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Ceremonial purification: which rite is right in liver failure? Author's reply

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We read with interest the letter of Fisher et al. [1] commenting our manuscript on artificial liver support in patients with liver failure [2]. The authors underline the role of continuous renal replacement therapy (CRRT) in the management of patients with acute liver failure (ALF) as it reduces ammonia levels. Nevertheless, the improvement in patient survival is not clearly shown. The correlation between ammonia levels, cerebral oedema and survival is not constant. The pathophysiological mechanism of hepatic encephalopathy (HE) is not only related to ammonia levels but more complex in patients with ALF and acute on chronic liver failure (ACLF). Evidence from several reports suggested that HE results from the accumulation of neurotoxic or neuroactive substances in the brain, including ammonia, manganese, aromatic amino acids, mercaptans, phenols, short-chain fatty acids and others, and triggered by heterogeneous factors such as ammonia, benzodiazepines, proinflammatory cytokines and hyponatremia [3–5].

Is CRRT a liver support therapy? The fact that a CRRT removes ammonia might be of interest but could not be considered as a liver support. CRRT has been used in patients with ALF and ACLF, but in most of the situations, in those patients undergoing acute kidney injury (AKI) or high lactates levels. Technically, extra-corporeal albumin dialysis incorporates in addition to a specific membrane, charcoal and anion columns, a CRRT membrane. Several studies have been performed using extracorporeal albumin dialysis (ECAD) with MARS® in patients with ALF, showing not only improvements in HE, but also a decrease in intracranial pressure, and an increase in cerebral perfusion pressure, mean arterial blood pressure, systemic vascular resistances and cardiac index [6–8]. In an ACLF

cohort, ECAD showed a significant decrease in circulating phenolic aromatic amino acids and improvement of HE in patients with severe liver failure [9].

Conventional hemodialysis and CRRT techniques have been used in the past but had little or no effect on liver detoxification and did not improve the prognosis of these patients [6]. In the retrospective study of Cardoso and Karvellas et al., from the United States ALF registry, 26.5% of the patients had a CRRT at day 1; the choice of CRRT was not protocolized and as expected was mainly used for AKI and/or metabolic acidosis then for liver support as shown in patients characteristics when both CRRT and no CRRT groups were compared [10]. Median (interquartile range, IQR) creatinine (mg/dL) and lactates (mmol/L) levels were, respectively, higher in the CRRT vs. no CRRT group 2.80 (1.72–4.12) vs. 1.34 (0.8–2.60) mg/dL ($p < 0.001$) and 6.3 (3.4–10.3) vs. 3.5 (2.5–5.9) mmol/L, $p < 0.001$. The RRT group had a significantly lower 21-day, post study admission, transplant free survival (TFS) (47% vs. 65%; $p < 0.001$) with similar proportion of transplanted patients in both arms. Only in a sub-group analysis, RRT use on day 1 and not IRRT was significantly associated with lower 21-day post study admission transplant-free all-cause mortality (adjusted odds ratio [aOR] 0.47 [95% confidence interval 0.26–0.82]).

Overall, the few studies on CRRT use in patients with ALF have large limitations and focused mainly on its use in those patients with concomitant AKI. CRRT membranes reduce ammonia levels, could be an adjunctive therapy for patients with ALF and AKI, but could not be considered a liver support or salvage therapy in these patients.

Data availability

Not applicable.

Declarations

Conflicts of interest

FS and SJ have no conflict of interest related to this manuscript.

Ethics approval

Not applicable.

References

1. Fisher C, Warrillow S, Bellomo R (2022) Ceremonial purification: which rite is right in liver failure? *Intensive Care Med.* <https://doi.org/10.1007/s00134-022-06923-7>
2. Saliba F, Bañares R, Larsen FS, Wilmer A, Parés A, Mitzner S, Stange J, Fuhrmann V, Gilg S, Hassanein T, Samuel D, Torner J, Jaber S (2022) Artificial liver support in patients with liver failure: a modified DELPHI consensus of international experts. *Intensive Care Med* 48(10):1352–1367
3. Jalan R, Pollok A, Shah SH, Madhavan K, Simpson KJ (2002) Liver derived proinflammatory cytokines may be important in producing intracranial hypertension in acute liver failure. *J Hepatol* 37:536–538 - [DOI](#)
4. Sekiyama KD, Yoshihara M, Thomson AW (1994) Circulating proinflammatory cytokines (IL-1beta, TNF-alpha, and IL-6) and IL-1 receptor antagonist (IL-1Ra) in

- fulminant hepatic failure and acute hepatitis. *Clin Exp Immunol* 98:71–77 - [DOI](#) - [PMC](#)
5. Häussinger D, Butz M, Schnitzler A, Görg B (2021) Pathomechanisms in hepatic encephalopathy. *Biol Chem* 402(9):1087–1102 - [DOI](#)
 6. Saliba F (2006) The Molecular Adsorbent Recirculating System (MARS) in the intensive care unit: a rescue therapy for patients with hepatic failure. *Crit Care* 10(1):118 - [DOI](#) - [PMC](#)
 7. Schmidt LE, Wang LP, Hansen BAH, Larsen FS (2003) Systemic hemodynamic effects of treatment with the molecular adsorbents recirculating system in patients with hyperacute liver failure: a prospective controlled trial. *Liver Transplant* 9:290–297 - [DOI](#)
 8. Ben Abraham R, Szold O, Merhav H, Biderman P, Kidron A, Nakache R, Oren R, Sorkine P (2001) Rapid resolution of brain oedema and improved cerebral perfusion pressure following the molecular adsorbent recycling system in acute liver failure patients. *Transplant Proc* 33:2897–2899 - [DOI](#)
 9. Parés A, Deulofeu R, Cisneros L, Escorsell A, Salmerón JM, Caballería J, Mas A (2009) Albumin dialysis improves hepatic encephalopathy and decreases circulating phenolic aromatic amino acids in patients with alcoholic hepatitis and severe liver failure. *Crit Care* 13(1):R8 - [DOI](#) - [PMC](#)
 10. Cardoso FS, Gottfried M, Tujios S, Olson JC, Karvellas CJ, US Acute Liver Failure Study Group (2018) Continuous renal replacement therapy is associated with reduced serum ammonia levels and mortality in acute liver failure. *Hepatology* 67(2):711–720 - [DOI](#)