Letters to the Editor

without ACLF. Further, it is not clearly described whether these patients with ACLF received steroids or other effective therapies as disease-modifying agents.

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Conflict of interest
The authors declare no conflicts of interest that pertain to this work.

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Authors’ contributions
Both SPS and AJ contributed equally in manuscript writing and final editing.

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References

To the Editor:

We read with interest the letter by Dr. Singh et al. on our recent manuscript and we thank the authors for their thoughtful comments. Still, we think that some of the raised points deserve further clarification.

Firstly, our study does not support the authors conclusion that epidemiological surveillance in critically ill patients with cirrhosis could guide early antibiotic prophylaxis to prevent life-threatening new infections by MRDOs. We believe that our study suggests that data on rectal colonization could be used to delineate and de-escalate broad-spectrum empirical antibiotic strategies in this setting, as infections occurring in colonized patients are mainly caused by the colonizing resistant strain.

Secondly, colonization at ICU admission was higher in patients with cirrhosis, a feature that was directly correlated with the presence of well-established risk factors for antibiotic resistance. Recent hospitalization, ICU admission and systemic antibiotic exposure were much more prevalent in the cirrhotic population, a finding that explains the higher rate of MDRO rectal colonization at baseline. As pointed out by Dr. Singh et al., rates of new colonization during ICU stay and of new bacterial infections by MDROs during hospitalization were similar between critically ill patients with and without cirrhosis, a finding that was in some way unexpected considering the higher risk of nosocomial infections described in the literature in the cirrhotic population. Also, the patients without cirrhosis were critically ill and therefore at high risk of colonization and infection with MDROs. Epidemiological surveillance swabs were performed weekly following local practice guidelines. A higher frequency may be an interesting approach, though the potential benefit is probably outweighed by the associated costs.

Thirdly, Dr. Singh et al. raised a point regarding the potential benefit of molecular typing that ensures the concordance between the colonizing bacteria and the strain responsible for infection in our study. These techniques, which we have used in other studies, are still very costly and too complex to be easily applicable to clinical practice. We believe that, similar to other confirmatory studies carried out in populations other than cirrhosis, decisions based on classical microbiology are useful in clinical practice, since colonization by MDROs is associated with increased risk of infection by the colonizing bacteria.

Fourthly, we agree that the administration of proton pump inhibitors and lactulose can modify intestinal microbiota and therefore increase the risk of colonization by MDROs. Regrettfully, none of these variables was specifically investigated in our prospective dataset. However, patients with hepatic encephalopathy at ICU

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Reply to: “Association of rectal colonisation by MDROs with new infection in cirrhosis”

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admission (a surrogate marker of lactulose therapy) were more frequently colonized by MDROs than patients without encephalopathy (53% vs. 36%; p = 0.06). Whether this higher rate of MDRO carriers is the consequence of lactulose therapy or reflects more severe disease in these patients deserves further investigation. On the other hand, most of our patients, colonized or not, were on proton pump inhibitors during their ICU stay (>90%), a feature that precludes any analysis on their impact on antibiotic resistance. Data on steroid therapy were unfortunately not recorded.

Finally, we are aware of studies reporting the carriage of highly pathogenic bacteria in patients with ACLF. This finding was not consistently observed in our series (MDRO colonization in 48% of patients with ACLF compared to 38% in those without in the Barcelona cohort; and very similar rates in the Frankfurt series [49% vs. 45%, respectively]). This may be explained by disease severity in patients without ACLF, since all patients were critically ill and admitted to the ICU.

Last but not least, we would again like to thank the authors of the letter for their interest and raising these points, and we would like to encourage further research in this highly interesting, evolving and clinically very important field.

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Conflict of interest
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Authors’ contributions
All authors contributed to writing this manuscript.

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References
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