



NURSING APPROACH TO CRRT IN NEONATES WITH AKI: THE EXPERIENCE OF A HUB PAEDIATRIC RENAL CENTRE

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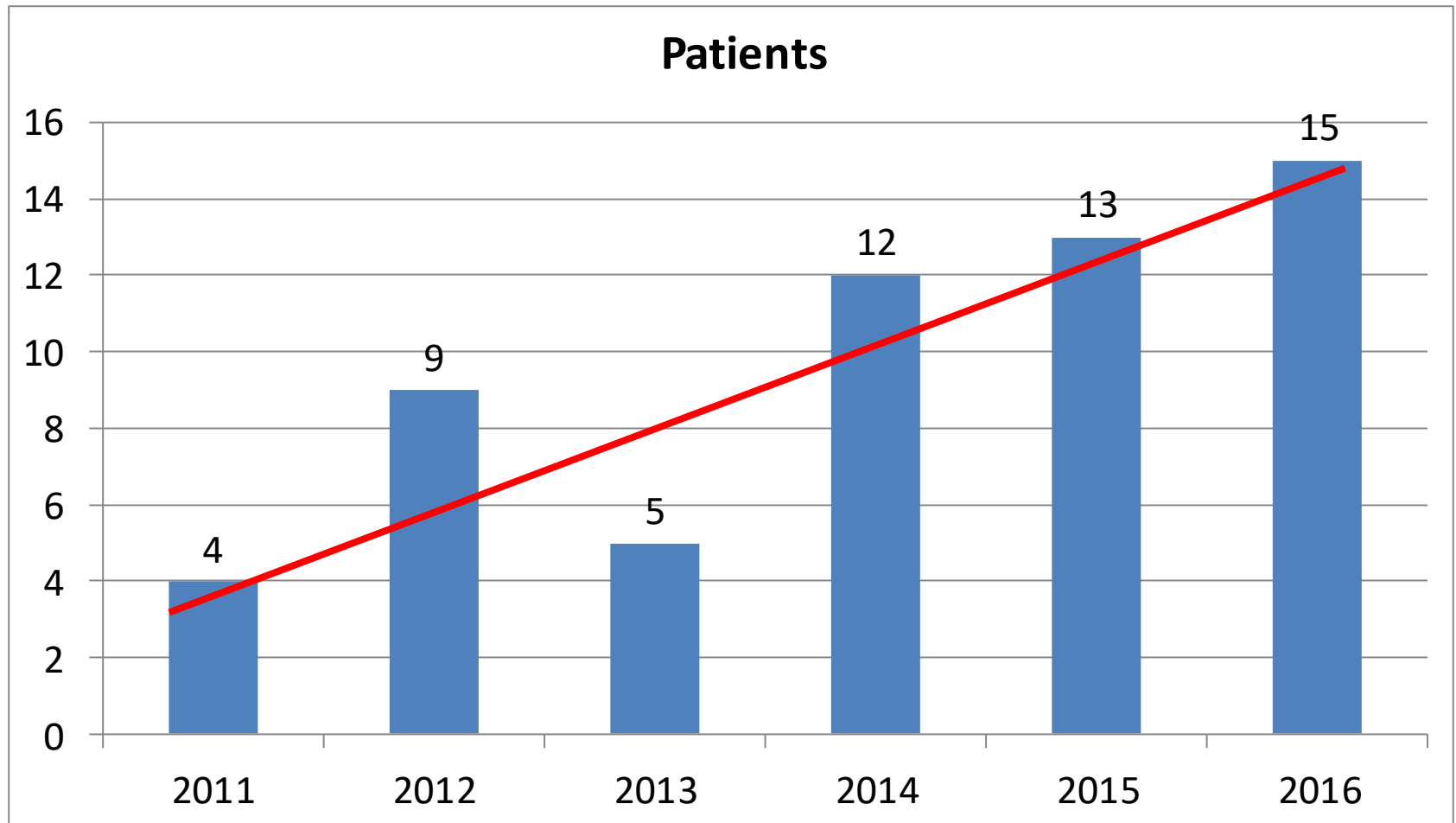
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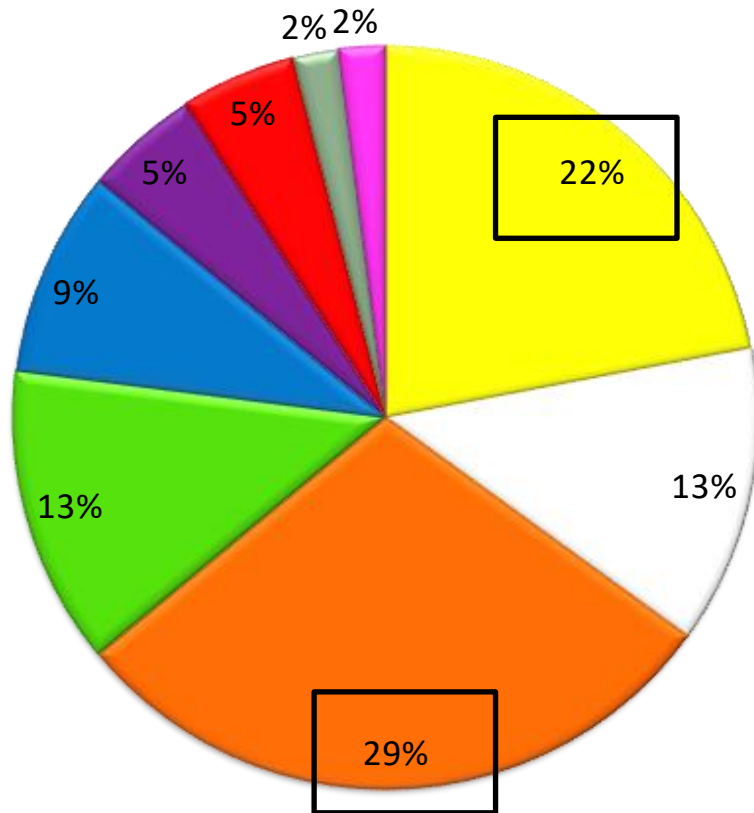
PEDIATRIC CRRT PROGRAM

- Structured CRRT program starting from 2011
- Pediatric Nephrology Unit:
 - Multifiltrate[®] Fresenius, Carpediem[®] Bellco
 - In close cooperation with PICU, PCICU, post OLT ICU and NICU

N° OF PATIENTS PER YEAR Extracorporeal therapies



DIAGNOSTIC CATEGORIES



MULTIPLE ORGAN DYSFUNCTION SYNDROME

CARDIAC SURGERY

HAEMOLYTIC UREMIC SYNDROME

ONCOEMATOLOGIC

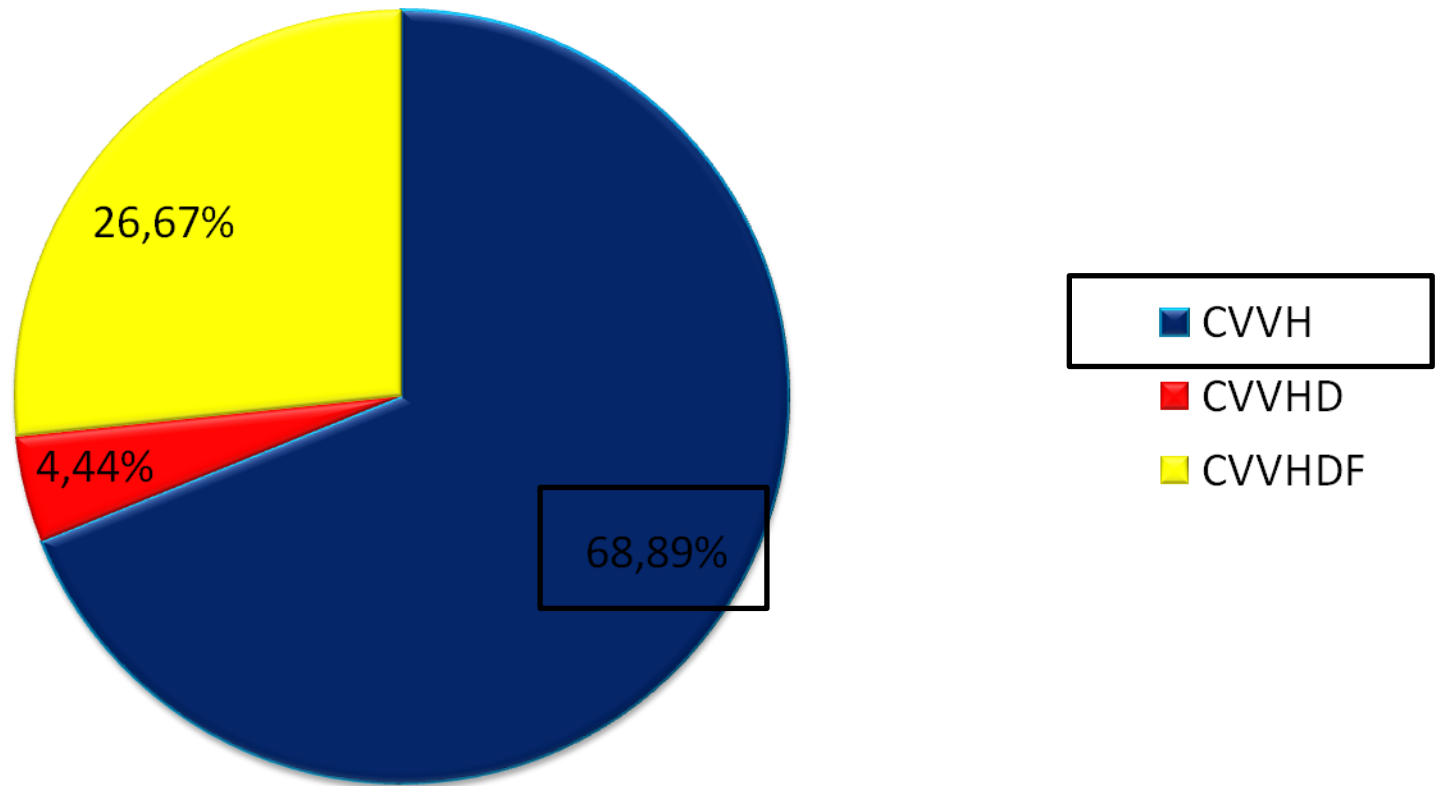
POST-ORTHOTOPIC LIVER TRANSPLANTATION

METABOLIC DISEASE

NEPHROTIC SYNDROME

BIRTH ASPHYXIA

TYPE OF CRRT



PATIENTS CHARACTERISTICS

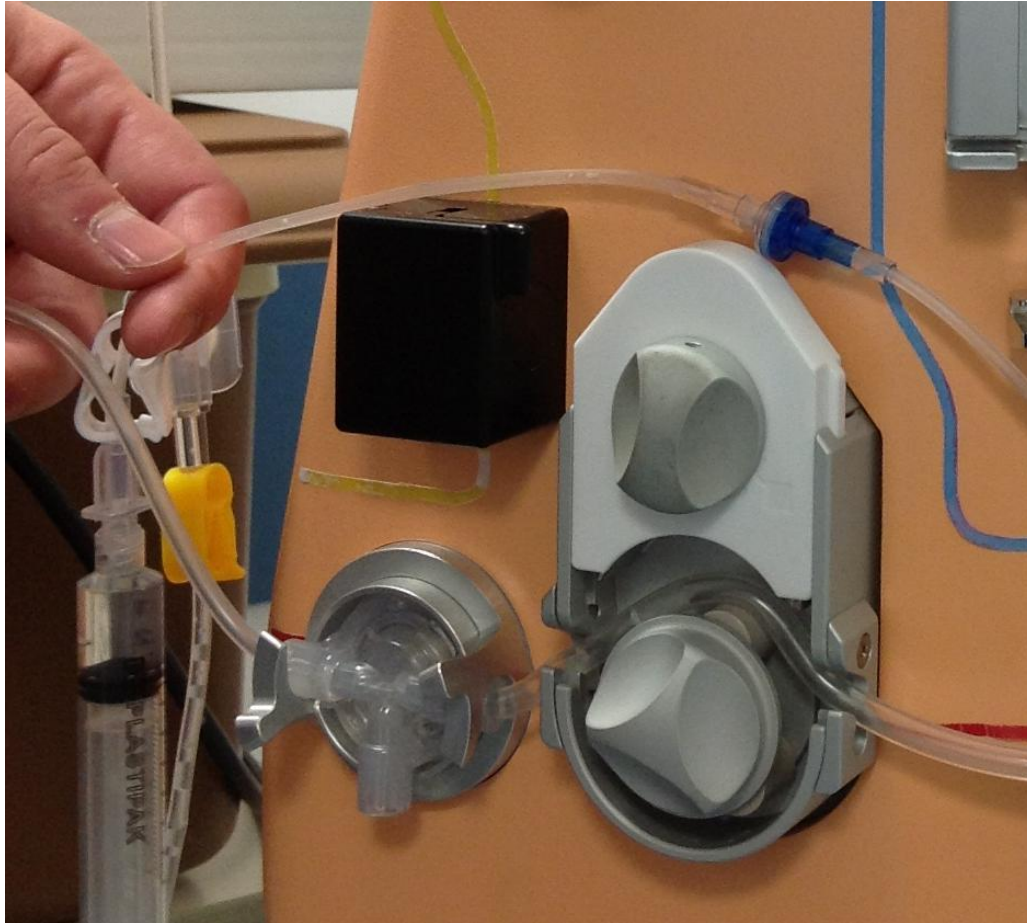
2011-2016 Overall Cohort

YEAR	N°	AGE (YEARS)	WEIGHT (KG)	N° OF SESSIONS	TOTAL HOURS
2011	4	1.3 (0.8-2.0)	10.7 (9.7-12.6)	2.5 (1.2-6.7)	25 (22.5-27.5)
2012	9	3.1 (2.3-7.9)	13 (8.7-19.6)	4 (3-14)	24 (23.5-62)
2013	5	4.3 (3.5-11.7)	17 (15.7-28.5)	4 (4-6)	120 (75-162)
2014	12	3.4 (0.3-5.8)	9.5 (3.4-15.7)	4.5 (1.7-7.2)	35.5 (13.7-60.5)
2015	13	1.7 (0.1-4.4)	5.5 (4.4-11)	3 (1.2-4.7)	43.5 (23.2-83)
2016	15	4.0 (1.7-9.6)	15 (10-28.5)	4 (2-5)	32 (16.7-54.5)
Overall	60	3.4 (1.1-7.4)	11 (6.3-16.8)	4 (2-6)	40 (17.5-62)

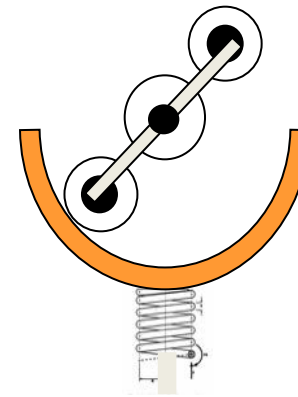
CARDIO-RENAL PEDIATRIC DYALYSIS EMERGENCY MACHINE (CARPEDIEM®)



New Technical issues: small pumps for small tubings



Peristaltic pumps with cradle movements instead of the rotors



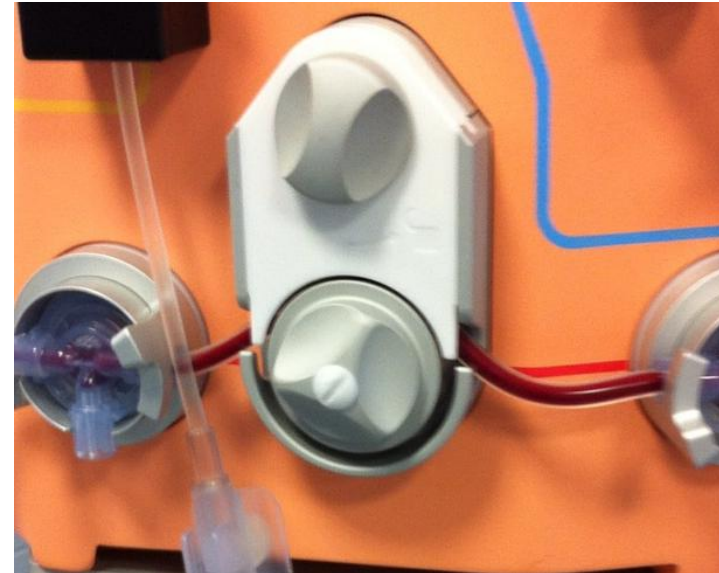
to reduce risk of hemolysis and traumatic injury of the small circuit lines

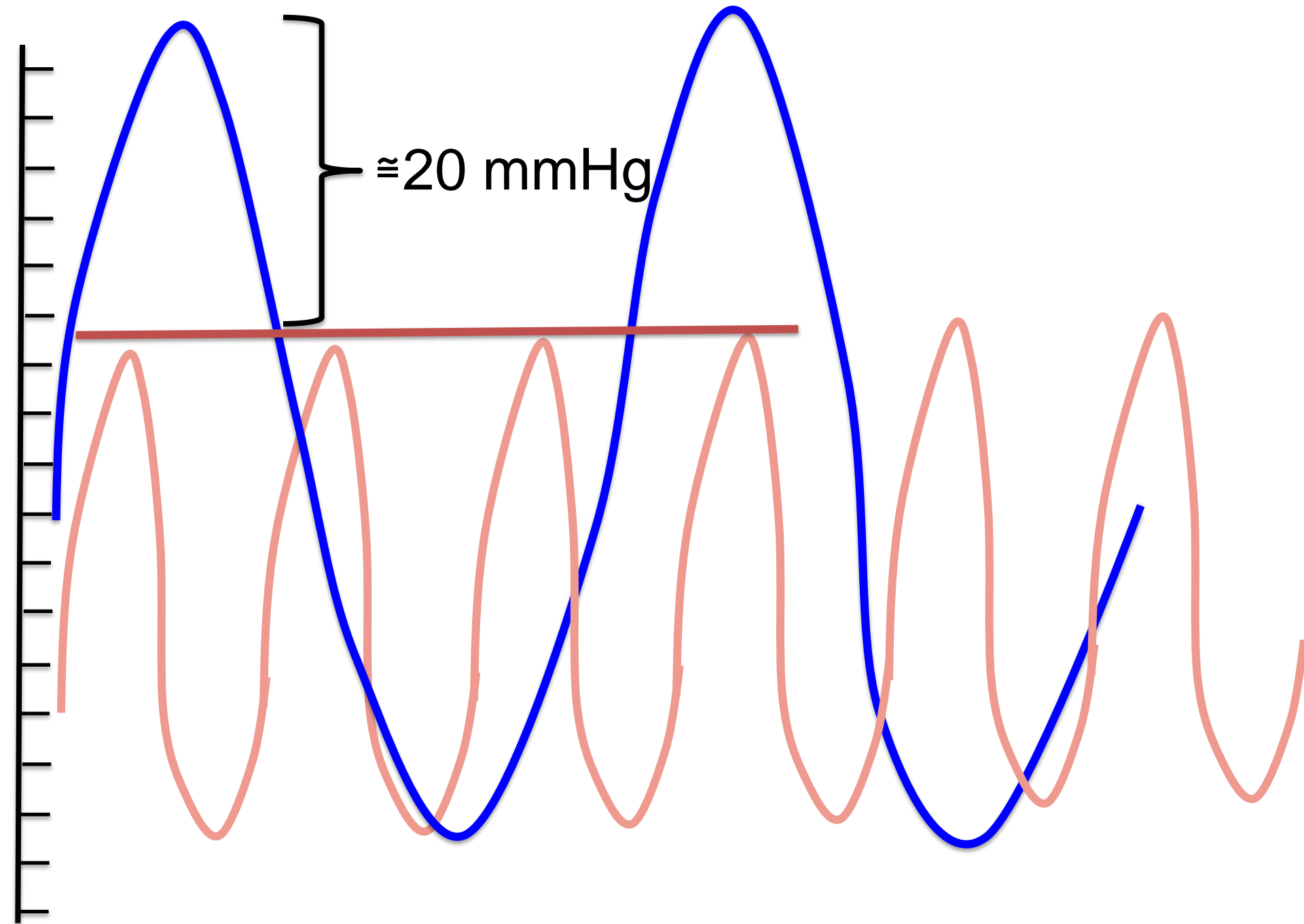
Large roller pump



The machine cuts the pressure

Small roller pump





≈ 20 mmHg

THE NEONATAL CRRT EXPERIENCE

CVC size

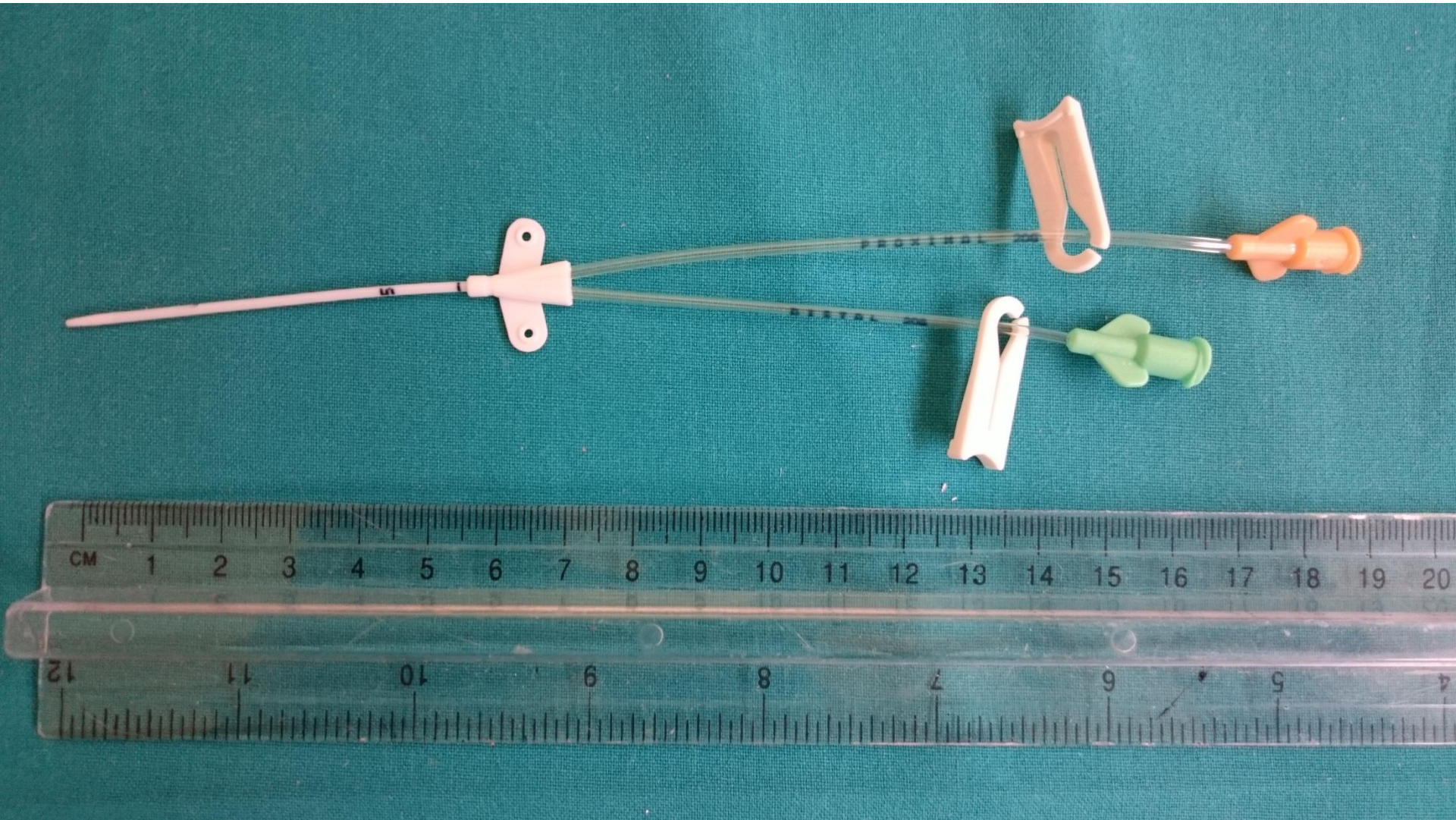
- The largest diameter that is safe for the child
- The smallest catheter that will achieve the necessary flow easily
- The minimum length to position the tip for optimal flow



5 French/5 cm CATHETER IS THE BEST CHOICE

THE NEONATAL CRRT EXPERIENCE

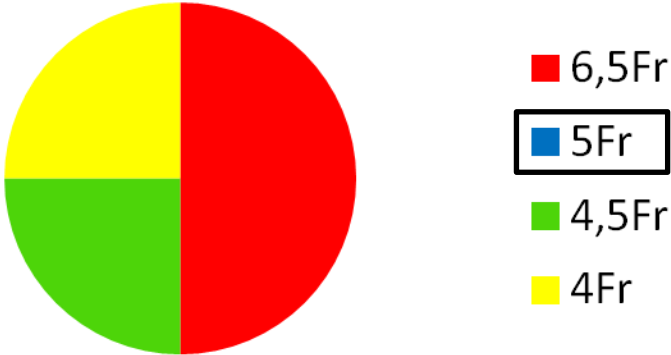
CVC size



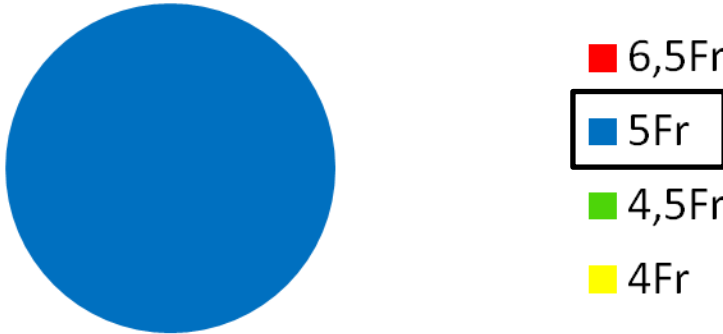
THE NEONATAL CRRT EXPERIENCE

CVC size

2014



2015-2016



CRRT MONITORS (CARPEDIEM[®], BELLCO)

SET	PRIMING VOLUME	FILTER SURFACE (m2)	MEMBRANE	Qb RANGE (ml/min)	Qr or Qd RANGE (ml/h)	UF RANGE RATE (ml/h)
025	41	0.25	Polyethersulfone	2/50	10/600	0/40
015	33	0.15	Polyethersulfone	2/50	10/600	0/40
0075	27	0.075	Polyethersulfone	2/50	10/600	0/40

THE NEONATAL CRRT EXPERIENCE

Priming volume

N°	CVC (Ch)	Location	Qb (ml/min)	Qb (ml/kg/min)	Filter (m2)	Priming	Eparin dose (UI/kg/hr)
1	6.5	RJV	20	5.8	0.15	NS	Bolus + 5
2	4	LSV	2	1.2	0.075	NS	Bolus + 15
3	6.5	RFV	20	5.7	0.15	4% albumin	Bolus + 10
4	4,5	RJV	2	0.7	0.15	4% albumin	10
5	5	RJV	6	3.6	0.075	4% albumin	10
6	5	RJV	10	3.5	0.15	4% albumin	Bolus + 20
7	5	RFV	5	1.4	0.075	NS	0
8	5	RJV	15	3.2	0.25	NS	40
9	5	RJV	7	1.6	0.15	NS	Bolus + 10
10	5	RFV	7	1.5	0.25	4% albumin	10
11	5	RFV	10	4.3	0.25	4% albumin	0
				3.2 (IQR 1.5-4)			

THE NEONATAL CRRT EXPERIENCE

Heparinization Protocol

BEFORE TREATMENT

1. Obtain:

PT/PTT

Platelet Count

ACT baseline

2. In the absence of coagulopathy (ACT <150):

Bolus of 25 units/kg (maximum x2)

THE NEONATAL CRRT EXPERIENCE

Heparinization Protocol

DURING TREATMENT

Start Heparin infusion (ACT >180) at 10units/kg/hr

ACT<180 increase heparin 1unit/kg/hr

ACT>220 decrease heparin 1unit/kg/hr

THE NEONATAL CRRT EXPERIENCE

Catheter locking solutions

LOCK WITH UROKINASI 5000 UNITS FOR
LUMEN FOR TWO HOURS

WORK IN PROGRESS

THE NEONATAL CRRT EXPERIENCE

Patients Characteristics

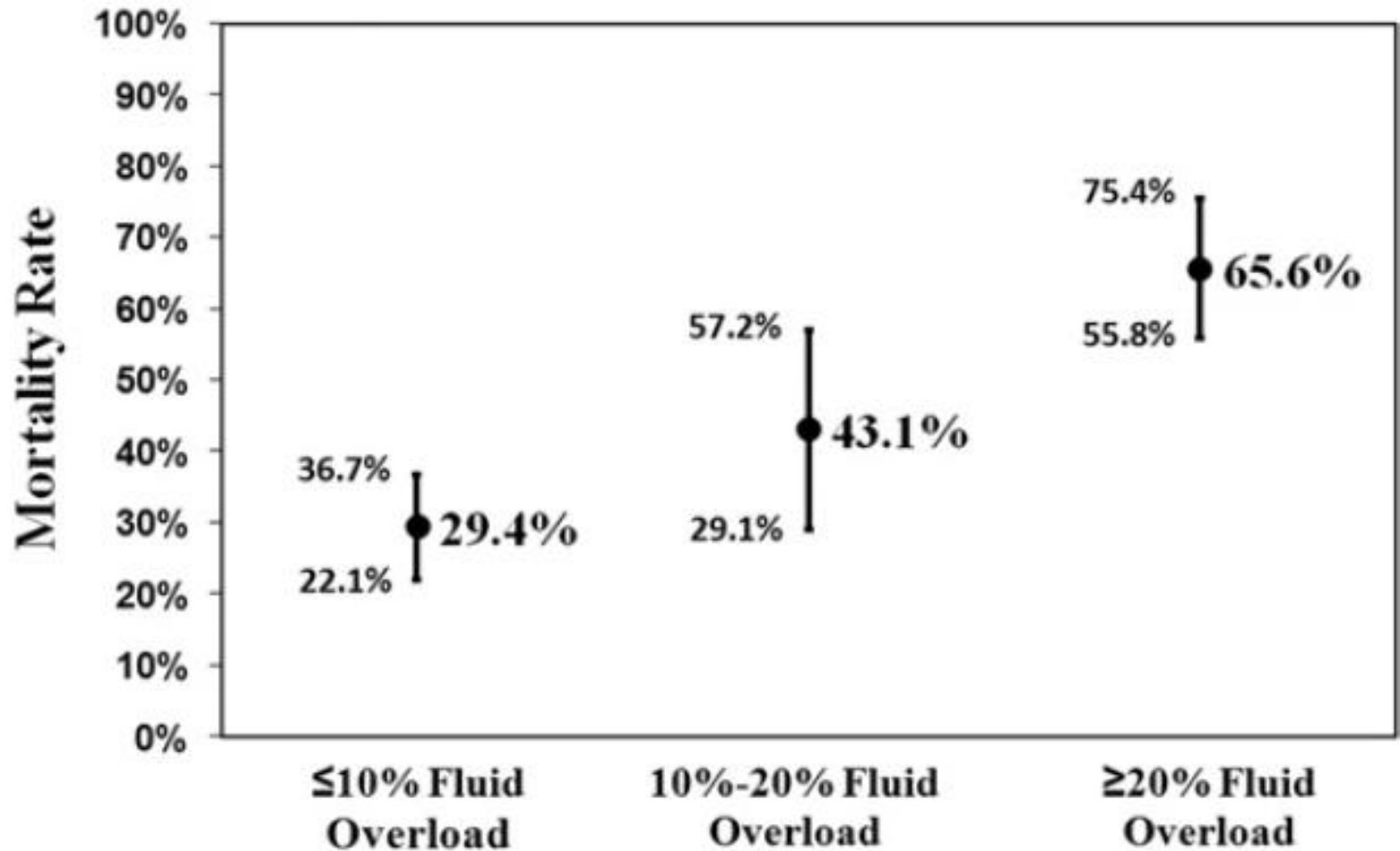
N°	AGE (DAYS)	WEIGHT (gr)	DIAGNOSTIC CATEGORIES	N° SESSION	HOURS	FLUID OVERLOAD	OUTCOME
1	7	3425	Birth Asphyxia	4	80	32%	End Stage Renal Disease
2	17	1610	Multiple Organ Dysfunction Syndrome	1	24	23%	Death
3	13	3500	Post-Cardio Pulmonar Bypass	21	321	20%	Normal Renal Function
4	135	3000	Fetal hydrops	1	8	23%	Death
5	36	1680	Birth Asphyxia	17	338	89%	Death
6	40	3000	Atypical Haemolytic Uremic Syndrome	4	69	15%	Normal Renal Function

THE NEONATAL CRRT EXPERIENCE

Patients Characteristics

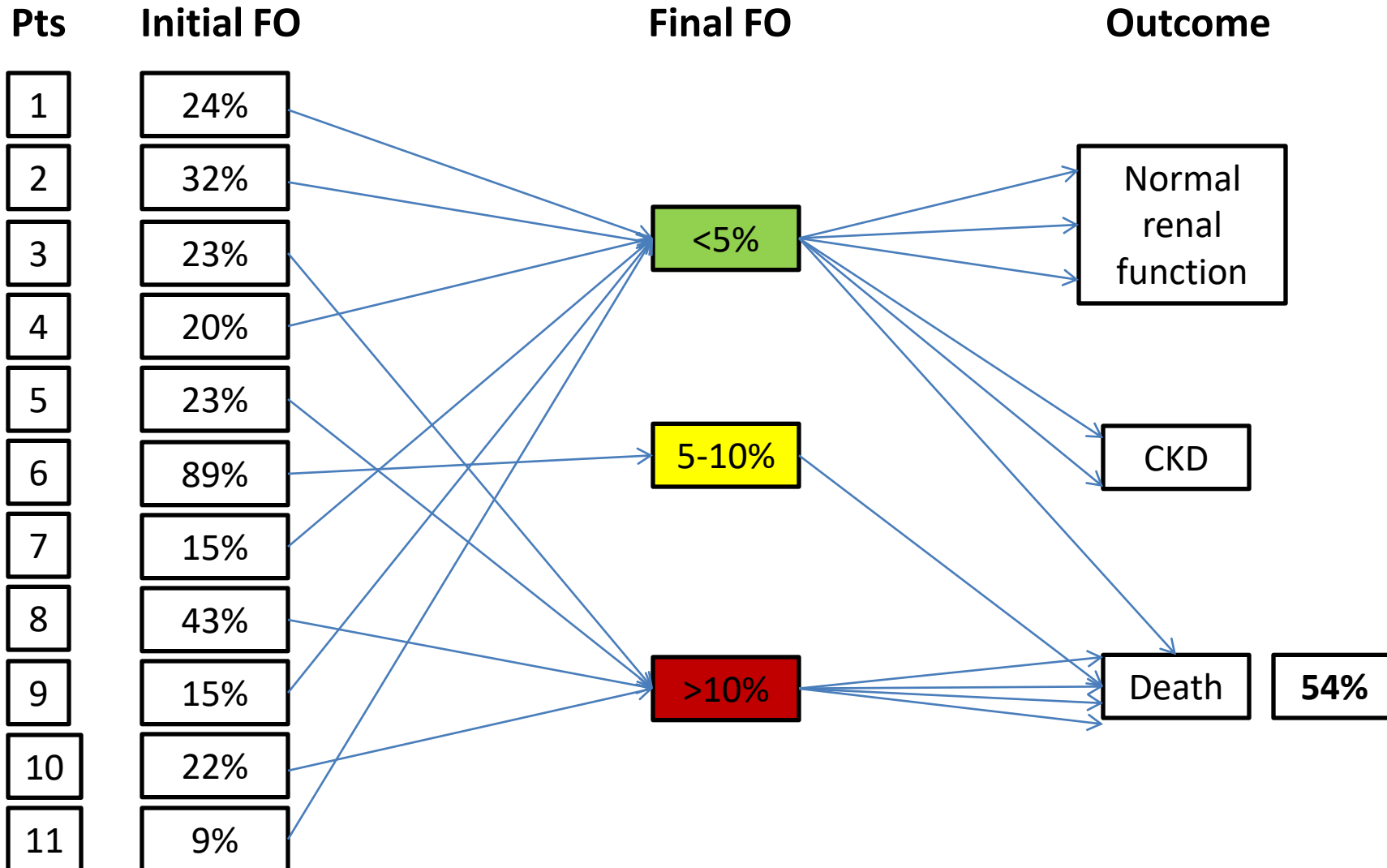
N°	AGE (DAYS)	WEIGHT (gr)	DIAGNOSTIC CATEGORIES	N° SESSION	HOURS	FLUID OVERLOAD	OUTCOME
7	10	3500	Diaphragmatic hernia	8	149	43%	Death
8	180	4650	Congenital Nephrotic Syndrome	4	39	15%	End Stage Renal Disease
9	1	4275	Fetal hydrops	2	33	23%	Normal Renal Function
10	175	4600	Post-Cardio Pulmonar Bypass	12	300	22%	Death
11	9	2300	Metabolic disease	2	28	9%	Death
	17 IQR(11-87)	3425 IQR(2650-3890)		Tot 76	Tot 1376.5	23.2% (IQR 18-28)	

Fluid Overload and Mortality in Children Receiving Continuous Renal Replacement Therapy: The Prospective Pediatric Continuous Renal Replacement Therapy Registry



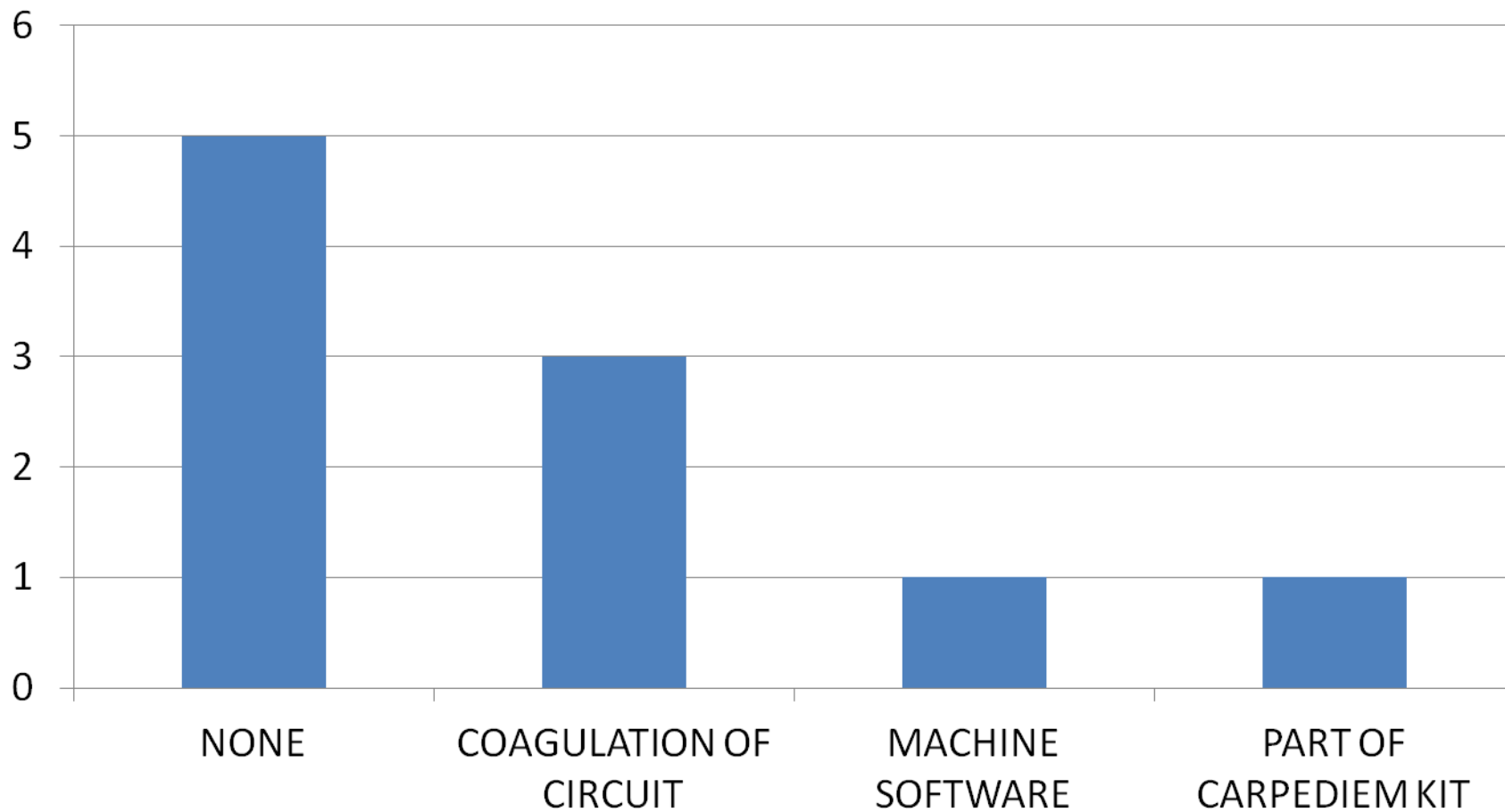
THE NEONATAL CRRT EXPERIENCE

Fluid overload and outcome



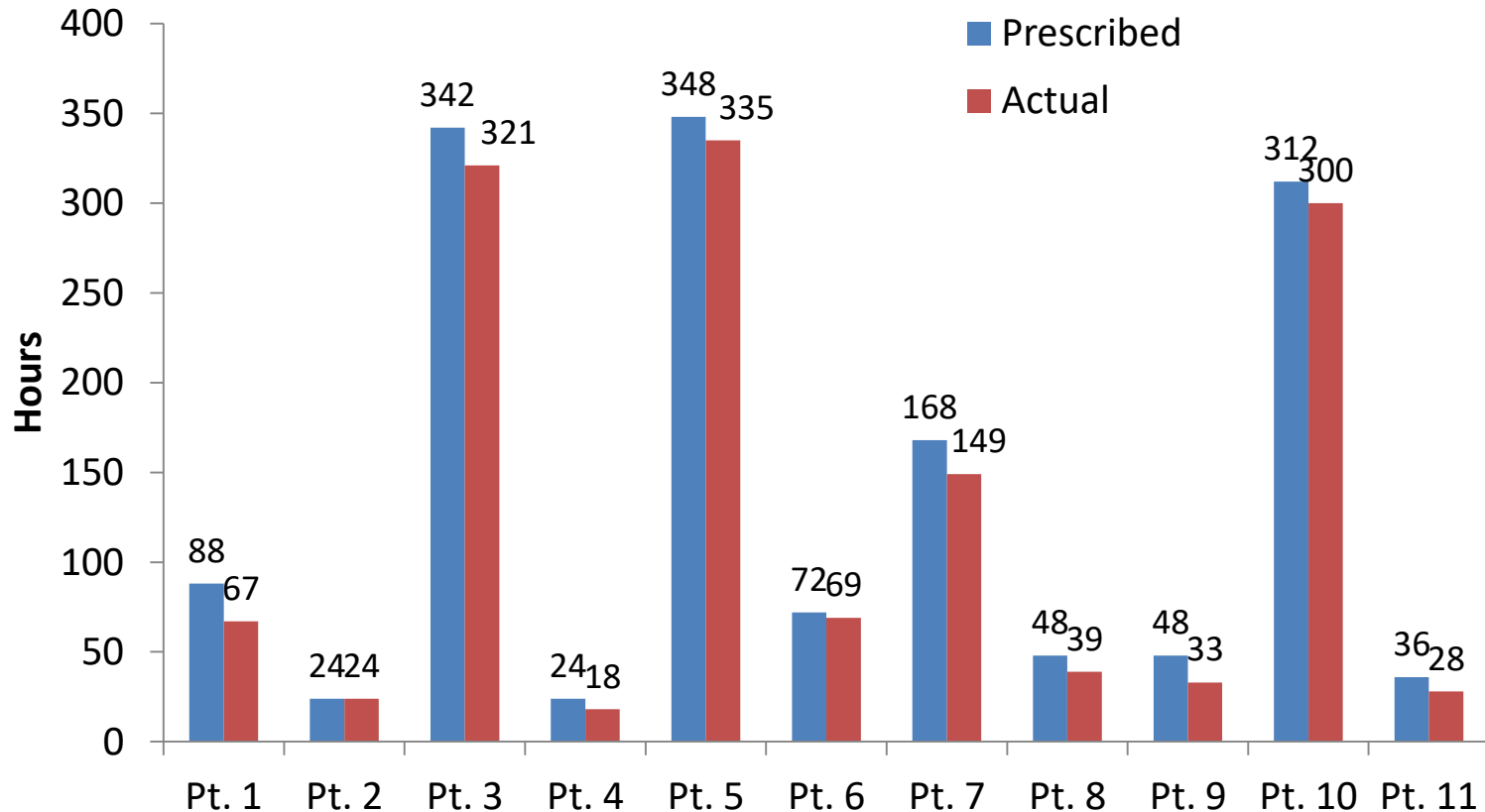
THE NEONATAL CRRT EXPERIENCE

Treatment Complication



The CARPEDIEM[®] EXPERIENCE

Total Session Time



NEPHROLOGIST

INTENSIVE
PHYSICIAN

DIALYSIS
NURSE





THANK YOU FOR ATTENTION