OVERVIEW

• Whether to MUF or not in Neonates and Pediatric patients
• Whether to ZBUF or not
• Whether to MUF in adult patients
• AV or VV MUF
• AKI & optimized technique
N=98           48 patients under 5 kgs, rest under 12 kg
• GROUP 1 - MUF & CUF
• GROUP 2 - MUF
• Exclusion criteria: Reop, preop transfusion, Corticosteroid use
• No difference in outcomes except reduction in transfusion.

Modified ultrafiltration does not provide additional positive benefits except for reduction in blood cell transfusion. This, however, comes at the cost of needing more fresh frozen plasma.

DISADVANTAGES OF MUF

- Air entrainment in oxygenator
- Cerebral steal during MUF
- Ineffectiveness of MUF during bleeding
- Accidental spikes of K while using cardioplegia circuit
- Hemodynamic instability
- "Are we there yet" from the surgeon
• N=40 pts under 20 kg
• Pressure recording analytical method
• No change in heart rate, CVR stroke vol variation & inotropic score
• Conclusion- MUF improves myocardial function by a 10% increase in Systemic art pressure, SVI & CI

Decreased inflammatory mediators
• Increased HCT
• Improving post-op hemodynamics
• Decreasing transfusion

ZBUF
• Compared steroids to ZBUF
• Plasma levels of tumor necrosis factor-alpha (TNF-alpha), interleukin-6 (IL-6), interleukin-8 (IL-8), and interleukin-10 (IL-10) were measured before CPB (T1), 5 min after the start of CPB (T2), at the termination of CPB (T3), the fourth hour (T4), and the eighth hour (T5) postoperatively.
• The results showed that the plasma concentrations of TNF-alpha in the Z group were significantly less than those in the M group at T4 and T5 (P < 0.05), and the plasma concentrations of IL-6 were significantly less than those in the M group at T4 (P < 0.05); the plasma concentrations of IL-8 in the Z group were significantly less than those in the M group at T5 (P < 0.05)

N=20 (Neonates & infants)

Group 1
- FFP and blood

Group 2
- FFP, Albumin and blood

Colloid oncotic pressures of the priming solutions were higher in the HA-group (28 mmHg ± 4.9) than in the FFP-group (6 mmHg ± 1.3, p < 0.001).

Relative weight gain as a marker of capillary leakage in the HA-group (2% ± 4.5) was significantly lower 6 h post CPB than in the FFP-group (8% ± 8.0, p = 0.015).

Conclusions. Both higher hematocrit and higher colloid oncotic pressure with pentafraction improve cerebral recovery after deep hypothermic circulatory arrest. The higher hematocrit improves cerebral oxygen delivery but does not reduce total body edema. Modified ultrafiltration after cardiopulmonary bypass is less effective than having a higher initial prime hematocrit or colloid oncotic pressure.
MUF-TECHNIQUES
A-V VS V-V

AV MUF targets pulmonary circulation, decrease pulmonary edema and PCD
VV MUF does the same without the oxygenation benefit

AKI AND CUF

Effects of Conventional Ultrafiltration on Renal Performance During Adult Cardiopulmonary Bypass Procedures

CUF VS CUF & MUF IN PEDS

Conventional and conventional plus modified ultrafiltration during cardiac surgery in high-risk congenital heart disease.

CONCLUSIONS: CUF and CUF-MUF were safe and efficient methods for patient stabilization—independent of diagnosis and complexity of surgery. Future clinical evaluation should address a larger population of patients to research the different variables.
MINIATURIZING MUF CIRCUIT

CONVENTIONAL MUF CIRCUIT

EFFICACY OF M.U.F (MODIFIED ULTRAFILTRATION)

13 KG FONTAN
The Novel Use of a Low Prime Modified Ultrafiltration Apparatus in a 13-kg Jehovah’s Witness Patient: A Case Report

Bharat Dutt, MSc, CCP, CPCR, FFP; Harish M. Murthy, MD, FICMA;*†
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SO WHATS THE CONTROVERSY??

• MUF IS A MEANS TO AN END
• SUPPLEMENTS MINIATURIZED CIRCUITS & DECREASES TOTAL BODY WATER
• ENROUTE REMOVING EVIL HUMORS
• REDUCING TRANSFUSION AND IMPROVING OUTCOMES
• ACCESS TO PREVIOUSLY INACCESSIBLE POPULATIONS
• SHOULD BE TAILORED TO THE INSTITUTION!!
Does Ultrafiltration Influence Urine Output during Cardiac Surgery: Results from a National Perfusion Registry

Al Stammers, Linda Mongero, Eric Tesdahl

Conclusions

What is the Effect of Ultrafiltration on Urine Output

Question

How does the use of ultrafiltration vary by both geography (USA) and by cardiac surgical procedure type requiring CPB?

Methods

☑ Observational analysis using registry (SCOPE) data
☑ Three year period (2016-2018)
☑ All non-emergent cardiac surgical procedures
☑ Preliminary descriptive results from approximately 17% of US cardiac surgical centers
Questions

- Does removal of excess plasma water result in a maldistribution of fluid resulting in splanchnic hypoperfusion and iatrogenic injury?
- What is the effect of ionic imbalances related to solute manipulation?
- Is there an increased risk to tubular or glomerular injury that may aggravate preexisting renal dysfunction?

Data obtained from a national registry on perfusion management may serve as a foundation to pursue more focused research to improve the conduct of CPB.