

Perioperative short-term positive airway pressure therapy in combating COVID-19 related oxygen crisis

Sir,

The second wave of coronavirus disease (COVID)-19 not only did bring a higher demand for sophisticated intensive care treatment, but also increased demands of basic needs like oxygen and vacant general beds. In the current scenario, where the oxygen demand is high even in some tertiary care setups, alternate strategies ensuring rational use of oxygen may be needed to combat the oxygen crisis.^[1]

Non-invasive ventilation (NIV) techniques like continuous positive airway pressure (CPAP) or bilevel positive airway pressure (BiPAP) are routinely used perioperatively for patients with obstructive sleep apnoea (OSA) or obstructive airway disease. A recent guideline by the European Society of Anaesthesiology/Intensive Care Medicine (ESA/ESICM) states that administering prophylactic NIV in anticipated hypoxic patients perioperatively has shown better results in reducing postoperative complications.^[2]

Short-term positive airway pressure (STPAP) refers to the process of providing a trial of positive airway pressure (PAP) for a lesser duration to the patients who have not had prior exposure. Perioperative PAP is an effective physiotherapy technique for alveolar recruitment and lung expansion. Prophylactic NIV in the immediate postoperative period in OSA patients undergoing major abdominal surgeries showed improvement in respiratory parameters and reduced postoperative oxygen dependence from 3 days to 6 h (RR 0.49; $P < 0.01$).^[3] Employing prophylactic preoperative STPAP might reduce intra-operative oxygen requirements in case of non-operating room procedures requiring sedation and postoperative oxygen requirements in case of general anaesthesia. It might also improve postoperative oxygen saturation facilitating early recovery, thereby, reducing postoperative oxygen dependence and hospital stay.^[4]

Post-COVID-19 syndrome manifests widely varying from residual anosmia to lung fibrosis due to the hyperinflammatory cytokine storm. While many

patients recover positively, some become dependent on prolonged oxygenation and long rehabilitation. Post-COVID-19 patients with residual fibrosis require comparatively higher oxygen levels during the intra- and postoperative periods to maintain saturation than the general population.^[5]

I hypothesise that prophylactic STPAP therapy during the immediate perioperative period (12–24 h before and/or after surgery) can be given for post-COVID-19 patients with a documented history of lung damage [COVID-19 Reporting and Data System (CO-RADS) Computed Tomography (CT) severity score ≥ 3] and low baseline oxygen saturation ($<96\%$), who undergo major surgical procedures, which demand higher perioperative oxygen supplementation. Among 22 of the observed 29 post-COVID-19 patients with prior lung involvement who underwent various elective intra-abdominal surgeries (i.e., laparotomy and cholecystectomy) in my setup, prophylactic STPAP therapy patients showed early recovery, improved postoperative oxygenation and decreased hospital stay to less than 2 days. As post-COVID-19 patients have become a major part of the elective surgical population nowadays, this may be useful when applied to them. This method while minimising hospital stay will also help in reducing excessive postoperative oxygen usage.

While administering non-operating room anaesthesia, anaesthesiologists tend to use higher flows of oxygen (>4 L/min) intraoperatively in patients undergoing procedures like endoscopic retrograde cholangiopancreatography (ERCP) under total intravenous anaesthesia to prevent intra-procedural desaturation. In post-COVID-19 patients undergoing these procedures, a prophylactic short duration preoperative PAP may be useful in increasing the apnoea threshold.^[6]

Post-COVID-19 patients with residual lung damage and/or poor baseline oxygen saturation ($<96\%$) without any contraindications for PAP therapy (i.e., h/o pulmonary hypertension) can be supplemented with either overnight or intermittent sessions according to their comfort (averaging 4–6 h/day) in the immediate perioperative period. Lower IPAP/EPAP pressures (<10 cm H₂O) can be employed to reduce the anticipated complications like patient discomfort, enteral feeding intolerance and pneumothorax. While maintaining stable functional residual capacity and alveolar recruitment, this method would reduce

excessive oxygen requirement in the intra-operative and the postoperative periods depending on the type of procedure.

My hypothesis is backed by little evidence, and it is difficult to say whether STPAP will reduce perioperative oxygen requirements in post-COVID-19 patients, undergoing elective procedures; nevertheless, I suggest that studies and multicentre trials should be conducted in the light of this idea.

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Conflicts of interest

There are no conflicts of interest.

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