Use of Continuous Renal Replacement Therapy (CRRT) in Special Situations. Case Report

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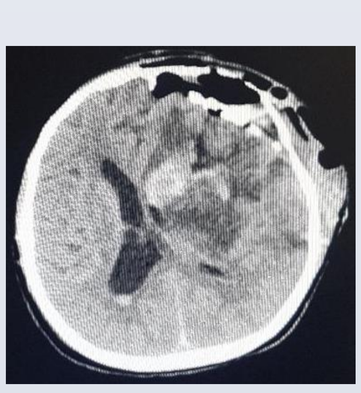
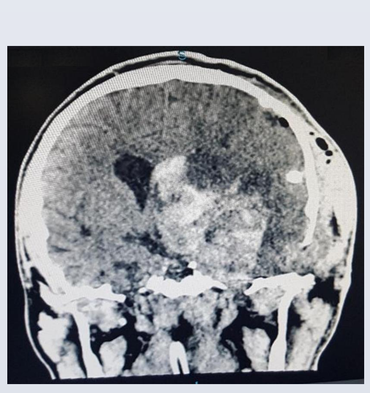
Purpose of the study

The purpose of this paper is to present the case of a critically ill pediatric patient, who developed multiple organ failure, including acute kidney injury (AKI) with continuous renal reemplacement therapy (CRRT) requirement, who after a series of appropriate hemodialysis sessions and medical management, resolved the renal failure, being discharged from critical area with renal function in basal ranges.

Methods

This is a 15-year-old male patient, with no relevant medical history, who began his condition with spontaneous deviation of the labial commissure, managed with steroids, without improvement. Subsequently, intense headache was added and 3 days later generalized tonic-clonic seizures. Magnetic resonance study (July 07th, 2019) reported cerebral parenchyma with loss of morphology at the left frontotemporoparietal hemisphere, secondary to lesion of well-defined borders, dimensions 73.2 * 81.1 * 75.7 mm. He was referred to the National Medical Center "20 de Noviembre" to continue diagnostic approach and treatment. He was assessed by neurosurgery, integrating the diagnosis of meniongioma and deciding its surgical management, requiring three surgical interventions to achieve resection of the lesion. Follow-up brain CT scan was performed (Fig. 1 & 2).





Figures 1 & 2. Follow-up Brain CT Scan

He stayed during 22 days in critical care unit, and was discharged to hospitalization pediatric ward for improvement of his general conditions. However, he developed fever, tachycardia and polypnea, and subsequently hemodynamic and respiratory failure, requiring entering the pediatric intensive care unit again. Presenting with a torpid evolution, the patient developed multiorganic failure. He was assessed by the nephrology department for oligoanuric AKI, severe metabolic acidemia and hyperkalemia. He initiated renal replacement therapy (RRT), and received the first session of conventional hemodialysis, resolving dialysis urgency (Table 1). However, the patient developed greater hemodynamic instability, oligoanuria and water overload of 7.5 liters (15% body weight), so he was considered a candidate for continuous renal replacement therapy (Table 2).

Table 1. Initial conventional hemodialysis prescription

Time	02:00 hours
Ultrafiltration	Without UF
Qb	200 ml/min
Qd	500 ml/min
Na	138 mEq/L
K	2.0 mEq/L
HCO3	28 mEq/L
Anticoagulation	Conventional heparin 500 UI bolus

Table 2. CRRT prescription

Dialyzer	Baxter HF-1000
Modality	CVVHDF
Qe	1750 ml/hr (35 ml/kg/hr)
Qb	100 ml/min
PBP	850 ml/hr
Qs	200 ml/hr
Qd	600 ml/hr
Quf	35-105 ml/hr (75 ml/hr)
Anti-coagulation	Conventional heparin 5 UI/kg/hr

However, with a first session duration of 5 hours due to filter coagulation. Assessed the next day, it was decided to start a new CRRT session, with the same prescription parameters, urea sieving-coefficient at 24 hours of 1.0. After 27 hours of treatment, the patient presented a 2-minute cardiorespiratory arrest, so the CVVHDF session was terminated, quantifying at the end a net ultafiltration of 1975 ml.

Results

Subsequently, after resolving the cardiorespiratory arrest and stabilization of the patient, he began with gradual improvement of its general conditions; with gradual neurological recovery, alert state with a Glasgow score of 13 pts (V3M6O4), with right hemiparesis (already known); hemodynamically he required vasoactive amines (adrenaline and dobutamine) for approximately 10 days (due to septic shock), with subsequent withdrawal; in the respiratory system, he required mechanical ventilatory assistance for 21 days, complicated with a pneumonia associated with mechanical ventilation, as well as airway bleeding (evident when aspirating secretions) and bilateral pulmonary edema, managed with elevated ventilation parameters, however, with gradual recovery, allowing the withdrawal of ventilatory assistance on September 21. As for the renal function, presenting with gradual recovery of urinary volumes up to 1 ml/kg/hr and after 2 weeks, with serum creatinine (CrS) levels in basal ranges (CrS 0.45 mg/dL), a glomerular filtration rate (GFR) of 110 ml/min, resolving electrolytic and acid-base disorders. Due to presenting improvement of its general conditions and resolution of organic failures, he was discharged from the pediatric critical care unit on September 26 (Fig. 3-6).

Figures 3 to 6. Patient in his last day in the pediatric critical care unit

Conclusions

The case of a neurocritical pediatric patient is presented, who developed multiple organ failure secondary to septic shock of pulmonary origin, with development of oligoanuric AKI, requiring RRT and with absolute indication of CRRT, who despite the evolution and clinical status at the time of diagnosis, with effective hemodialytic sessions, initially with dialysis emergency resolution (hyperkalemia and severe metabolic acidosis) and subsequently with effective ultrafiltration and azoates clearance through CVVHDF. The patient, despite the poor life and function prognosis, managed to solve septic process and resolve organic failures to continue managing complications due to prolonged intensive care stay, as well as neurological rehabilitation.

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