



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Letter to the Editor

Renal replacement therapy in severe COVID-19 patients: Intermittent or continuous, the ongoing debate


Dear Editor,

We read with interest the article of G Louis et al. [1]. The authors report the high incidence of acute kidney injury (AKI) and renal replacement therapy (RRT) in COVID-19 critically ill patients, and they provide some preventive measures. In this particular context, we suggest that RRT modalities should also be discussed.

The choice between intermittent or continuous RRT is still controversial for AKI management in intensive care units (ICU), but some authors suggested that continuous veno-venous haemofiltration (CVVHF) should be the preferred modality in COVID-19 patients [2]. CVVHF offers many benefits in haemodynamically unstable patients; however, about one-third only of the COVID-19 patients hospitalised in ICU suffered haemodynamic failure [3]. Out of this setting, evidence is lacking to formally recommend one RRT technique rather than another [4]. Regarding the health crisis we have experienced, intermittent RRT modalities can provide many benefits and should also be considered.

In our rather small public hospital, there is no haemodialysis unit. For AKI management in ICU, we routinely use both CVVHF and intermittent haemodialysis (IHD), with three Prismaflex[®] systems (Gambro, Saint-Léonard, Quebec) and two Innova[®] dialysis machines (Hospal, Lyon, France), respectively. During the COVID-19 crisis, we increased the number of ICU beds from 10 to 24, but RRT machines availability remained unchanged. During the first wave of the epidemic, 56 COVID-19 patients have been admitted in our unit. Twenty-five of them (45%) experienced acute renal failure, 16 (29%) required RRT, and up to 7 patients required RRT on the same day. RRT was achieved each time it was indicated. In all patients, CVVHF was used as the first-choice technique, for a median duration of 8 days (IQR 3–10). It was secondarily switched to IHD in 7 patients, i.e. 44% of the patients requiring RRT. The median CVVHF duration before IHD initiation was 9 days (IQR 5–12), indicating that IHD was mainly used in patients with persistent kidney failure.

In this particular context, IHD provided many benefits. First, IHD enabled the treatment of several patients a day with the same device whereas a CVVHF device must be dedicated to one patient

for several days. Secondly, due to COVID-19-associated hypercoagulability, many patients receiving continuous renal replacement therapy experienced RRT circuit clotting [5]. In contrast, in our experience, IHD allowed short and effective treatments. Third, IHD offered many periods free of RRT, that were useful for prone positioning, transport for imaging examinations, respiratory rehabilitation. . . Finally, this global health crisis was also a medical supply crisis. Although media mainly focused on ventilator availability, supply tensions also occurred regarding RRT materials. Having two distinct methods allowed us to be less dependent on supply shortages.

Strains related to the COVID-19 crisis may have renewed interest for IHD in ICU. IHD offered many logistics advantages that helped to deal with the significant increase of critical patients requiring RRT. However, new RRT modalities should not be initiated in crisis circumstances. Training and regular practice are critical to ensure RRT safety and efficiency. The COVID-19 crisis confirmed that both intermittent and continuous RRT modalities are complementary and should be considered and regularly practiced for their respective interests, depending on the patient's needs and circumstances.

Conflicts of interest

The authors declare that they have no competing interest.

References

- [1] Louis G, Belveyre T, Goetz C, Gaci R, Dinot V. Acute kidney injury in severe SARS-CoV-2 infection: an experience report in Eastern France. *Anaesth Crit Care Pain Med* 2021;40100788.
- [2] Ronco C, Reis T, Husain-Syed F. Management of acute kidney injury in patients with COVID-19. *Lancet Respir Med* 2020;8:738–42.
- [3] Yang X, Yu Y, Xu J, Shu H, Xia J, Liu H, et al. Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. *Lancet Respir Med* 2020;8:475–81.
- [4] Ricci Z, Ronco C. Dose and efficiency of renal replacement therapy: continuous renal replacement therapy versus intermittent hemodialysis versus slow extended daily dialysis. *Crit Care Med* 2008;36:229–37.
- [5] Helms J, Tacquard C, Severac F, Leonard-Lorant I, Ohana M, Delabranche X, et al. High risk of thrombosis in patients with severe SARS-CoV-2 infection: a multicenter prospective cohort study. *Intensive Care Med* 2020;46:1089–98.