
5. Güldner A, Kiss T, Serpa Neto A, et al. *Intraoperative protective mechanical ventilation for prevention of postoperative pulmonary complications: a comprehensive review of the role of tidal volume, positive end-expiratory pressure, and lung recruitment maneuvers*. Anesthesiology. 2015 Sep;123(3):692-713.

Get more
INSIGHTS!
www.draeger.com/insights

