

Atelectasis in patients undergoing bariatric surgery without any previous pulmonary alterations: comments from the prevalence study



Atelectasias em pacientes submetidos à cirurgia bariátrica sem qualquer alteração pulmonar prévia: comentários do estudo de prevalência

Dear Editor,

Obesity is a risk factor intrinsic to the development of areas of atelectasis, especially when the patient undergoes to general anesthesia and, therefore, some groups of studies has been dedicated to studying such subject. The recently published letter to the editor¹ comments on and points out some aspects regarding the article² on the prevalence of atelectasis in the obese Grade III submitted to bariatric surgery. In response, the clinical relevance of this study² is that there are no studies in the literature consulted to date that have observed the prevalence of atelectasis in the postoperative period of bariatric surgery since they may cause respiratory failure in these patients. Considering this prevalence, it is possible to study effective prevention and treatment measures to minimize postoperative complications.

Thus, firstly, in fact, the retrospective analysis is subject to bias, but the service in which the study was carried out follows strict protocols instituted for years regarding preoperative preparation, hospitalization, medications, anesthetic and surgical staff, anesthesia and surgery techniques, recovery time in the postoperative period and complementary exams. In addition the data collection time was only 14 months and thus, these facts can minimize the biases of a retrospective study.

The fact that a study with only patients with previous pulmonary alterations is against the initial proposal of the research, which aims to observe the development of atelectasis in patients without any pulmonary alterations or respiratory symptoms so that we can actually reinforce the assumption that obesity alone is a risk factor for the development of respiratory complications and such complications can be triggered by the emergence of atelectasis areas.

The research group also investigated solutions to minimize the prevalence of atelectasis in these patients by applying positive pressure at different times of hospitalization and, in corroboration with the cited author,³ we also identified⁴ that the best time is soon after extubation, because it reduces the prevalence of atelectasis and has less loss of expiratory reserve volume.

Second, regarding the predominance of the female gender, it is common to observe a higher prevalence of women in studies of obesity as already demonstrated in the study conducted by Ogden et al.,⁵ in which a higher prevalence

of obesity was observed in women. This fact has several explanations, ranging from the different hormonal factors involved in the gender to the greater outpatient demand for women who seem to be more concerned about health. As a result, it becomes more difficult to homogenize the sample with respect to gender. However, with the Chi-square test used in the study to analyze the association between gender and prevalence of atelectasis, it is possible to isolate the discrepancy effects of the sample.

Thirdly, in fact, physiotherapy has been shown to be of extreme relevance in the treatment of patients in the pre and postoperative period of abdominal surgeries, as demonstrated in a literature review performed by Lawrence et al.,⁶ in which it was concluded that respiratory physiotherapy with reexpansive techniques has proven benefits in reducing postoperative complications in abdominal surgeries. Moreover, since then, several other studies have been emerging to prove even more this finding. In view of the vast evidence of the benefits of physical therapy in these cases, the hospital conducting the study, as well as several others, already includes respiratory physiotherapy in the routine of these patients when they are hospitalized. However, the high prevalence of atelectasis in these patients must be observed, and the researchers should direct attention to new treatment techniques in order to avoid them.

Finally, the authors also agree that more research is encouraged in this area to evaluate the respiratory complications related to abdominal surgeries and their possible risk factors as well as to perform the best prevention or treatment.

Conflicts of interest

The authors declare no conflicts of interest.

References

1. Forgiarini Junior LA, Esquinas AM. Atelectasis in postoperative bariatric surgery: how many understand them? *Rev Bras Anesthesiol.* 2017; <http://dx.doi.org/10.1016/j.bjane.2017.04.004> (in press).
2. Baltieri L, Peixoto-Souza FS, Rasera-Junior I, et al. Analysis of the prevalence of atelectasis in patients undergoing bariatric surgery. *Rev Bras Anesthesiol.* 2016;66:577–82.
3. Guimarães J, Pinho D, Nunes CS, et al. Effect of Boussignac continuous positive airway pressure ventilation on PaO₂ and PaO₂/FiO₂ ratio immediately after extubation in morbidly obese patients undergoing bariatric surgery: a randomized controlled trial. *J Clin Anesth.* 2016;34:562–70.
4. Baltieri L, Santos LA, Rasera I Jr, et al. Use of positive pressure in the bariatric surgery and effects on pulmonary function. *Arq Bras Cir Dig.* 2014;27 Suppl. 1:26–30.
5. Ogden CL, Yanovski SZ, Carroll MD, et al. The epidemiology of obesity. *Gastroenterology.* 2007;132:2087–102.
6. Lawrence VA, Cornell JE, Smetana GW. Strategies to reduce postoperative pulmonary complications after noncardiothoracic surgery: systematic review for the American College of Physicians. *Ann Intern Med.* 2006;144:596–608.

Letícia Baltieri^a, Eli Maria Pazzianotto-Forti^{b,*}

^a Universidade de Campinas (UNICAMP), Campinas, SP, Brazil

^b Universidade Metodista de Piracicaba (UNIMEP), Programa de Pós-graduação em Ciências do Movimento Humano (PPG-CMH), Piracicaba, SP, Brazil

* Corresponding author.

E-mail: empforti@unimep.br (E.M. Pazzianotto-Forti).

Available online 20 September 2017

<https://doi.org/10.1016/j.bjane.2017.08.004>
0104-0014/

© 2017 Sociedade Brasileira de Anestesiologia. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Pulmonary function alteration in laparoscopic surgery with pneumoperitoneum and abdominal wall elevation



Alteração da função pulmonar em cirurgia laparoscópica com pneumoperitônio e elevação da parede abdominal

Dear Editor,

It was with great interest that we read the article published by Hiroshi Ueda and Takuo Hoshi, which addressed lung function in laparoscopic surgery with abdominal wall

elevation.¹ In general, laparoscopic surgeries require a pneumoperitoneum (PnP), which involves carbon dioxide insufflation into the peritoneal cavity, resulting in a change of respiratory mechanics. This change is associated with pulmonary base compression due to cephalic displacement of the diaphragm causing decreased functional residual capacity. In a pilot study carried out by our group at the Federal University of São Paulo – Paulista Medical School, during PnP with intra-abdominal pressure (IAP) of 20 mmHg, we identified that the cephalic displacement of the diaphragm appears to be the main component for change in lung function. However, the elevation of the abdominal wall by increasing IAP could result in diaphragmatic rectification due to costophrenic angle opening and discretely contributing to the opening of the basal regions of the

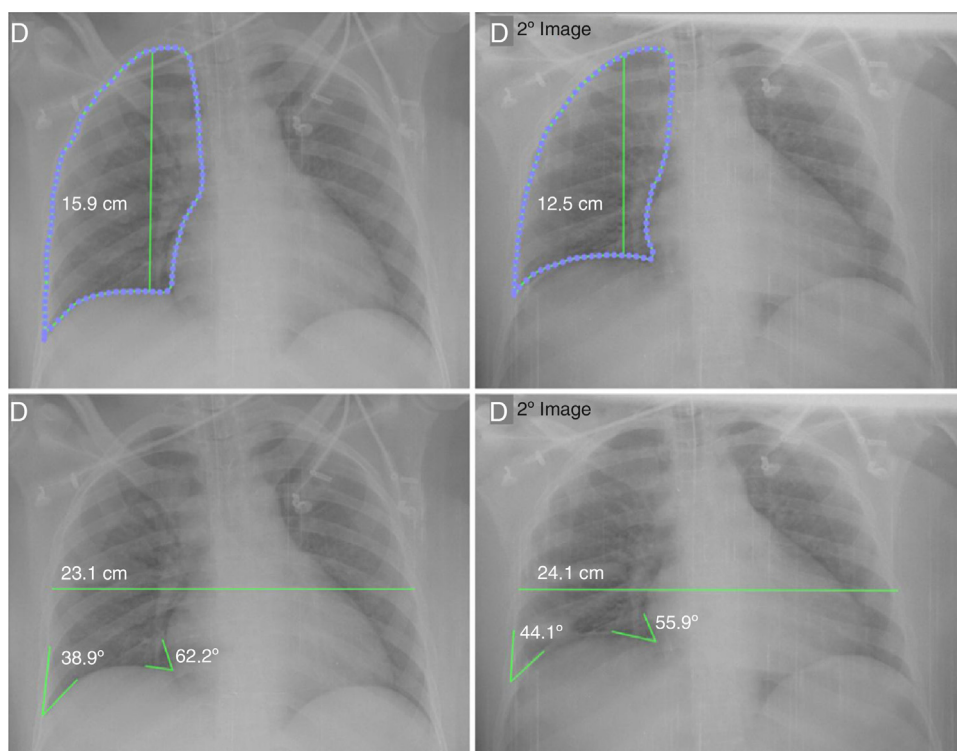


Figure 1 Female patient undergoing videolaparoscopy with pneumoperitoneum (PnP) pressure of 20 mmHg. Before PnP (first column), lung height was 15.9 cm, showing a reduction of 21.4% (3.4 cm) after PnP insufflation (second column). The laterolateral diameter had a slight increase of 4.5% (23.1–24.1 cm). The right costophrenic angle had an increase of 13.5% (ranging from 38.9° to 44.1°), corroborating for greater rectification of the diaphragm, but the cardiophrenic angle reduced its angulation by 10.1% (62.2° for 55.9°). Thus, it is possible to notice a significant reduction in lung height with insufficient diaphragmatic conformation change.