Does High Oxygen Concentration Reduce Postoperative Infection?

To the Editor:

We read not only with interest but also with some surprise the review on high intraoperative oxygen concentration by Hovaguimian et al. that appeared recently in Anesthesiology. The authors selected 9 to 11 of 21 studies and by a meta-analysis they concluded that “Intraoperative high inspired oxygen fraction decreases the risk of surgical-site infection in surgical patients receiving prophylactic antibiotics, has a weak beneficial effect on nausea, and does not increase the risk of postoperative atelectasis.” We notice that two of the four largest studies that were included in the meta-analysis (434 and 1,386 patients) showed no better result with high oxygen2,3 and that the largest study (2,012 patients)4 was designed to evaluate effects of nitrous oxide (0 or 70%) rather than oxygen. In another three studies, the nitrous oxide concentration was also varied. This must be considered a confounding factor when aiming at an analysis of oxygen effects. Among the remaining studies, one was discontinued because of more adverse effects by the high oxygen concentration.5 In a study by Meyhoff et al.,6 high oxygen concentrations increased mortality in patients undergoing cancer surgery. Whether high oxygen concentrations are good or harmful in a surgical wound can thus still be discussed and is indeed a hot issue in redox signaling and tissue repair.7

The other result that surprises us is the conclusion that high oxygen concentration (80 vs. 30%) does not increase the risk of postoperative atelectasis. The anesthesia was presumably induced by preoxygenation with 100% oxygen in both groups and this causes atelectasis within a few minutes of anesthesia.8 The atelectasis remains during the whole anesthetic period and the switch to either 30 or 80% oxygen does not add much to the initial atelectasis.9 Moreover, the atelectasis remains for some time postoperatively. One may rather conclude that with present standard routines for anesthesia and ventilation atelectasis will develop in the vast majority of patients (90% or more) with no additional effect by the intraoperative oxygen concentration. If the intention is to avoid atelectasis, the lung has to be recruited after induction of anesthesia. Continuation with 30 or 80% oxygen will then show a clear difference between the groups with more atelectasis in the high oxygen group. A rationale to avoid atelectasis, besides its impairment of oxygenation, may be that proliferation and translocation of bacteria to promote pneumonia have been shown in the atelectatic lung in anesthetized, mechanically ventilated animals. All taken together, whether high or low oxygen concentration is to be used, atelectasis can and should be avoided.

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Competing Interests

The authors declare no competing interests.

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References


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