

EFFECTS OF INITIATION OF CONTINUOUS RENAL REPLACEMENT THERAPY ON HAEMODYNAMICS IN CRITICALLY ILL CHILDREN

J Brierley¹, M Richardson¹, M Peters¹

¹ Paediatric Intensive Care Unit, Great Ormond Street Hospital, London, United Kingdom

Background and Aims:

There are no studies analysing the haemodynamic effects of initiating continuous venovenous haemofiltration (CVVH) in critically ill children. Haemodynamic instability is often met by countering 'filter-related decreased systemic vascular resistance (SVR)' with vasoconstrictors. Newer non-invasive haemodynamic techniques may allow more physiological management.

Methods:

Prospective observational study of 9 critically ill children (1-9 years) to define haemodynamic responses to commencing CVVH. Heart rate (HR), mean blood pressure (MABP), central venous pressure (CVP), and central venous oxygen saturation (ScvO₂%) were directly measured at 15 minutely intervals for an hour together with cardiac index (CI), SVR index (SVRi), stroke volume index (SVi) by non-invasive continuous wave Doppler ultrasound device. (USCOM) No changes in inotrope or volume administration occurred during the study.

Results:

CVVH induced an initial significant decrease in the volume-related haemodynamic parameters SVi and CVP. Subsequently a significant increase in SVRi and decrease in CI were seen. ScvO₂ remained unchanged.

Conclusions:

Initiating CVVH in critically ill children induces hypovolemia leading to a systemic cardiovascular response of vasoconstriction and overall decrease in cardiac output. This may represent haemodilution with lowering of effective inotropic concentration through increased volume of distribution, or there may be a direct negative inotropic effect of initiating CVVH. Physiological based therapy would consist of increasing inotropes, rather than vasoconstrictors.

Haemodynamics of the five timings [mean (SD)].

	Pre CVVH	15 mins	30 mins	45 mins	60 mins
HR (beat·min ⁻¹)	126 (14)	145 (14)	125 (12)	104 (12)	105 (11)
CI (l·min ⁻¹ ·m ⁻²)	3.0 (0.6)	2.5 (0.5)	2.4 (0.6)	2.4 (0.4)	2.2 (0.5) **
SVi (ml·min ⁻¹ ·m ⁻²)	23.8 (5.3)	17.2 (4.2)	19.2 (5.1) *	23.1 (4.2)	21 (4.2)
CVP (mmHg)	12.6 (1.3)	11.4 (1.5)	9.5 (1.7) *	8.8 (1.7)	9.3 (1.3)
MABP (mmHg)	61 (4.6)	59.5 (3.6)	62.3 (4.5)	63.3 (3.4)	60.1 (3.3)
SVRi (dyn.s.cm ⁻⁵)	540 (299)	585 (277)	658 (310)	750(256)	744(295) **
ScvO ₂ (%)	76.5 (3.3)	74.6 (4.7)	73.5 (5.1)	74.5 (5.5)	74.9 (5.0)

* P < 0.01 compared to CVP pre CVVH; ** P < 0.05 compared to Pre CVVH
Paired ttests