Is intraoperative low tidal volume ventilation worse in patients with preexisting systemic inflammatory response? Our insights to Chugh et al. study

Dear Madam,

Low tidal volume, that is, 5–8 mL/kg of ideal body weight (IBW), has been safely used and with better results in patients with or without acute respiratory distress syndrome.[1,2] In this context, a recently published randomized controlled double-blinded trial by Chugh et al.[3] interested us. The authors aimed to determine whether intraoperative ventilation using high tidal volume (10 mL/kg IBW) versus a lung-protective strategy using low tidal volume (6 mL/kg IBW) along with positive end-expiratory pressure (PEEP) of 10 cmH₂O, improves postoperative organ dysfunction in patients suffering from intestinal perforation peritonitis-induced systemic inflammatory response syndrome. They showed that the use of low tidal volume along with PEEP is associated with worse postoperative organ functions as compared to high tidal volume without PEEP, indicated by higher aggregate SOFA score (3 days) as well as the score on the first postoperative day. The result is indeed exciting; however, we found some limitations in this study which are very critical to consider before we apply their results in our clinical practice.

Firstly, the PEEP levels used by the authors need attention. In this study, one group had no PEEP and the other a PEEP of 10 cmH₂O. The use of a high PEEP increases abdominal pressure and provokes complications such as intraoperative circulatory depression as evident from the PROVEHILO trial.[4] The PROVEHILO trial compared high(12 cmH₂O) versus low (2 cmH₂O) PEEP during general anesthesia for open abdominal surgery at the same tidal volume (8 mL/kg IBW) and concluded that an intraoperative protective ventilation strategy should include a low PEEP, without recruitment maneuvers.[4] Therefore, we believe that a lower amount of PEEP was indicated in otherwise non-hypoxemic patients with relatively healthy lungs of the cohort. Further, to minimize this confounder, the two groups should have been compared with the same PEEP. Indeed one parameter of the Chugh et al study should have been similar in both groups to remove confounders.

Secondly, we know that the higher the surgeon experience, the lower is the rate of complications.[5] We could not find information on the surgeon’s experience in both groups if in one group, patients were operated by more experienced surgeons, shouldn’t it have expected better results? We hope these are taken into account in further studies.

We applaud the authors’ work as the study has some important perspectives on the management of abdominal surgical patients, nevertheless, we would like to have our suggestions taken into consideration in the next studies.

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Conflicts of interest
There are no conflicts of interest.

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Evolving spectrum of dexmedetomidine preconditioning for Ischemia–reperfusion injury amelioration

Madam,

Ischemia–reperfusion injury (IRI) is inexorably linked to a wide gamut of clinical settings such as myocardial revascularization, organ transplantation, vascular procedures, gastrointestinal surgeries, and intraoperative tourniquet application. The restoration of perfusion to ischemic tissues is characterized by microvascular dysfunction, endothelial cell activation, generation of oxygen free radicals, and leukocyte adhesion. This complex inflammatory milieu predisposes to organ dysfunction which accounts for an elevated morbidity and mortality. Therefore, diverse techniques such as ischemic preconditioning, remote ischemia preconditioning, ischemic postconditioning, and pharmacological preconditioning have been evaluated for the attenuation of IRI.

In this context, many anesthetic medications (inhalational agents, propofol, ketamine, etc.) have been evaluated for pharmacological preconditioning. Interestingly, a considerable degree of evidence regarding the role of dexmedetomidine in IRI amelioration has emanated from the animal studies over the last decade. These laboratory studies have demonstrated a promising potential of dexmedetomidine in reducing the inflammatory and oxidative stress in major organs.

The aforementioned fact has motivated the recent emphasis on a formal evaluation of the impact of dexmedetomidine on IRI across diverse predisposed clinical settings. Initial few studies have revealed that dexmedetomidine infusion markedly reduces the ischemia–reperfusion markers (hypoxanthine and malondialdehyde, respectively) associated with tourniquet application. Another study by Kundra et al. in patients undergoing aortobifemoral bypass procedure demonstrated an attenuated skeletal muscle IRI as suggested by lower postprocedural creatine phosphokinase levels. Chi et al. outlined reduced postoperative cardiac troponin I and creatine kinase MB following the administration of dexmedetomidine in off‑pump coronary artery bypass grafting. Recent clinical studies characterized a hepatic protective effect attributable to dexmedetomidine in living donors and in subjects undergoing hepatectomy.

A number of caveats surface on a meticulous evaluation of the literature regarding the role of dexmedetomidine in IRI amelioration. First and foremost, the timing of drug administration is closely related to the subsequent impact on IRI, with most of the researchers depicting a beneficial impact only with an initiation prior to ischemia. The literature elucidates that dexmedetomidine induces subtle alterations in signaling pathways, membrane receptors, mediators, and transmitters which formulate the putative mechanisms of protection. Second, albeit the demonstration of a dose‑dependent attenuation of IRI, the optimal dosage regimen continues to be investigated in order to closely balance the efficacy and safety profile. Third, there is a definitive lack of human trials over a range of many other predisposed perioperative scenarios evaluating reperfusion lung injury. Similarly, renal IRI, particularly in diabetic and hypertensive cohort, merits further evaluation.

To conclude, the era of translational research continues to unveil a number of novel discoveries. However, it is certainly the right time to move to more human trials evaluating the role...