

Vascular access in infants weighing less than 10 kg



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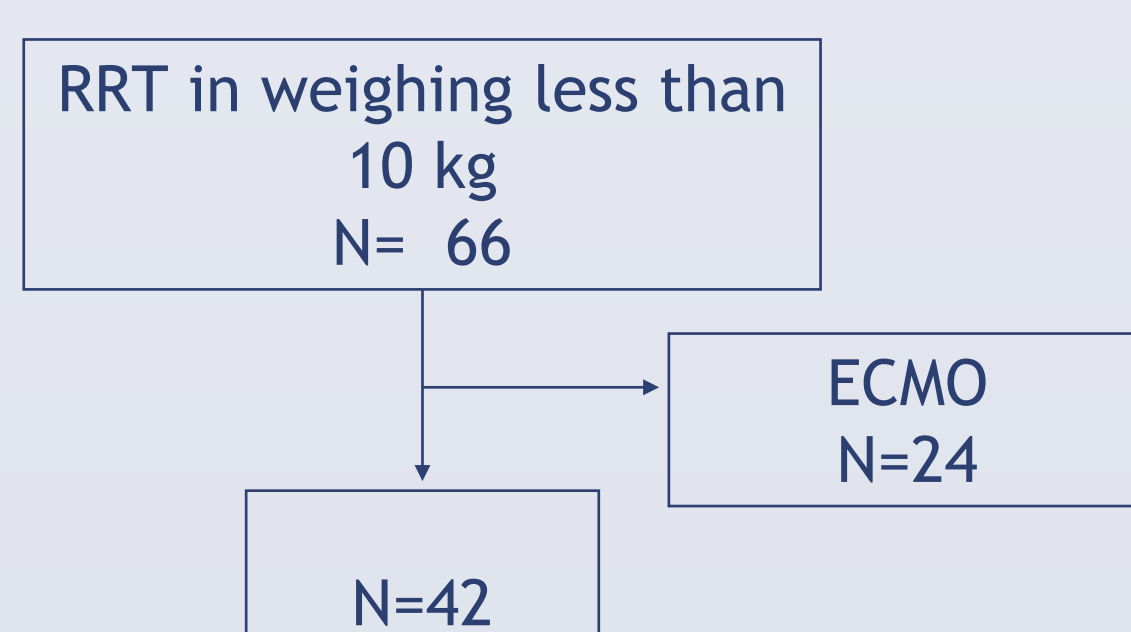
Purpose

The first step in acute blood purification therapy (BPT) is ensuring a stable vascular access (VA); this is vital in small children. However, there are few reports on VA in infants. We investigated the VA performance of extracorporeal therapies in infants.

Methods

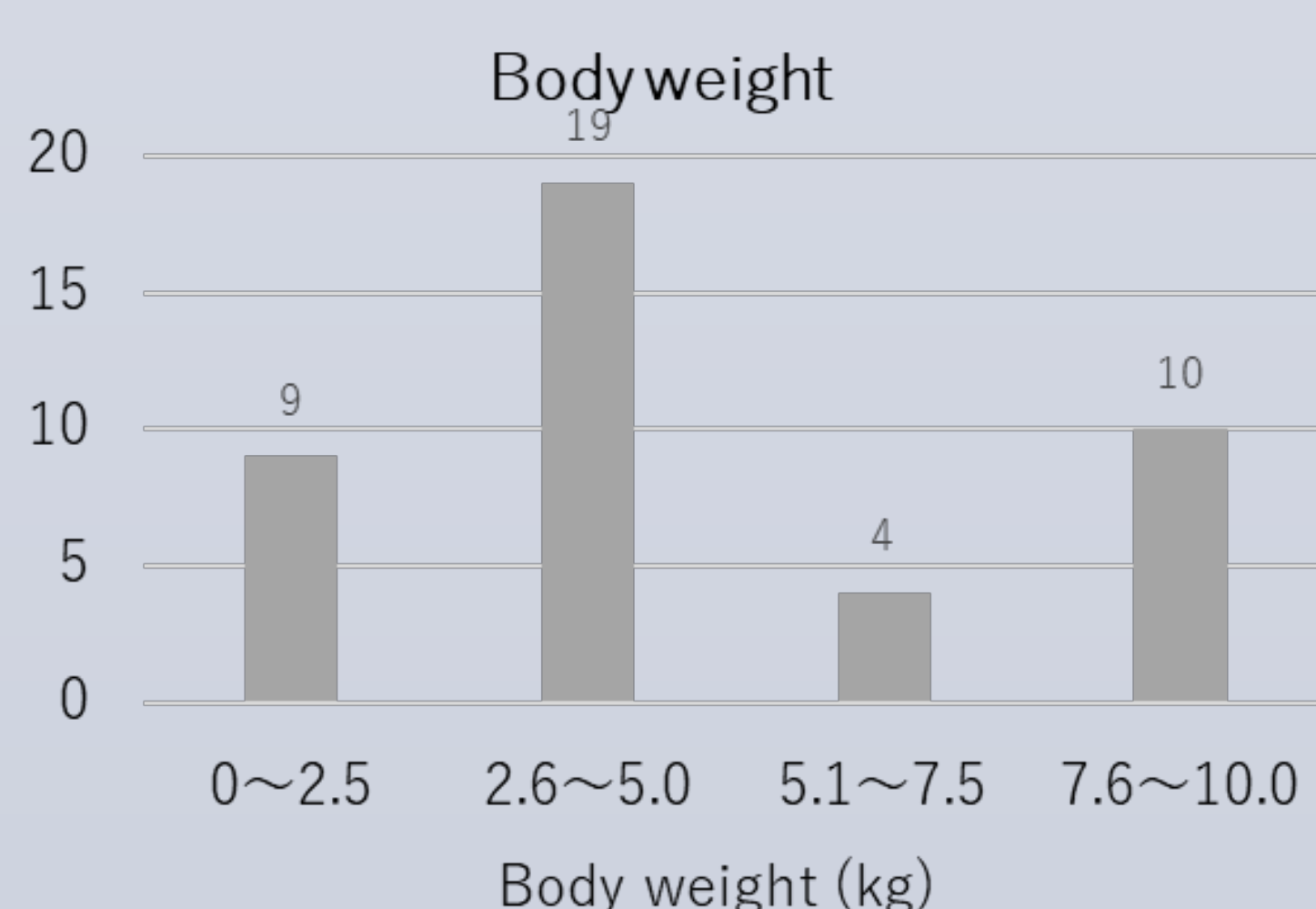
This was a single-center retrospective study of 42 infants, weighing less than 10 kg, who underwent acute BPT between January 2006 and August 2021; we excluded the patients with concomitant cardiac pulmonary bypass. We collected demographic, clinical, and laboratory data from medical records and retrospectively analyzed.

<Entry Criteria>



<Patients' Characteristics>

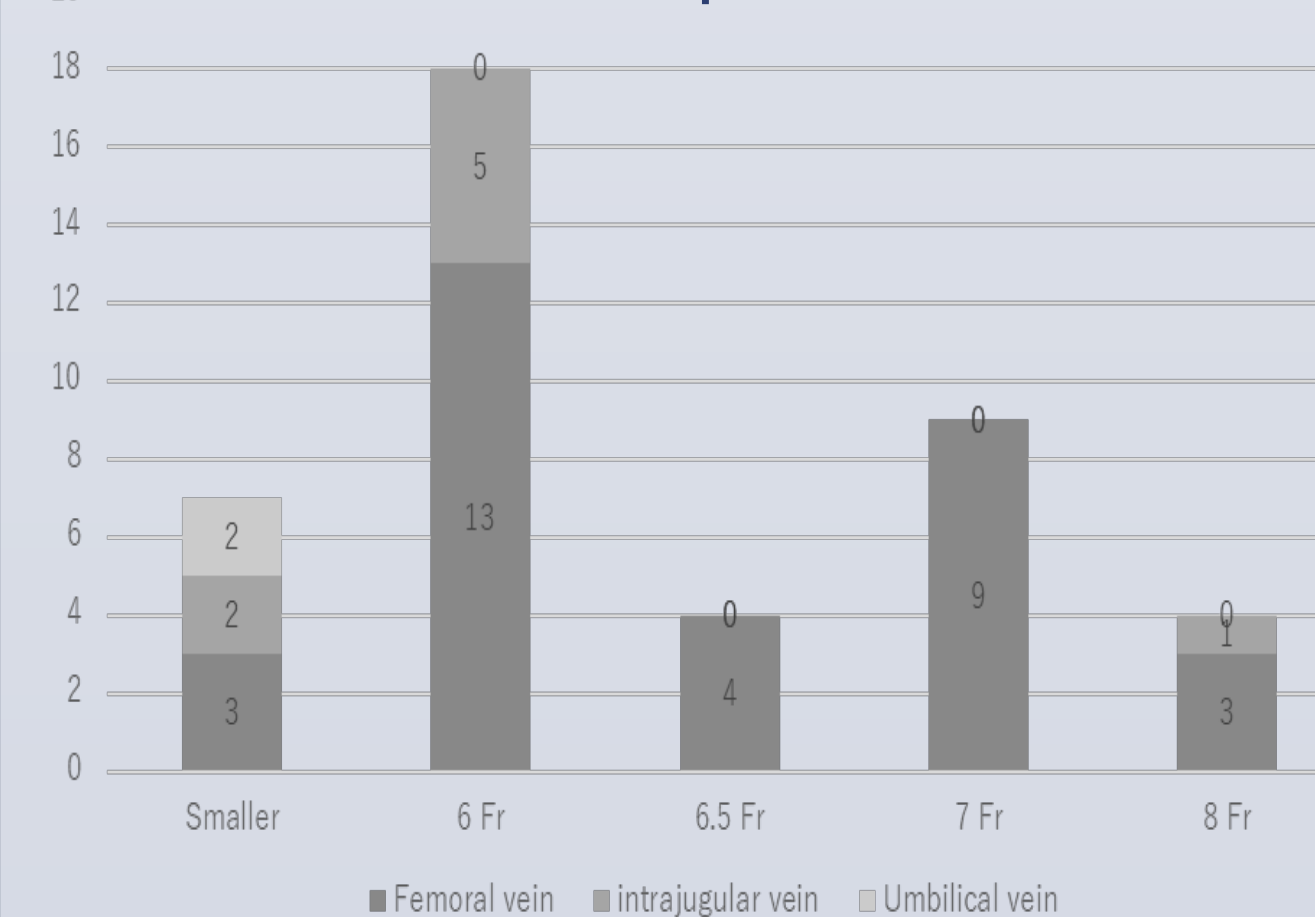
| | Overall N=42 |
|----------------------------|-----------------|
| Male, n(%) | 23 (54.3%) |
| Age (month) | 1 [0~58] |
| Body weight (kg) | 3.6[0.8~9.8] |
| Primary disease | |
| Sepsis | 21 (50.0%) |
| Autoimmune disease | 10 (23.8%) |
| Inborn error of metabolism | 3 (7.1%) |
| Cardiac disease | 2 (4.8%) |
| Renal disease | 4 (9.5%) |
| Others | |
| Type of BPT | 18 (42.9%) |
| CHDF | 13 (31.0%) |
| PMX | 11 (26.2%) |
| PE | |



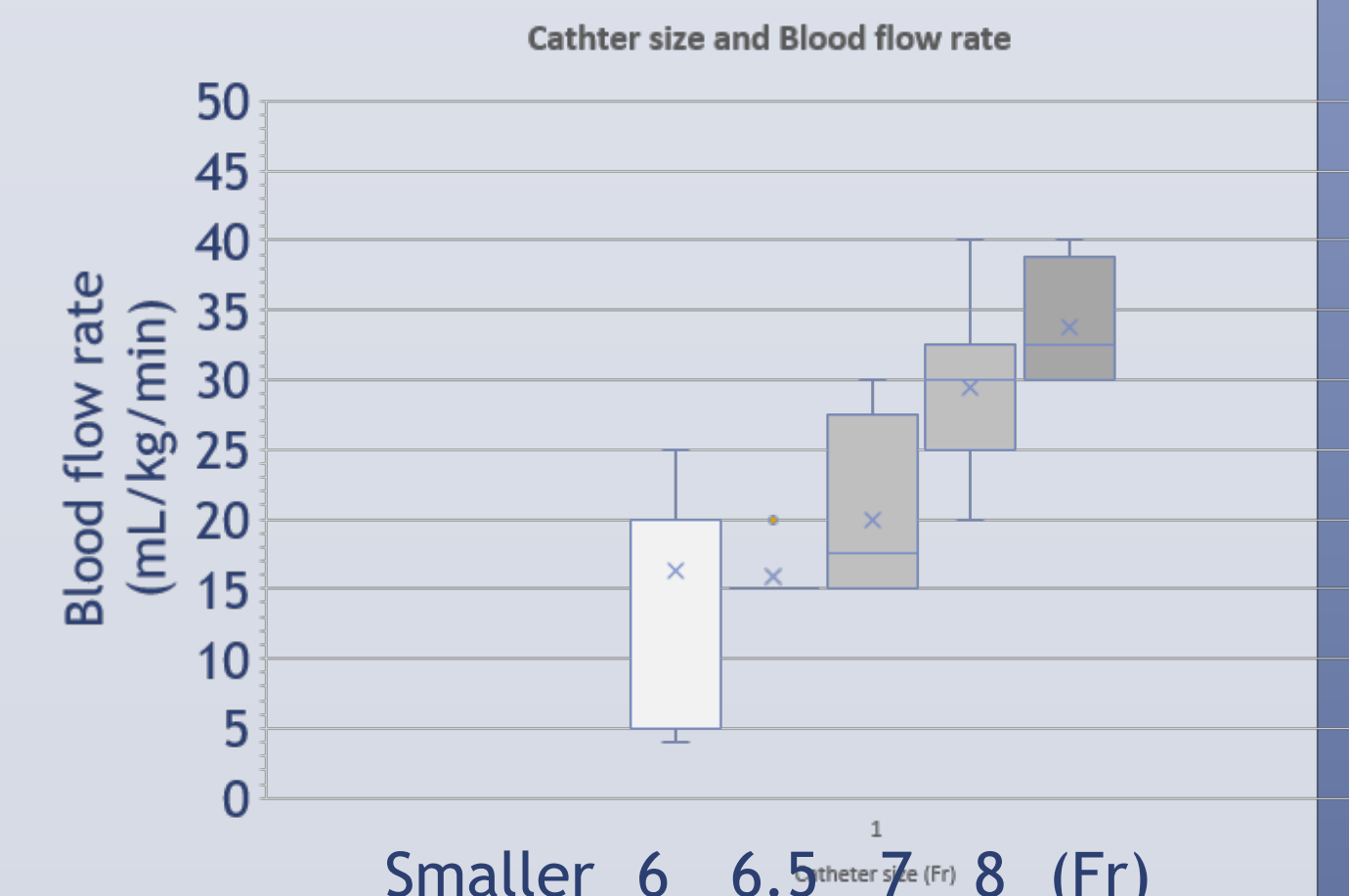
Results

Of patients, 23 (54.3%) were male, 21 (45.2%) were female. The age ranged from 0 to 58 months old (median; 1 month old). Body weight ranged from 0.8 to 9.8 kg (median; 3.6 kg). The primary diseases were sepsis (21 patients), autoimmune disease (10), inborn error of metabolism (3); 8 patients had other diseases. The type of BPT performed varied among patients; 18 patients underwent continuous hemodiafiltration, 13 had polymyxin B-immobilized fiber column direct hemoperfusion, and 11 underwent plasma exchange. Urokinase-coated double lumen catheters of varying sizes were used; the catheter size was 6 Fr in 18 infants, 6.5 Fr in 4, 7 Fr in 9, 8 Fr in 4. A smaller central venous catheter (≤ 5 Fr), not coated in urokinase, was used in patients weighing less than 2 kg. The catheter insertion sites were the femoral vein in 32 patients, right intrajugular vein in 8, and umbilical vein in 2. The catheter tip position was intra/supra vena cava in 36 patients, right atrium in 6. Blood flow rates ranged from 4 to 40 mL/min (median; 20 mL/min); the average blood flow rate per body weight was 5.5 ± 3.3 mL/kg/min. Catheter size was significantly related to body weight and blood flow rate (p value <0.05 , <0.05 , respectively). The anticoagulant used was nafamostat mesilate in 32 patients and heparin in 11. The duration of BPT was 3.5 ± 3.2 days and was not related to catheter size. There was no failure of bleeding out that led to reinsertion or abandonment of blood purification therapy. The 90-day survival rate was 81.0% (34/42 patients); this differed depending on the primary disease.

<Catheter size and position>



<Catheter size and Blood flow rates>



Conclusion

Small size, urokinase-coated, central venous catheters (6, 6.5, 7, and 8 Fr) specialized for dialysis were useful in infants weighing less than 10 kg. In those weighing less than 2 kg, much-smaller non-dialytic catheters were available for performing acute BPT.