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CORRESPONDENCE

Use of a Boussignac^{TM} continuous positive airway pressure mask to improve postoperative pulmonary function in morbidly obese patients

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To the Editor,

In a randomized controlled trial in morbidly obese patients undergoing bariatric surgery, Wong *et al.*[1] compared the Boussignac^{TM} continuous positive airway pressure (CPAP) mask with a venturi mask and showed that the Boussignac^{TM} CPAP mask can improve early postoperative oxygenation as measured by the PaO_2/F_IO_2 ratio. These results make a valuable contribution to the treatment of postoperative respiratory insufficiency following bariatric surgery, which is a major concern for morbidly obese patients.[2] However, in our view, there are two issues related to this study that warrant cautious interpretation of the results.

First, the patient position during the early postoperative period is not clearly documented. Considering the potentially deleterious effects of supine positioning on pulmonary function in morbidly obese patients, these patients are more optimally managed in a non-supine position. During the first 48 postoperative hours after abdominal surgery, it has been shown that arterial oxygenation in morbidly obese patients is better maintained in the semi-recumbent position rather than in the supine position.[2] Furthermore, morbidly obese patients placed in a reverse Trendelenburg position have improved pulmonary compliance and increased functional residual capacity, which improves oxygenation relative to the supine position.[3] In our view, an important variable to consider is whether Wong *et al.* maintained identical positioning in all patients when evaluating the effects of the two respiratory treatments on postoperative pulmonary function.

Second, although pain scores were reported to have been similar in the two groups at all time points, the article did not specify the postoperative analgesic protocol used in the two groups. This makes it difficult to assess whether all patients were ensured adequate postoperative analgesia. Following bariatric surgery, pain is recognized as being the most frequent postoperative problem, even for surgery that is performed laparoscopically.[4] Inadequate postoperative analgesia results in splinting with rapid and shallow breathing.[2] Furthermore, in morbidly obese patients, intensity of postoperative pain influences the extent of postoperative atelectasis 24 hr after tracheal extubation.[5] Thus, ensuring optimal analgesia for morbidly obese patients in the postoperative period is of great importance, not only for patient comfort but also for improvement of pulmonary function and a reduction in the risk of respiratory complications.[4]

We recognize that providing optimal postoperative pain relief for morbidly obese patients remains a major challenge for modern anesthetic practice. For example, use of opioids is often inevitable to achieve satisfactory postoperative pain control, especially when regional anesthetic techniques are either difficult or impossible for anatomical reasons. Morbidly obese patients are at a very high risk for postoperative exacerbation of respiratory depression, with further depression with the administration of opioids.[2] For this reason, standardization of the postoperative analgesic protocol should be an important element of the study design when evaluating effects of different treatments on

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the postoperative pulmonary function of morbidly obese patients. In the absence of a comparable postoperative analgesic protocol between groups, the secondary outcome findings and the subsequent conclusions should be interpreted with caution.

Competing interests None declared.

References

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Reply

We appreciate the opportunity to respond to the comments of Liu *et al.* regarding our recently published investigation.[1] We agree that a randomized controlled trial is designed such that patients in both study groups are subjected to similar management with the exception of the study intervention. Indeed, both patient positioning and pain control can affect respiratory physiology, lung function, and oxygenation.

First, regarding patient positioning in the postanesthesia care unit (PACU), each study patient was placed on a Hill-Rom TotalCare® Bariatric Plus Bed (Hill-Rom Canada, Mississauga, ON, Canada) in a semi-recumbent 30° head-up position. The degree of the patient's head-up positioning could be altered according to patient comfort and the discretion of the PACU nurse. We did not use reverse Trendelenburg positioning during the study.

Second, regarding patient pain control and analgesic requirements, PACU nurses were instructed to use fentanyl 25-50 ug and/or morphine 2-4 mg as needed for a target pain score of ≤ 4. The median [25^{th}-75^{th} percentile] pain scores at one hour post extubation were 4 [2-5] and 3.5 [2-5] for the Boussignac and venturi groups, respectively, and the pain scores at two hours post extubation were 2 [2-4] and 3 [2-4], respectively. These differences were not statistically significant. As well, the sedation scores were similar between the Boussignac and venturi groups at one and two hours post extubation. In the original manuscript, the pain and sedation scores were stated to be similar, but the actual values were not shown.[1] We did not document the amount of narcotic analgesics consumed by the study patients.

In summary, the baseline characteristics of postoperative patient positioning, PACU pain scores, and sedation scores in our study were comparable between groups. In our view, the difference in our primary outcome, i.e., the PaO_2/F_IO_2 ratio, was primarily due to the study intervention of the Boussignac™ continuous positive airway pressure mask *vs* the venturi mask.

Competing interests None declared.

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