CORRESPONDENCE

Obesity paradox in ICU? A topic of discussion, not a key issue!

International Journal of Obesity (2022) 46:1248–1249; https://doi.org/10.1038/s41366-022-01099-y

Gérard Audibert[1], Aurélie Bannay[2] and Olivier Ziegler[3]✉
[1]*Department of Anesthesiology and Intensive Care Medicine, Nancy University Hospital, Central Hospital, and Lorraine University, Nancy, France.* [2]*Department of Medical Information and Evaluation, Nancy University Hospital, Nancy and Lorraine University, Nancy, France.* [3]*Specialized Obesity Center and Department of Endocrinology, Diabetology, Nutrition, Brabois Hospital, Nancy University hospital, Vandoeuvre-Lès-Nancy and Lorraine University, Nancy, France.* ✉*email: o.ziegler@chru-nancy.fr*

TO THE EDITOR:

We thank Stovitz et al. [1] for their valuable comments on our paper [2]. We notice that they agree on the basis of the study i.e. analyzing differences in covid-19 mortality risk across BMI categories. Moreover, they do not seem to challenge the main finding of our study.

Their main focus relates to the "obesity paradox" which is debated in our discussion section. We raised the notion of obesity paradox as an hypothesis of what we measured in critically ill patients with COVID 19, whereas Stovitz et al. [1] consider that there was a collider stratification bias. This was already discussed before [3]. The main argument being that our findings may be in relation with an « unmeasured reason » responsible for severe COVID 19 both in non-obese patients and in patients with severe obesity. Although this may be partially true [4], it is difficult to figure out what could be these « unmeasured reasons », present both in non-obese and severely obese patients.

Moreover, obesity paradox does not apply to all categories of BMI. It disappears for class 3 Obesity (BMI ≥ 40 kg/m^2), as clearly demonstrated by recent studies of ICU critically ill patients [5–7]. More precisely, Chetboun et al. [7] showed a significant relation between BMI and invasive mechanical ventilation but adjusted regression models showed a significant association between BMI and 28-day all-cause mortality, which was only increased in obesity class 3 (BMI ≥ 40 kg/m^2) (adjusted HR 1.68; 95% CI 1.06–2.64).

Gong et al. [8] reported significant associations between BMI and obesity and increased development of acute respiratory distress syndrome (ARDS) that persist after adjusting for known risk factors for the development of ARDS. While obesity was found to be associated with increased ICU length of stay, there was no significant association between obesity and ARDS mortality, after adjusting for potential predictors of mortality including Apache III score, etiology of ARDS (septic shock or direct pulmonary injury) or comorbidities.

Moreover a paradoxical better survival has been generally observed in critically ill patients with obesity [9], with overweight and moderate obesity being protective as compared with lean BMI or normal BMI or more severe obesity [10].

To take into account the arguments of Stovitz et al. [1, 3], we agree with this slightly modified formulation of a "seemingly obesity survival paradox" observed in critically ill patients with COVID 19 and we reinforce our conclusion that "obesity paradox should not be interpreted as a safety message for moderate obese patients with severe COVID19, but should lead intensivists to aggressively manage these patients in view of their good prognosis".

REFERENCES

1. Stovitz SD, Banack HR, Kaufman JS. Selection bias: "The unseen enemy is always the most fearsome". Int J Obes (Lond) 2022. https://doi.org/10.1038/s41366-021-00981-5.
2. Dana R, Bannay A, Bourst P, Ziegler C, Losser MR, Gibot S, et al. Obesity and mortality in critically ill COVID-19 patients with respiratory failure. Int J Obes. 2021. https://doi.org/10.1038/s41366-021-00872-9.
3. Stovitz SD, Banack HR, Kaufman JS. Structural Bias in Studies of Cardiovascular Disease: Let's Not Be Fooled by the "Obesity Paradox". Can J Cardiol. 2018;34:540–2. https://doi.org/10.1016/j.cjca.2017.10.025
4. Sperrin M, Candlish J, Badrick E, Renehan A, Buchan I. Collider bias is only a partial explanation for the obesity paradox. Epidemiology. 2016;27:525–30. https://doi.org/10.1097/EDE.0000000000000493
5. Gupta S, Hayek SS, Wang W, Chan L, Mathews KS, Melamed ML, et al. Factors associated with death in critically ill patients with coronavirus disease 2019 in the US. JAMA Intern Med. 2020;180:1436 https://doi.org/10.1001/jamainternmed.2020.3596
6. COVID-ICU Group on behalf of the REVA Network and the COVID-ICU Investigators. Clinical characteristics and day-90 outcomes of 4244 critically ill adults with COVID-19: a prospective cohort study. Intensive Care Med. 2021;47:60–73. https://doi.org/10.1007/s00134-020-06294-x
7. Chetboun M, Raverdy V, Labreuche J, Simonnet A, Wallet F, Caussy C, et al. BMI and pneumonia outcomes in critically ill COVID-19 patients: an international multicenter study. Obesity. 2021. https://doi.org/10.1002/oby.23223.
8. Gong MN, Bajwa EK, Thompson BT, Christiani DC. Body mass index is associated with the development of acute respiratory distress syndrome. Thorax. 2010;65:44–50. https://doi.org/10.1136/thx.2009.117572
9. Schetz M, De Jong A, Deane AM, Druml W, Hemelaar P, Pelosi P, et al. Obesity in the critically ill: a narrative review. Intensive Care Med. 2019;45:757–69. https://doi.org/10.1007/s00134-019-05594-1
10. Acharya P, Upadhyay L, Qavi A, Naaraayan A, Jesmajian S, Acharya S, et al. The paradox prevails: outcomes are better in critically ill obese patients regardless of the comorbidity burden. J Crit Care. 2019;53:25–31. https://doi.org/10.1016/j.jcrc.2019.05.004

AUTHOR CONTRIBUTIONS

The authors confirm contribution to the paper as follows. Letter conception: GA, AB and OZ. Manuscript draft: GA and OZ wrote the manuscript. OZ edited the manuscript. All authors revised the manucsript and approved the final version.

Received: 11 August 2021 Revised: 19 September 2021 Accepted: 11 February 2022
Published online: 24 February 2022

COMPETING INTERESTS

The authors declare no competing interests.

ADDITIONAL INFORMATION

Correspondence and requests for materials should be addressed to Olivier Ziegler.