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PRESS INFORMATION

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Baby Dialysis Machine Revisited: CAREPEDIEM decreases mortality rate by 50 percent!

Two years ago almost to the day, Professor Claudio Ronco, Vicenza, Italy, revealed his innovative 'CARPEDIEM' dialysis machine for babies to the medical world. At the ERA-EDTA Congress, he presented a case history that was published at the same time in the highly renowned journal 'The Lancet' [1]. The first patient, a baby girl named Lisa, was treated successfully. This 2.9 kg neonate with hemorrhagic shock, multiple organ dysfunction and severe fluid overload was treated with the CARPEDIEM machine, using continuous venovenous hemofiltration, single-pass albumin dialysis, blood exchange and plasma exchange. The patient's 65% fluid overload, elevated creatinine and bilirubin concentrations and severe acidosis were all managed safely and effectively. More patients followed, and by the time of his presentation, Professor Ronco had already treated eight babies successfully.

What did the innovation entail? Until it was made, babies with kidney failure had been treated with machines built for adults, only with smaller filters and other imprecise adaptations that tended to harm the patient. Outcomes were accordingly poor as a result. "It's like using a tool for a car to fix a watch," commented Ronco two years ago. It was for that reason that he and his colleagues launched a fundraising program and collected € 300,000 to build a prototype. CARPEDIEM processes significantly lower blood and ultrafiltration flows than conventional machines, and it is also possible to use much smaller catheters that are better adapted to the small blood vessels.

Acute kidney injury (AKI) is not a rare phenomenon in neonates and is associated with poor outcomes: In a study [2] published this year, AKI occurred in 30.3% of the 357 enrolled neonates (72.2% were AKI stage 1). The incidence of AKI in pediatric patients following surgery for congenital heart disease is even higher (45% [3]).

Outcomes for pediatric AKI patients are poor, especially in neonates. In a randomized study by Mathur et al. [4], the mortality rate was significantly higher in neonates with sepsis and AKI than in those with sepsis and no AKI (70.2% vs 25%, $p < 0.001$). "That matches our clinical experience. So far we have lost about three-quarters of our neonatal AKI patients in need of dialysis", comments Ronco. Those who survive generally achieve renal recovery within a few weeks and have the chance to develop healthily thereafter. "This is why we need to fight for their lives!"

CARPEDIEM marked a turning point: So far, more than 40 babies have been treated with CARPEDIEM and many lives have been saved. According to Ronco, the mortality rate in babies treated with CARPEDIEM is about 30-35%. This equates to a halving of the previous average mortality rate of these children. A publication is currently being drafted. Ronco et al. have now started a register documenting the outcomes of all the babies treated with CARPEDIEM and which will also gather long-term data.

References

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