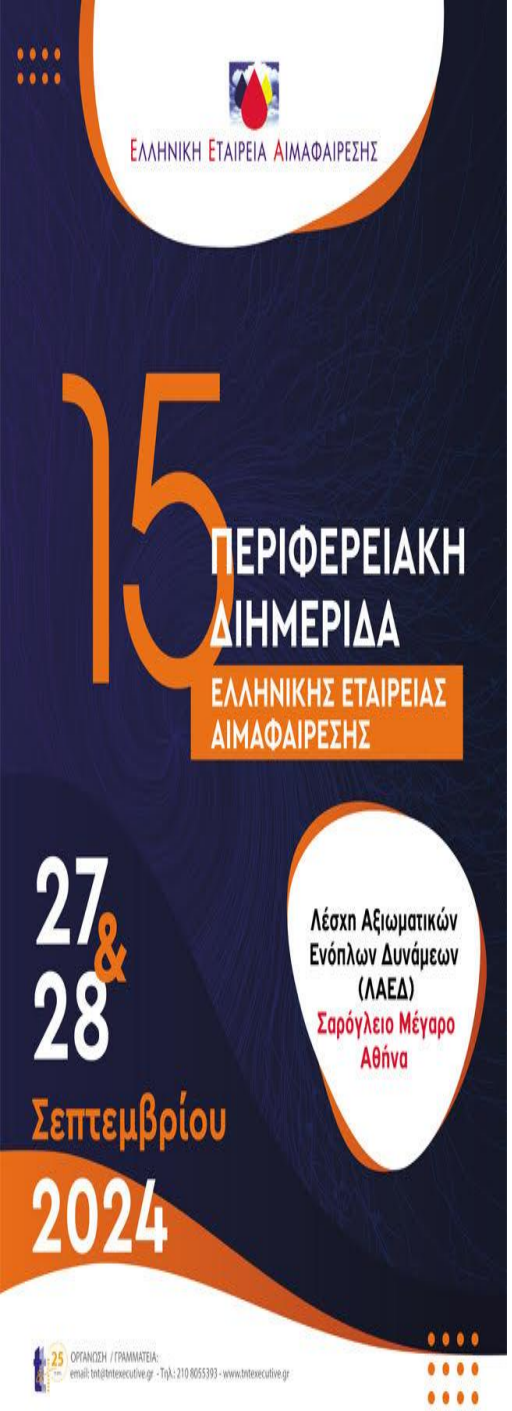
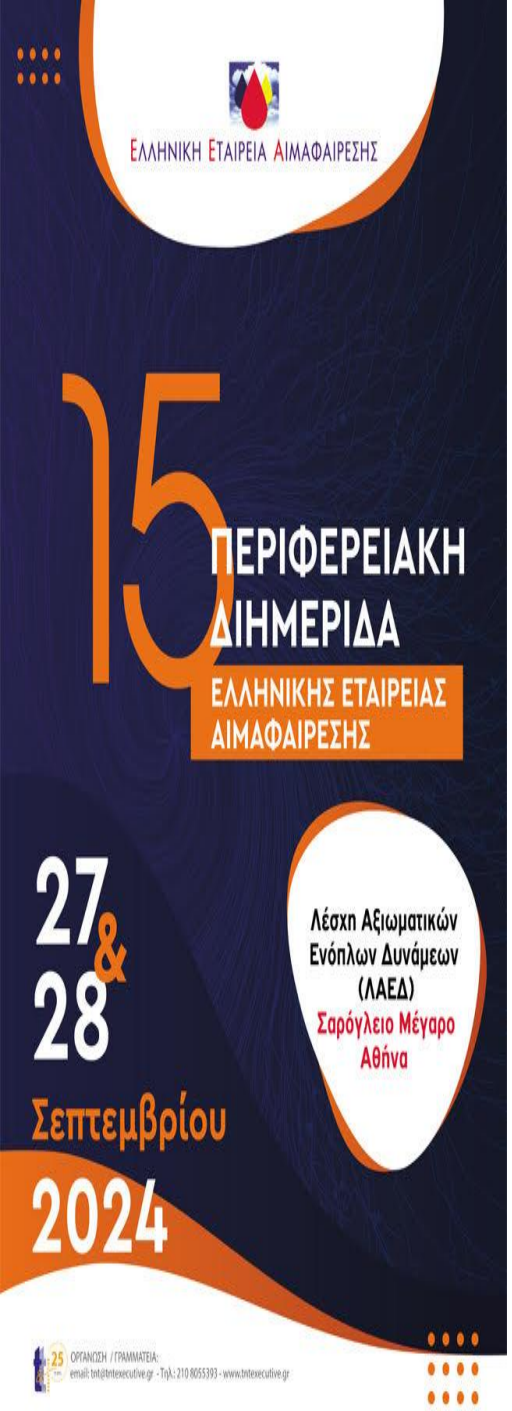


Ο ρόλος της θεραπευτικής αφαίρεσης στη ΜΕΘ Χρειάζεται ο Νεφρολόγος;

Χρήστος Πλέρος
Νεφρολόγος
ΠΑΓΝΗ



Θεραπευτική αφαίρεση στη ΜΕΘ

- *Ενδείξεις θεραπευτικής αφαίρεσης*
- *Συχνότητα – επίπτωση*
- *Ιδιαιτερότητες ασθενών και περιβάλλοντος*
- *Τεχνικά ζητήματα*
- *Σήψη*
- *Χρειάζεται ο νεφρολόγος;*

Table 1 Indications for therapeutic plasma exchange (TPE) in the ICU: absolute (likely or less likely be used), relative, and rescue therapy

Disease	Rationale	Replacement fluid	Adjunct therapeutic options	Strategy[a] and Endpoints	Parameters to monitor	Additional comments
Absolute indications: disorders for which TPE is a recognized first-line treatment [2]						
Acute inflammatory demyelinating polyradiculoneuropathy (Guillain-Barré syndrome)	Removal of antibodies	Albumin or plasma	IVIG	1–1.5 TPV, 5–6 sessions over 10–14 days *until* clinical improvement	Clinical response	Consider TPE if failed to respond to IVIG and/or impending respiratory failure
Anti-glomerular basement membrane disease (Goodpasture syndrome)	Removal of pathogenic autoantibodies (including anti-GBM antibodies)	Albumin; plasma if bleeding	Corticosteroids, cyclophosphamide, rituximab	1–1.5 TPV daily or on alternate days over 10–20 days *until* disease control	Renal function Clinical response	Anti-GBM antibodies may fall to undetectable levels within 2 weeks; TPE course should be ≥ 10–20 days and should continue until resolution of glomerular or pulmonary injury The presence or absence of antibody should not guide decisions to initiate or end TPE
Hyper-viscosity syndrome (in hypergammaglobulinemia, especially Waldenström macroglobulinemia)	Removal of paraproteins, thereby reducing the plasma viscosity	Albumin or Albumin/saline	Systemic chemotherapy or immunotherapy	1–1.5 TPV daily *until* symptoms subside, most often 1–3 procedures	Clinical response M component (mainly IgM levels)	Symptoms are more reliable than concrete values of viscosity or immunoglobulins to guide therapy
Catastrophic antiphospholipid syndrome	Removal of antibodies (including antiphospholipid antibodies), cytokines, and complement factors; administration of coagulation factors	Plasma (± albumin)	Anticoagulation, corticosteroids, IVIG, rituximab or eculizumab	1–1.5 TPV daily or alternate days; *until* clinical response	Clinical response	
Myasthenia gravis	Removal of autoantibodies (including antiacetylcholine receptor antibodies) and immunomodulation	Albumin	Cholinesterase inhibitors, corticosteroids, immunosuppression, IVIG, thymectomy, eculizumab	1–1.5 TPV; 3–6 sessions over 10–14 days, *until* disease control	Clinical response	More effective if initiated during myasthenic crisis, especially with bulbar or severe generalized response; more effective than IVIG in patients with MuSK-Ab
N-Methyl-D-aspartate receptor antibody encephalitis	Removal of antibodies (including anti-neuronal autoantibodies)	Albumin	High dose corticosteroids, IVIG, occasionally rituximab or cyclophosphamide Tumor resection (when tumor is present)	1–1.5 TPV; 5–12 sessions over 1–3 weeks *until* clinical response	Clinical response	Check for ovarian tumors and other tumors (germ cell tumors, carcinoma, teratoma, lymphoma)

Bauer et al. Intensive Care Med 2022

Table 1 (continued)

Disease	Rationale	Replacement fluid	Adjunct therapeutic options	Strategy[a] and Endpoints	Parameters to monitor	Additional comments
Thrombotic thrombocytopenic purpura	Administration of ADAMTS13 protease and removal of anti-ADAMTS13 autoantibodies	Plasma	Corticosteroids, rituximab, Caplacizumab (recombinant ADAMTS13?)	Daily *until* platelet count > 150 × $10.^9$/L, LDH approaching normal and resolution of non-fixed neurologic symptoms then Continue for 2 more sessions then stop	Platelet count, LDH, ADAMTS13 activity	Recovery of ADAMTS13 activity to > 10% within 7 days is associated with clinical response
Acute liver failure[a]	Removal of albumin-bound and water-soluble toxins Replacement of plasma proteins including clotting factors Immunomodulation Reduction of proinflammatory response	Plasma	Multiorgan support	High-volume TPE if possible (target 8–12 L); otherwise, 1–1.5 TPV daily *until* clinical improvement or transplantation	Clinical response Supportive care as a bridge to liver transplantation	Always consider TTP in the differential in specific scenarios (e.g., pregnancy and acute liver failure) Supportive care may improve nontransplant outcome Support care may stabilize while awaiting liver transplant
Relative indications: Disorders for which TPE is a recognized second-line treatment (alone or combined)						
Thyroid storm (refractory)	Removal of autoantibodies, catecholamines, and cytokines	Plasma, albumin	Propylthiouracil, corticosteroids, ß-blockers, cholestyramine, organ support	Daily to every 3 days, *until* control of systemic response	Clinical response	Although a category II per 8th ASFA guidelines, TPE could be considered in refractory cases
ANCA-associated vasculitis with diffuse alveolar hemorrhage	Removal of autoantibodies and inflammatory mediators	Plasma	Corticosteroids, rituximab, cyclophosphamide	1–1.5 TPV daily or every other day *until* disease control	Clinical response (resolution of pulmonary hemorrhage)	PEXIVAS trial suggested no benefit on death or end stage kidney disease Now category II per recent ASFA update [73]
Acute disseminated encephalomyelitis	Removal of presumedly pathogenic autoantibodies	Albumin	Corticosteroids, IVIG	1–1.5 TPV every other day *until* disease control	Clinical response	
Thrombotic microangiopathy-complement-mediated (formerly known as atypical hemolytic syndrome (aHUS))	Recommended while investigations for TTP and other forms of TMA are in progress or if eculizumab is not available	Plasma	Eculizumab	1–1.5 TPV daily *until* TTP ruled out	Platelet count	
Autoimmune hemolytic anemia	Removal of pathogenic immune complexes, autoantibodies and complement components	Albumin	Corticosteroids, rituximab, IVIG, immunosuppression, monoclonal antibody therapy, splenectomy	TPV 1–1.5 daily *until* disease control	Clinical response	

Bauer et al. Intensive Care Med 2022

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Plasma exchange in the intensive care unit: A 10 year retrospective audit

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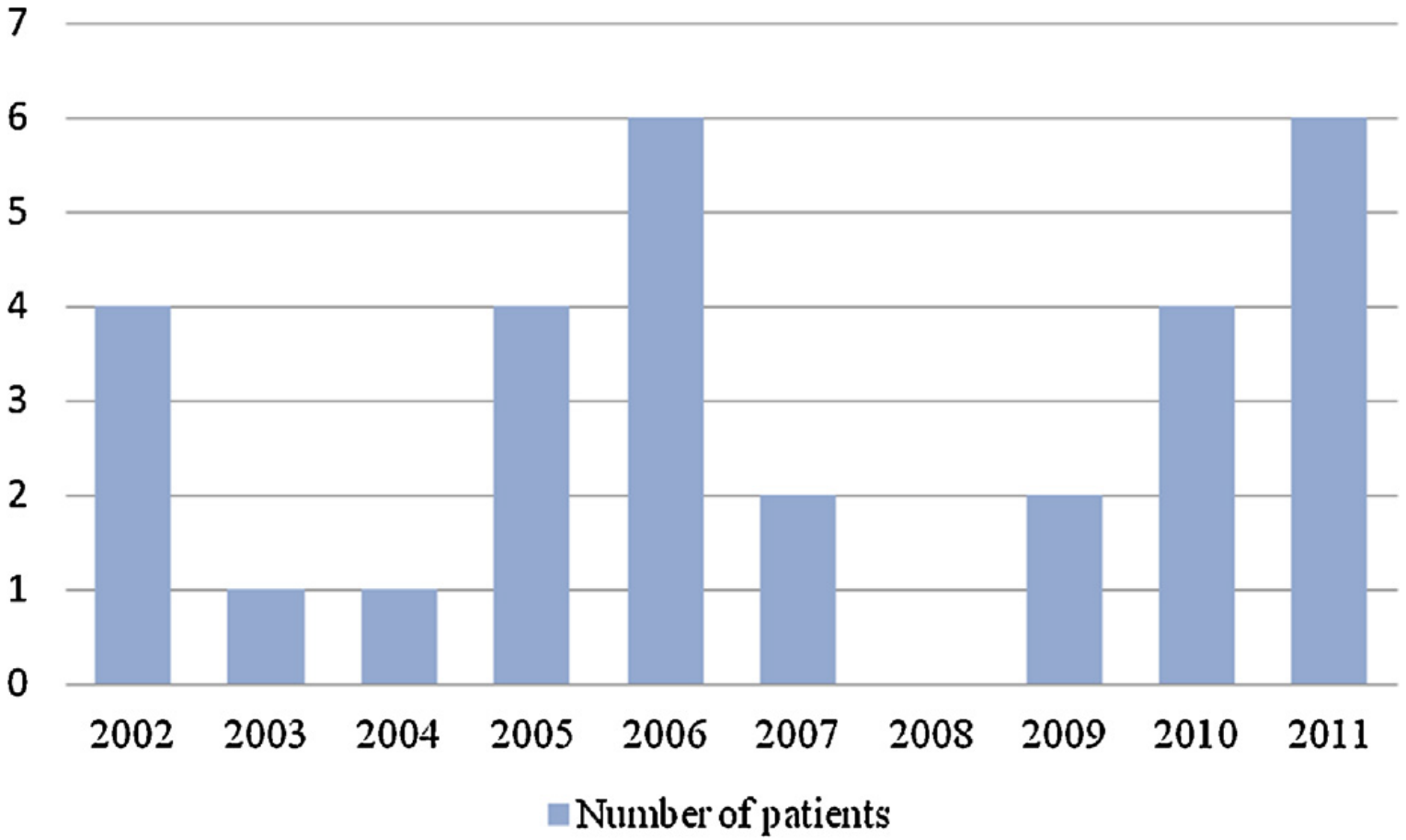

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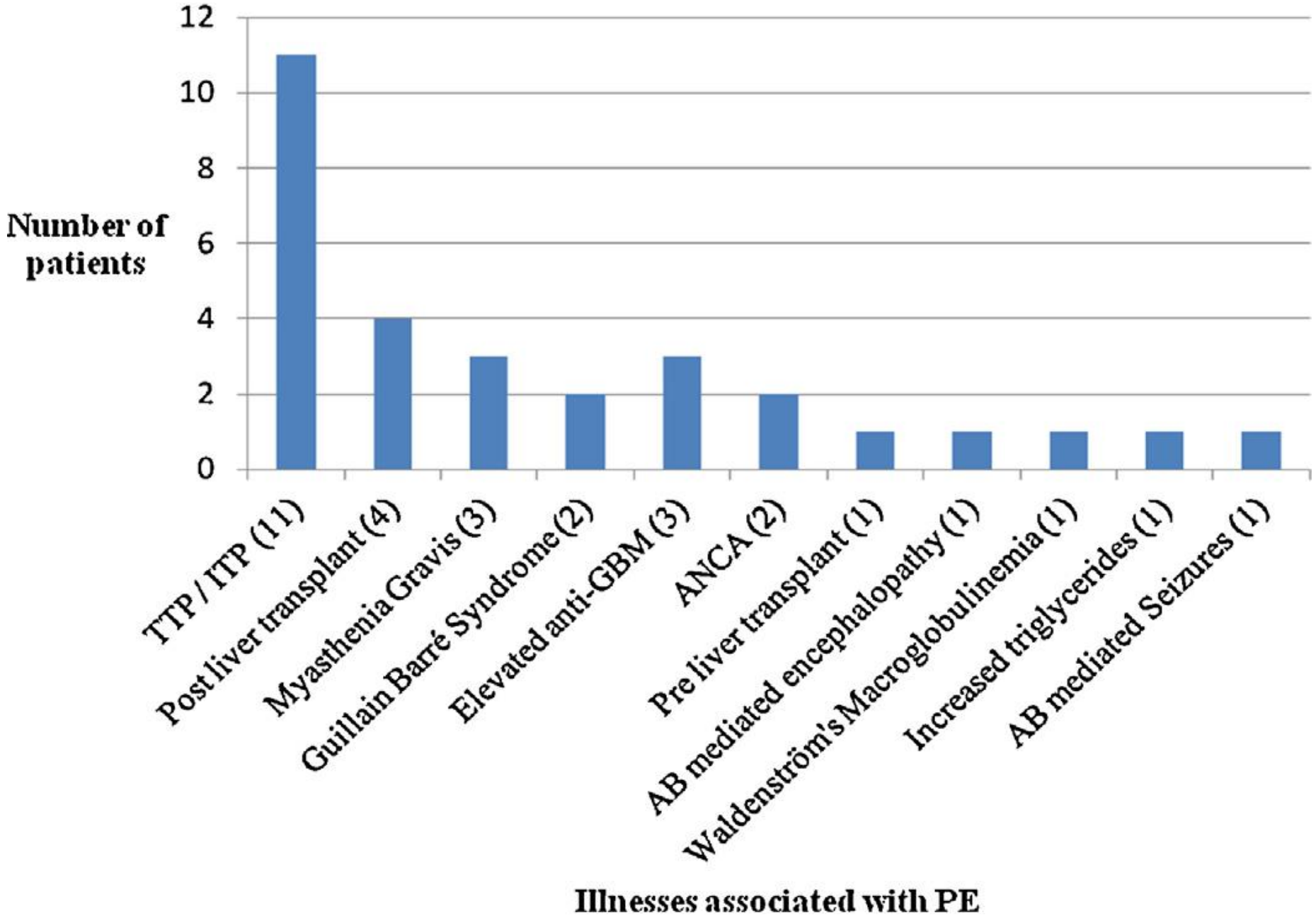

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Journal of Clinical Medicine
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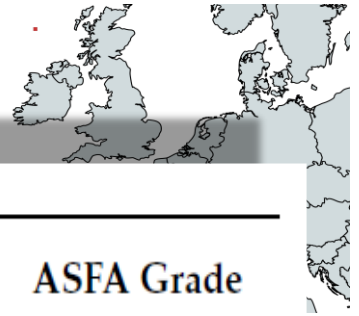


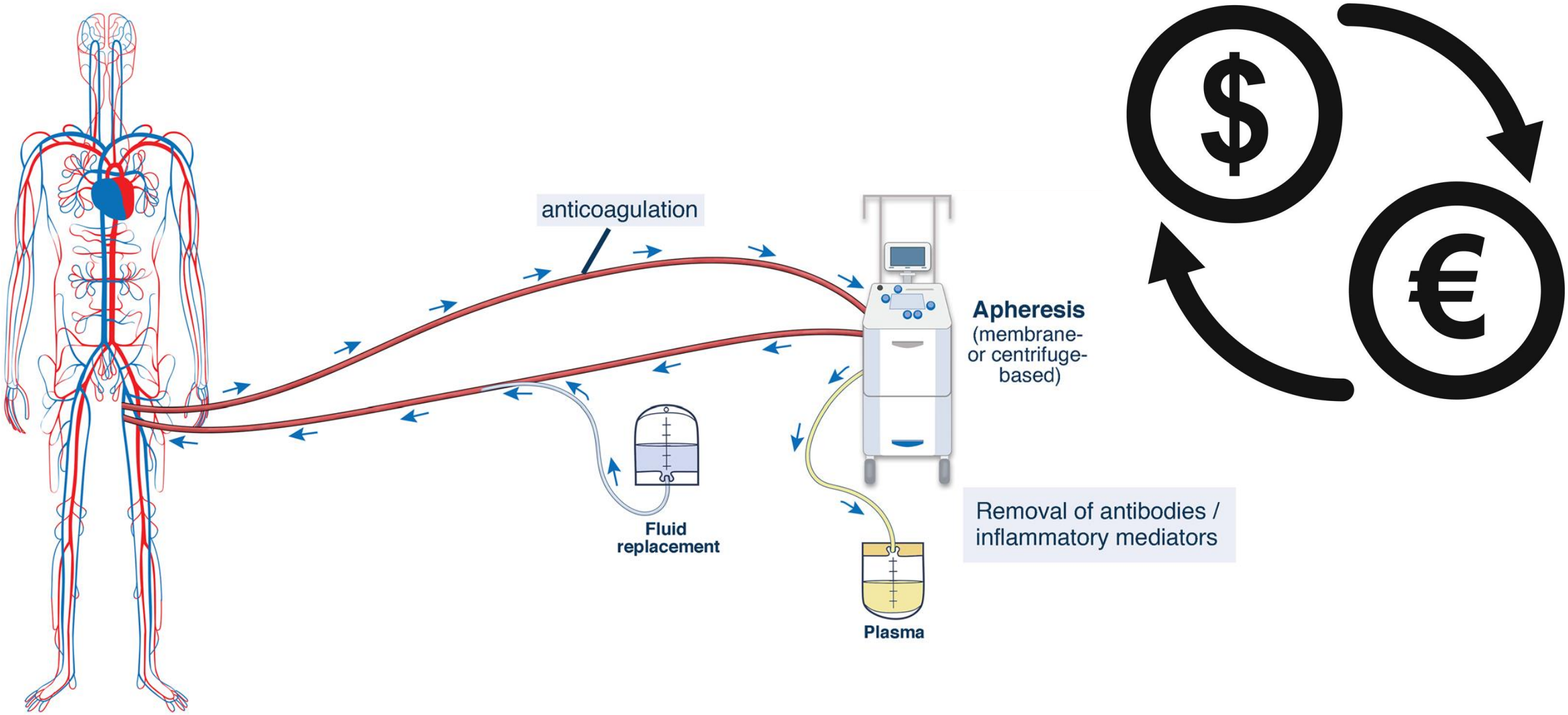
Article

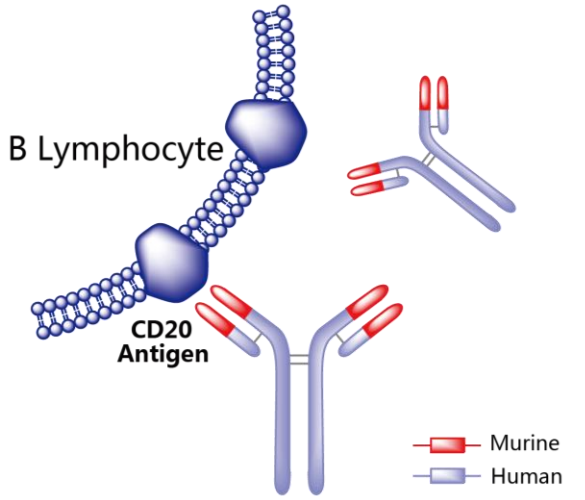
Indications and Outcomes of Patients Receiving Therapeutic Plasma Exchange under Critical Care Conditions: A R Car

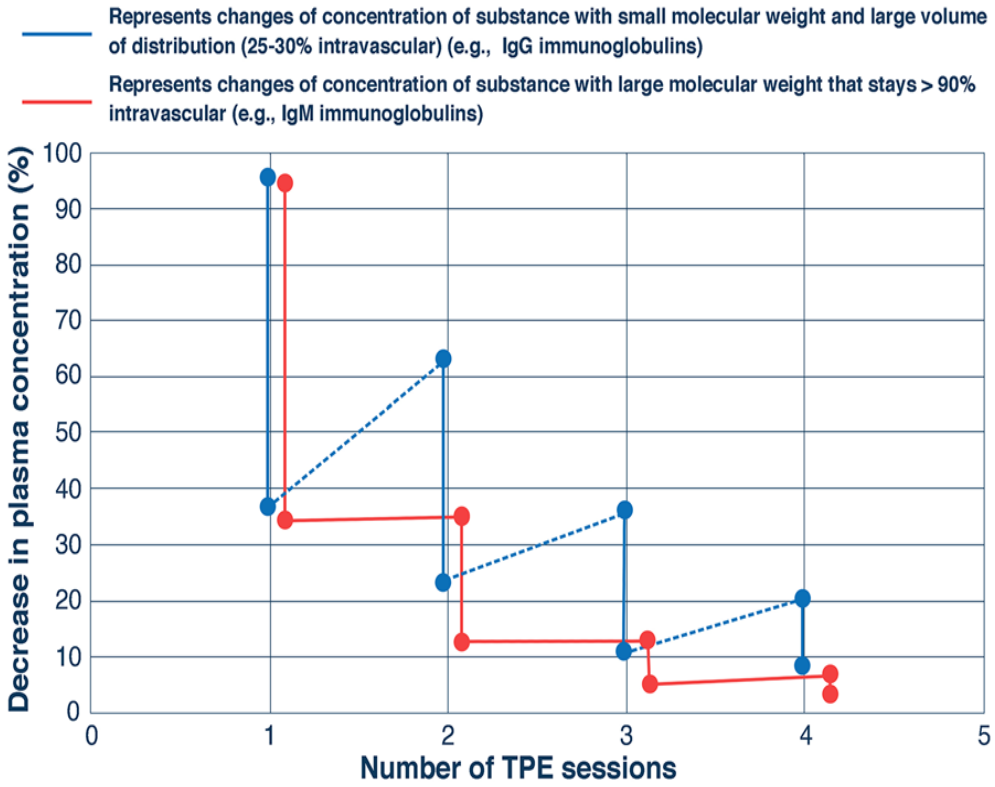
Alexan Christ and Sa

Indication	Number of Patients n (%)	Median TPE Sessions (IQR)	ASFA Category	ASFA Grade
Anti-IgLON5-associated encephalopathy	1 (0.95)	2	unclear	unclear
Systemic sclerosis	1 (0.95)	4	I	1A
Chronic inflammatory demyelinating neuropathy	1 (0.95)	1	I	1B
Postpartum microangiopathy	1 (0.95)	7	I or III	1A or 2C
Miller-Fisher Syndrome	1 (0.95)	1	I	1A
Polyradiculoneuritis	1 (0.95)	1	unclear	unclear
Paraneoplastic neurological syndrome	1 (0.95)	8	III	2C
Catastrophic antiphospholipid syndrome	1 (0.95)	4	I	2C
acute demyelinating neuropathy	1 (0.95)	1	unclear	unclear
Hyperviscosity in hypergammaglobulinemia	1 (0.95)	2	I	1B

Total=105


anticoagulation
Apheresis
(membrane-
or centrifuge-
based)
Fluid
replacement
Plasma
Removal of antibodies /
inflammatory mediators





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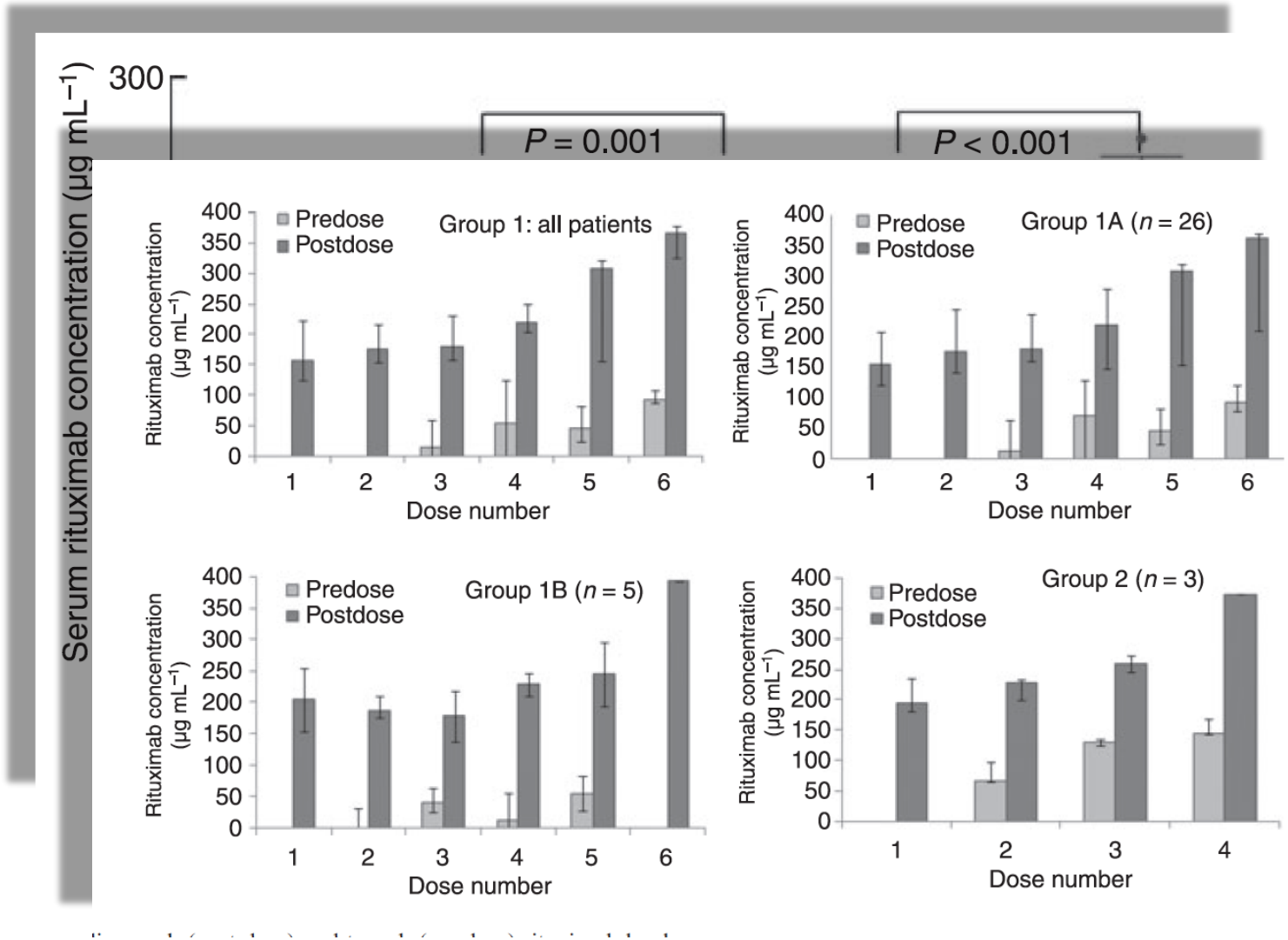
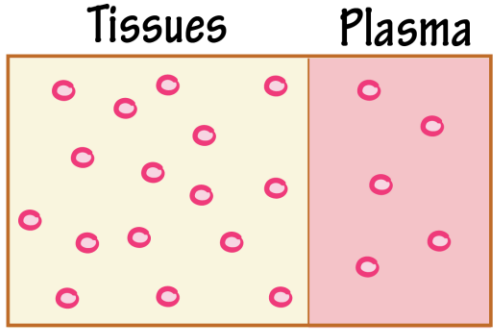


McDonald et al. J Thromb Haemost 2009

Volume of Distribution

$$\frac{F \times Dose}{TC} = Vd$$

- Vd – Volume of Distribution
- TC – Target Plasma Concentration
- F – Bioavailability



↑ Vd
- Small size
- Lipophilic
- Tissue protein bound

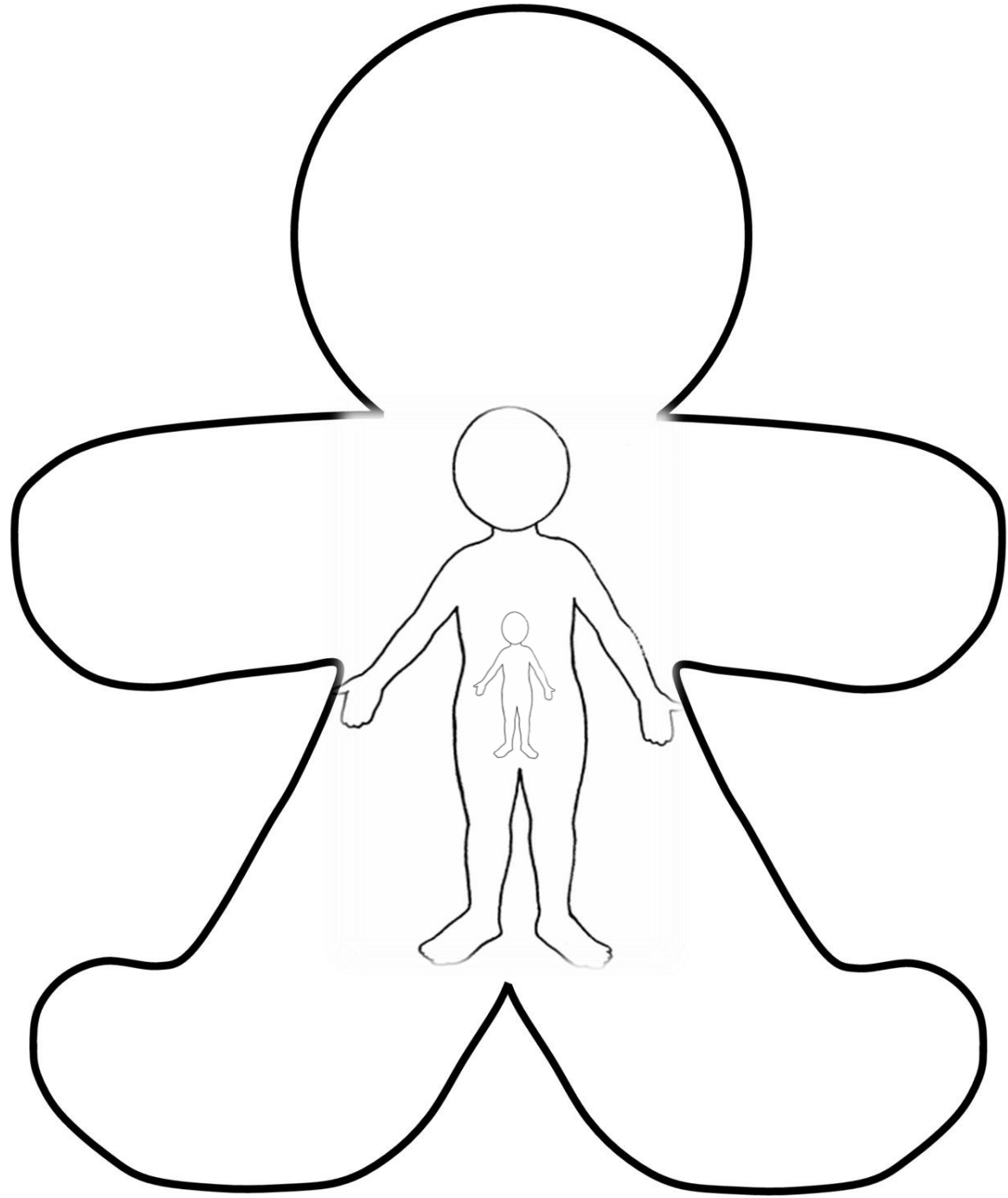
↓ Vd
- Large size
- Charged
- Plasma protein bound

Example

$$\frac{0.50 \times 500\cancel{mg}}{5\cancel{mg}/L} = 50\ L$$

Loading Dose

$$Dose = \frac{Vd \times TC}{F}$$



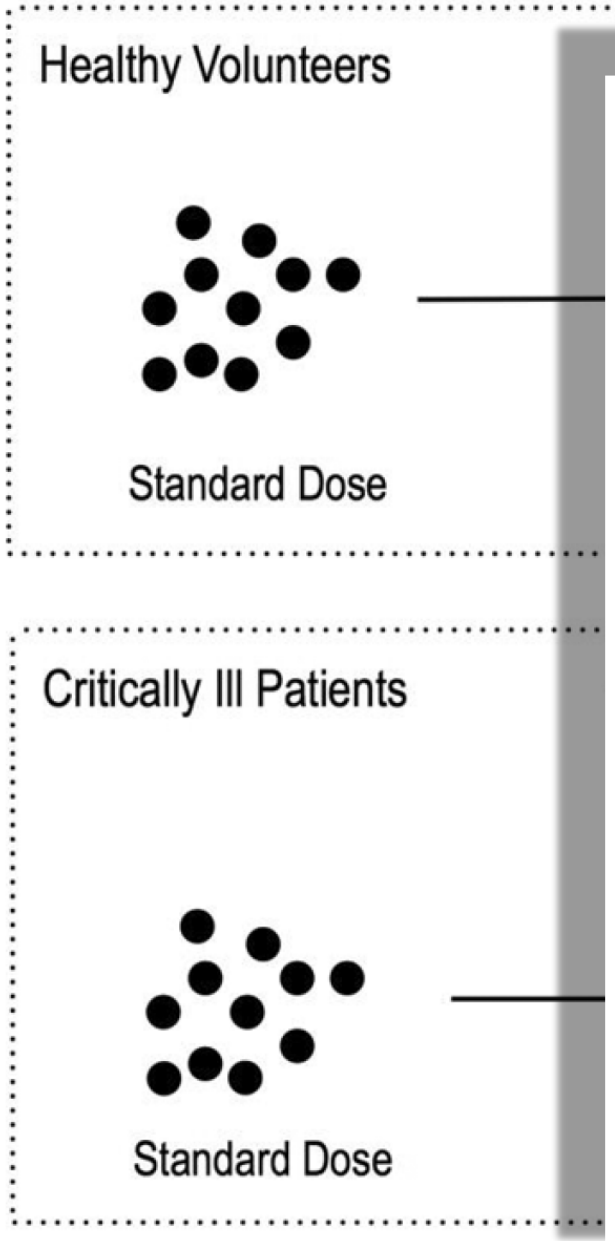


Table 1 Antibiotic Physicochemical Characteristics

Hydrophilic	Lipophilic
Beta-Lactams	Fluoroquinolones
Aminoglycosides	Macrolides
Glycopeptides	Lincosamides
Linezolid	Tetracyclines and Tigecycline
Daptomycin	Daptomycin
Polymyxins	Rifampicin
	Metronidazole
	Azoles
	Echinocandins

Ulldemolins & Rello. Curr Pharm Biotechnol 2011

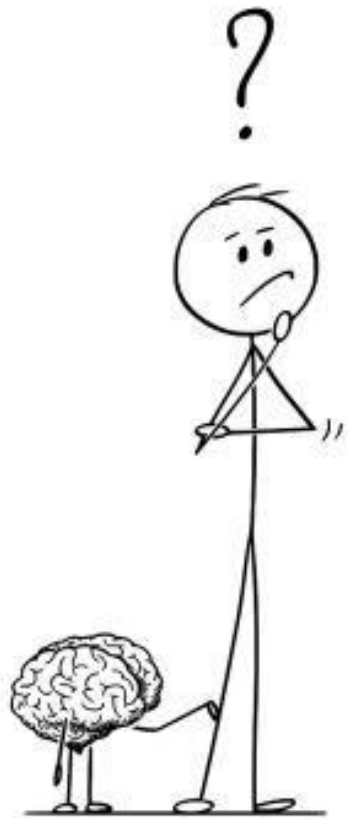


Table 1. Effect of Plasma Exchange on Various Classes of Drugs (continued)

Drug Class, Drug	Type of Publication	Plasma Exchange		
		Indication	Drug Removal	Time After Last Dose (hrs)[a]
Ceftriaxone (continued)	Phase II parallel-group trial (n=11)[37]	Early vs late administration	No; 12.6% (early) or 5.7% (late) of 2-g dose	3 or 15
Ceftazidime	Phase II trial (n=11)[38]	Various; Cl_{cr} > 50 (6 patients) or < 50 (5 patients) ml/min	No; 5% of administered dose	0.25–2
Chloramphenicol	Case report (n=1)[39]	Intoxication	Yes	29
Tobramycin	Case report (n=1)[40]	TTP	Yes; 11% of total body stores	NR
	Case report (n=2)[41]	Hyperviscosity syndrome and myasthenia gravis	Yes; 4.3–6.1% of total body stores	0.66–5.5
	Case report (n=1)[42]	Myositis	Yes; 6.8–10.8% of total stores	18, 1[d]
Gentamicin	Phase II trial (n=15)[35]	Neonatal sepsis and hyperbilirubinemia	Yes; 33.1% mean drop in concentration	2–10
	Phase II trial (n=7, 8 controls)[43]	Neonatal hyperbilirubinemia	Yes; ~5% of single dose	~9.5
	Phase II trial (n=7)[44]	Neonatal sepsis and hyperbilirubinemia	Yes; 62% reduction in concentration	3–12
	Phase II trial (n=12)[45]	Neonatal coagulation abnormalities and hyperbilirubinemia	Yes; ~26% drop in concentration	NR
Vancomycin	Case report (n=1)[46]	TTP	No	~24
	Phase II trial (n=12)[47]	Various	No; 6.3% of total body stores	2.75–134.25
	Case report (n=1)[48]	Sickle cell disease	Yes	NR
	Case report (n=1)[49]	TTP, acute renal failure	Yes; 27% reduction in concentration	NR
	Case report (n=1)[50]	Hemolytic anemia	Yes; 48.5% mean drop in concentration	NR
Teicoplanin	Phase II trials (n=12)[51]	Various	Yes; ~20% of dose	0
Antiepileptics				
Phenytoin	Case report (n=1)[52]	TTP	Yes; 10% of total body stores	NR
	Case report (n=2)[53]	Myasthenia gravis	No; 5% of total body stores	1–1.5
	Case report (n=1)[54]	Overdose	No; 5% of total body stores	4 days
	Case series (n=5)[55]	Healthy (1 patient) or various (4 patients)	No; ~4% of total body stores	12 (4 patients), 2 (1 patient)
	Case report (n=1)[56]	Renal failure due to lupus nephritis	No; ~3% of total body stores	NR
	Case report (n=1)[57]	TTP	No; ~4% of total body stores	NR
	Case report (n=1)[58]	TTP	No; ~9% of total body stores	NR
	Case report (n=1)[59]	TTP	No; 4.6% of total body stores	NA[e]
Oxcarbazepine	Case report (n=1)[60]	Seizures	No; ~6% of total body stores; 4% of dose	~1
Carbamazepine	Case report (n=1)[61]	Overdose	No; ~6% of total body stores	32
	Case report (n=1)[62]	Overdose	Yes	> 2 days
	Case report (n=1)[63]	Accidental ingestion	Yes	26

Ibrahim et al. Pharmacotherapy 2007

Figure 1A. Dose-Response Curves for Wide Therapeutic Index Medications

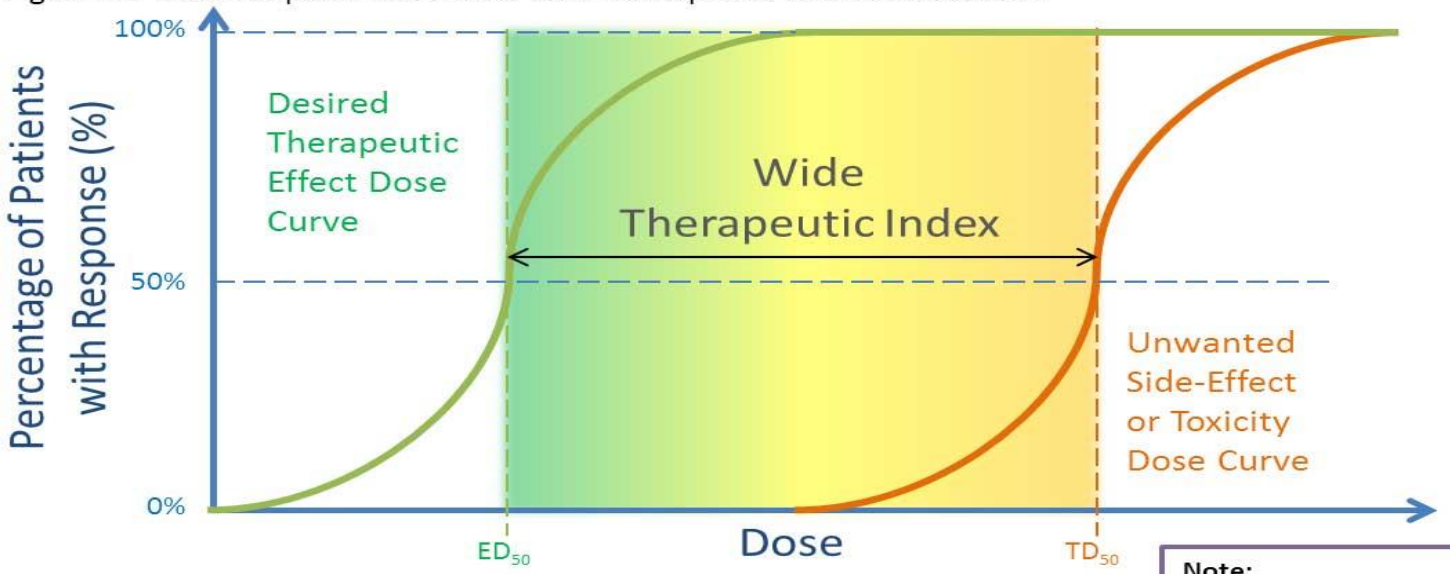
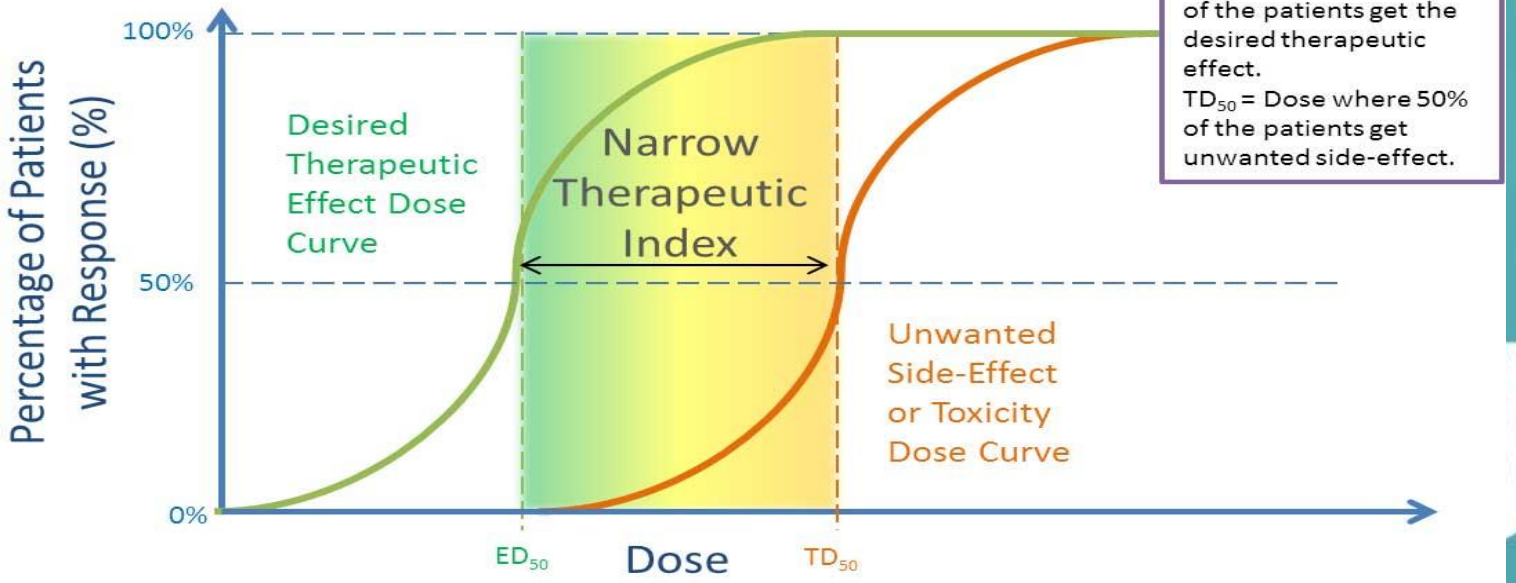


Figure 1B. Dose-Response Curves for Narrow Therapeutic Index Medications



Note:
ED_{50} = Dose where 50% of the patients get the desired therapeutic effect.
TD_{50} = Dose where 50% of the patients get unwanted side-effect.

Table 5
Most common findings of mild specified AE/10,000 procedures.

Symptom, reason	AE/10,000
Access problems	130
Hypotension	36
Tingling	19
Device problems	17
Urticaria	12
Nausea/vomiting	12
Hematoma at puncture site	10
Hypertension	5
Flush	2
Phlebitis	2
Shivering, fever	2
Arrhythmia	1
Back pain	1
Vertigo	1

Table 6
Most common findings of moderate specified AEs/10,000 procedures.

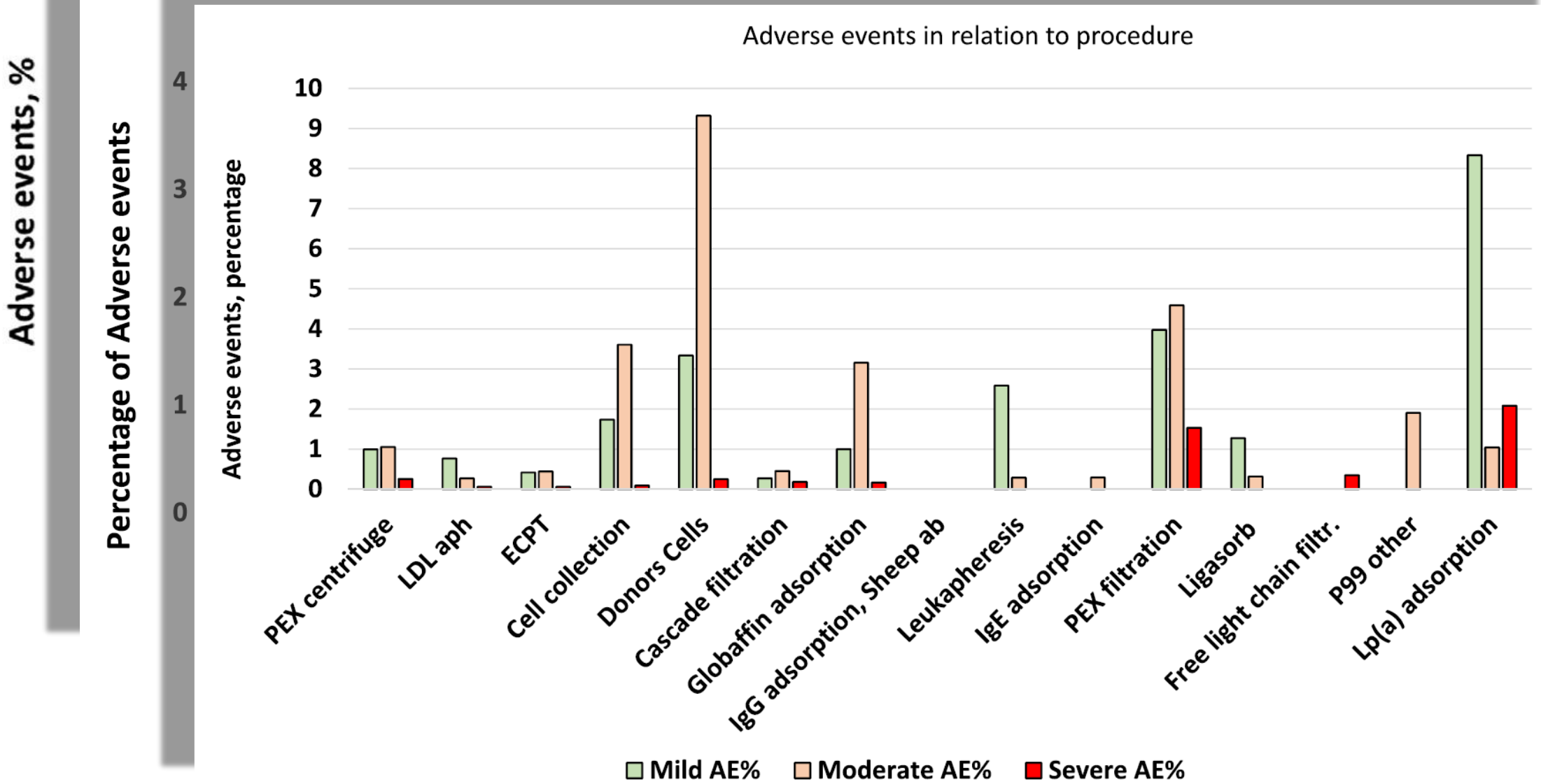
Symptom, reason	AEs
Tingling	174
Urticaria	45
Hypotension	30
Nausea	9
Technical problems	6
Hypertension	6
Chills and fever	6
Flush	5

Table 7
Severe adverse events (primary reason in 168 procedures) resulting in interruption of apheresis given as specified AEs/10,000 procedures.

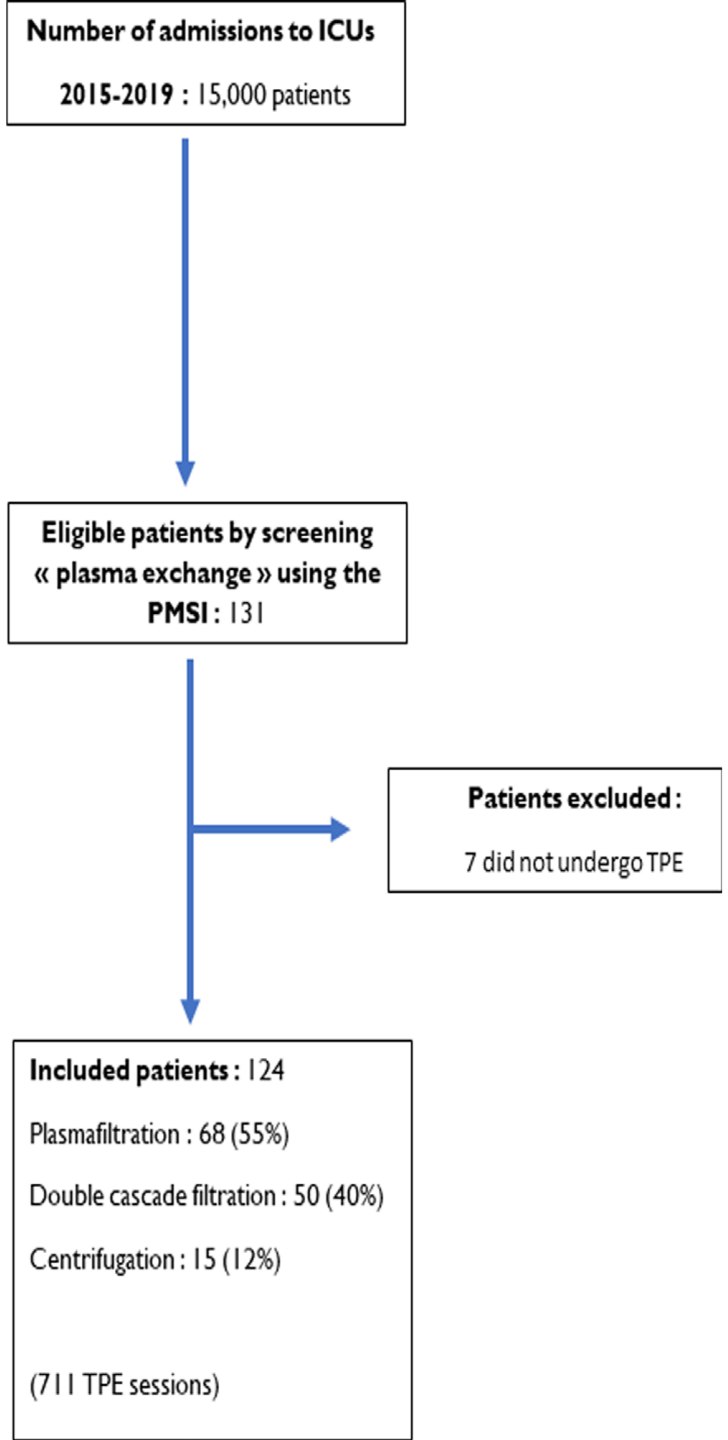
Symptom, reason	AEs
Hypotension, syncope	11
Urticaria	6
Fever, chills	3
Nausea, vomit	2
Access problem	2
Flush	2
Tingling, stitching	2
Arrhythmia	2
Bronchospasm	1
Quincke edema	1
Technical problem	0.8
Abdominal pain	0.8
Back pain	0.8
Epilepsy	0.6
Hypertension	0.4
Spasm	0.4
Asystolia	0.2
TRALI chest pain	0.2
Anaphylaxis	0.2
Gastro intestinal bleeding	0.2
Wrong plasma	0.2
Adverse event to drug	0.2
Chest pain	0.2
Anxiety + hyperventilation	0.2

Henriksson et al. Transfus Apher Sci 2016

Adverse events in % of procedures /year



Vrielink et al. Transfus Apher Sci 2023



N (%) or Median [Q1–Q3]	Patients (*n* = 124)
Indication for TPE	
Thrombotic microangiopathy	32 (26)
Myasthenia	25 (20)
Acute polyradiculoneuritis	12 (10)
Catastrophic antiphospholipid syndrome	9 (7)
ANCA vasculitis	8 (6)
Other	38 (31)
TPE modality and characteristics (711 sessions)	
Plasma filtration	68 (55)
Double cascade filtration	50 (40)
Centrifugation	15 (12)
No. of sessions per patient	5 [2–7]
Duration of treatment, d	7 [3–12]
Volume of plasma treated, mL/kg	52 [45–60]
Substitute products	
Plasma alone	53 (43)
Albumin alone	46 (37)
Plasma + albumin	35 (28)

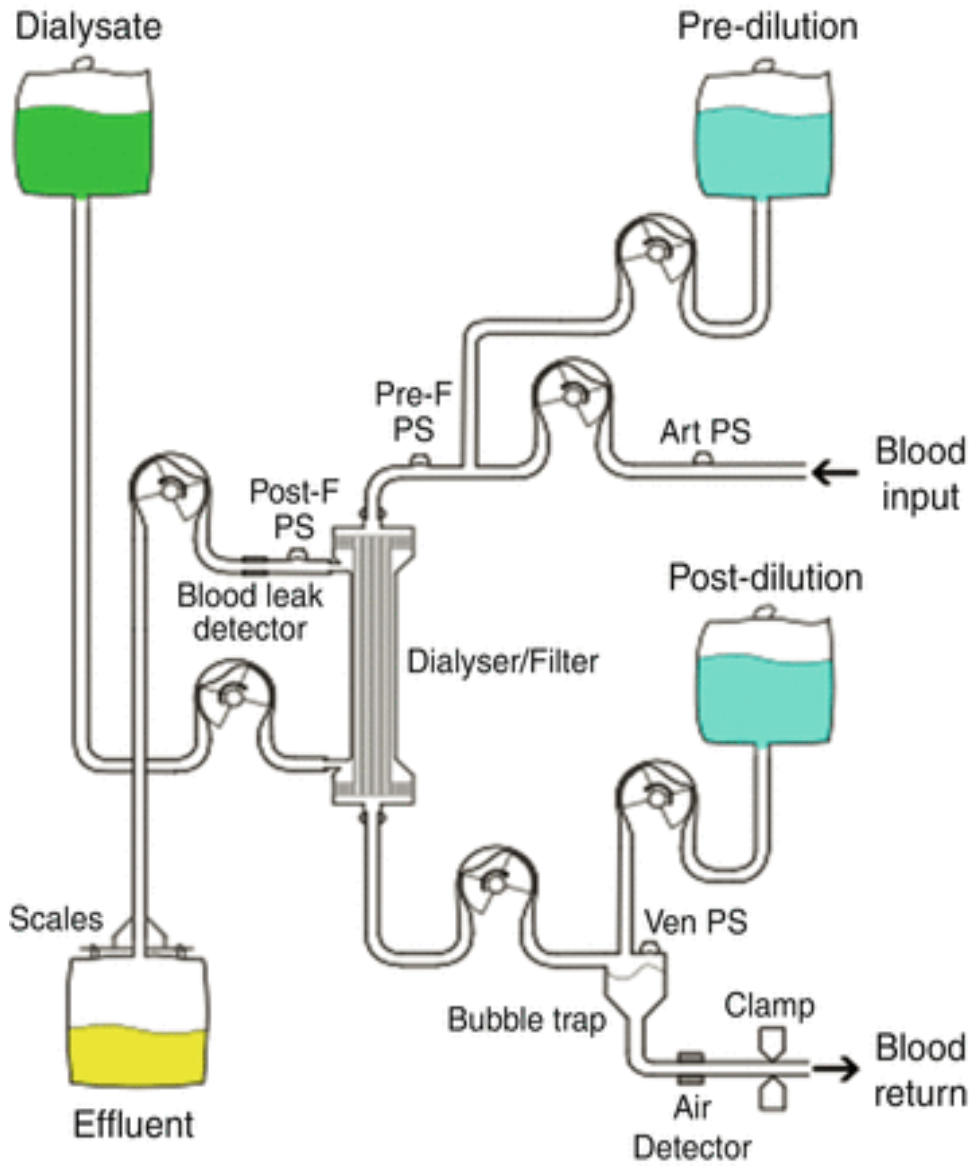
Adverse events during TPE	
Arterial hypotension	22 (21)
Fever	12 (12)
Electrolyte disturbance	9 (9)
Arrhythmia	7 (7)
Pruritus-urticaria	3 (3)
Nausea-vomiting	2 (2)
Cardiac arrest	1 (1)
Infectious complications	
At least one infectious event	60 (48)
Pneumonia	55 (44)
Nosocomial pneumonia	13 (10)
Ventilator-associated pneumonia	42 (34)
Viral reactivation	14 (11)
Bacteremia	18 (14)
Catheter-related infection	6 (5)
Elapsed time to first infectious complication, d	
From ICU admission	9 [4–14]
From TPE initiation	5 [2–8]

Francois et al. Crit Care Explor 2023

TABLE 3.
Comparison of the Studied Population to the Control Group

N (%) or Median [Q1–Q3]	Control Group (*n* = 124)	Therapeutic Plasma Exchange Group (*n* = 124)	*p*
Age, yr	56 [41–68]	54 [39–72]	0.76
Gender (male)	73	55	0.22
Sequential Organ Failure Assessment	6 [3–9]	5 [2–8]	0.50
Simplified Acute Physiology Score II	43 [31–60]	36 [25–51]	0.01
Invasive mechanical ventilation	80 (64)	78 (63%)	0.79
Duration, d	13 [6–20]	14 [7–22]	0.75
Renal replacement therapy	25 (20)	36 (29)	0.11
Duration, d	4 [1–7]	10 [3–17]	0.06
Vasopressor support	78 (63)	56 (45)	0.01
Duration, d	4 [3–10]	6 [2–11]	0.79
ICU Length of stay, d	14 [6–24]	14 [6–26]	0.74
Mortality			
ICU	19 (15)	18 (14)	0.86
In-hospital	22 (18)	27 (22)	0.35
Withdrawal of life-sustaining treatments	26 (21)	20 (16)	0.33
Infectious events			
At least one infectious event	36 (29)	60 (48)	0.01
Ventilator-associated pneumonia	27 (22)	42 (34)	0.03
Pneumonia	4 (3)	13 (10)	0.24
Catheter-related infection	9 (7)	6 (4)	0.28
Blood stream infection	7 (5)	12 (9)	0.91
Septic shock	8 (6)	19 (15)	0.03
Viral reactivation	8 (6)	14 (11)	0.06

Francois et al. Crit Care Explor 2023



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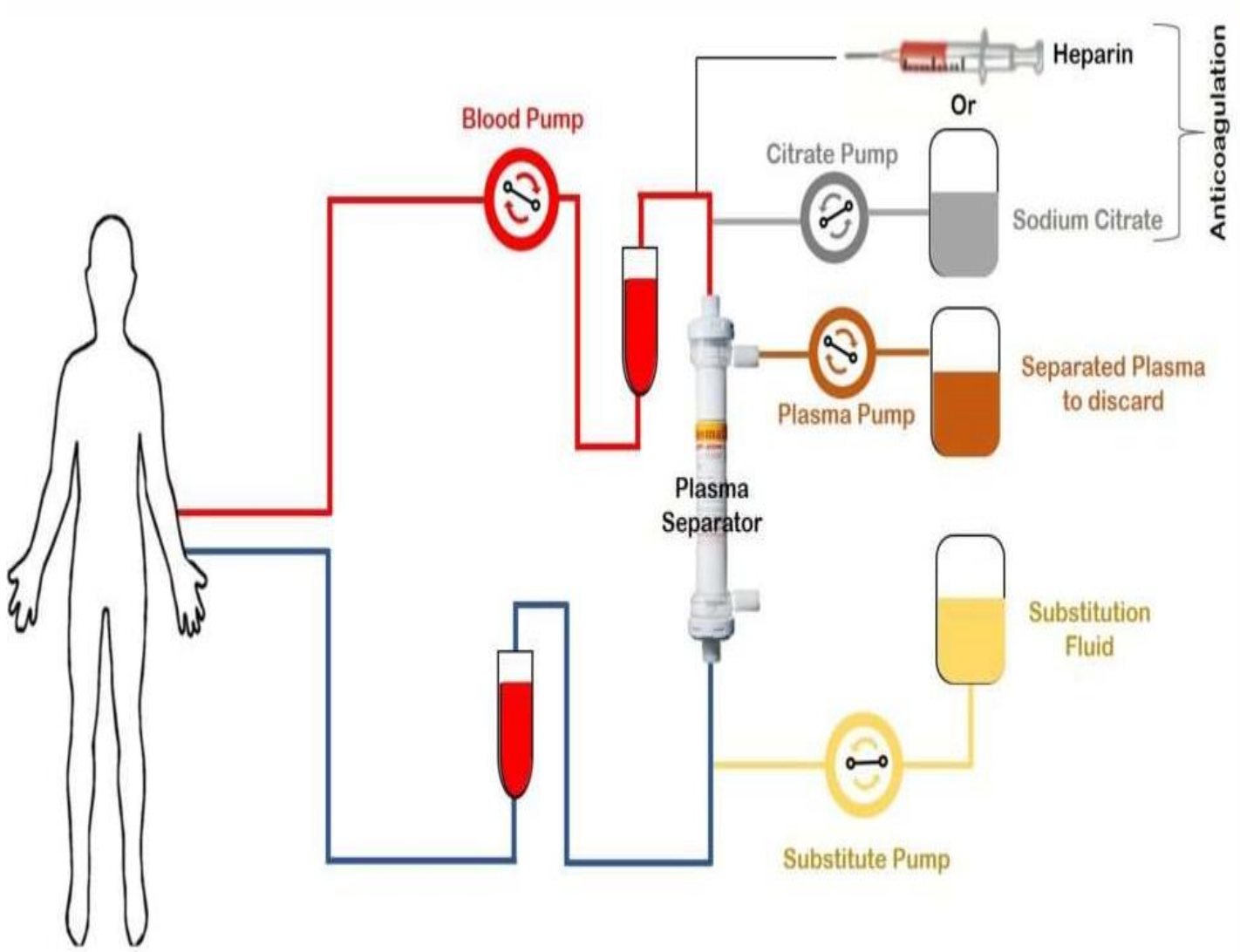
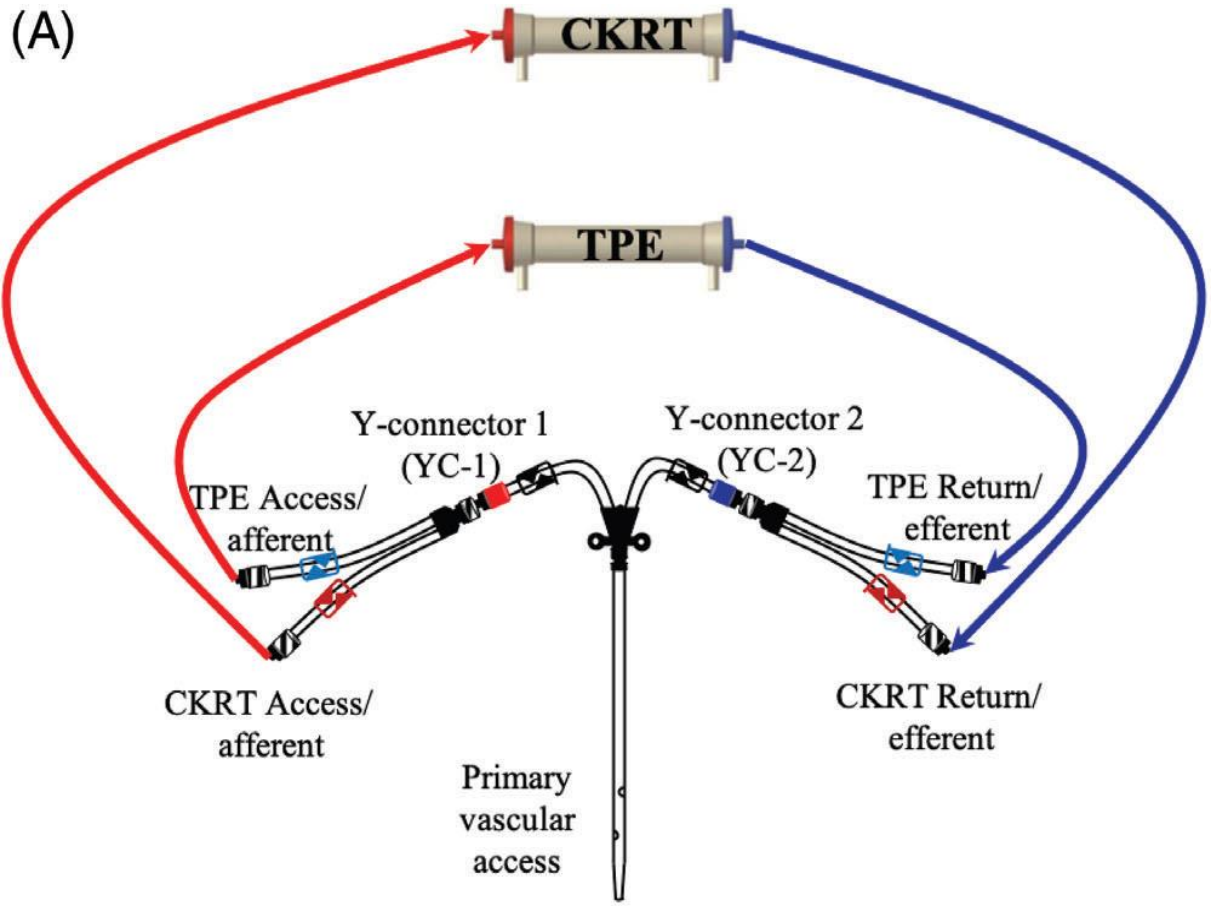
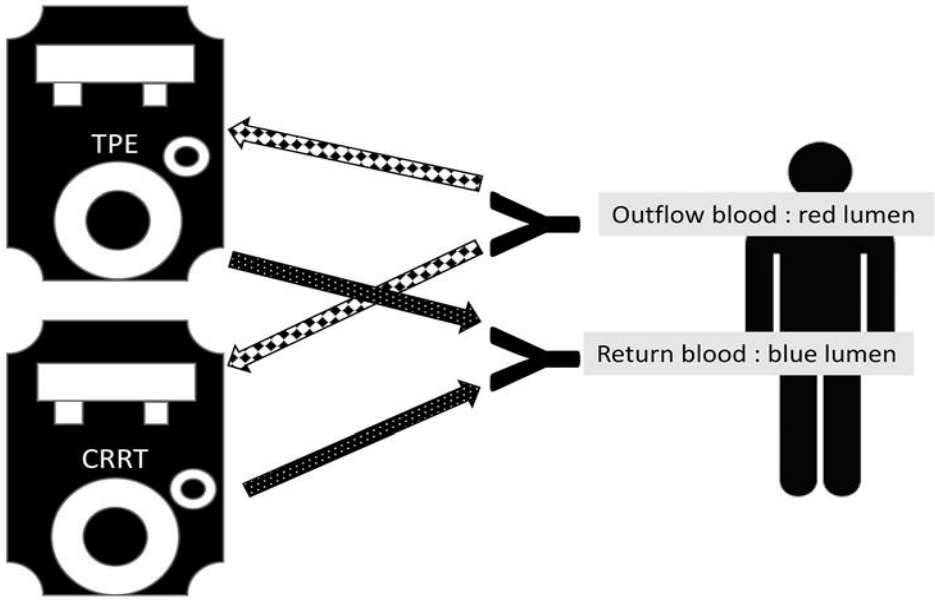
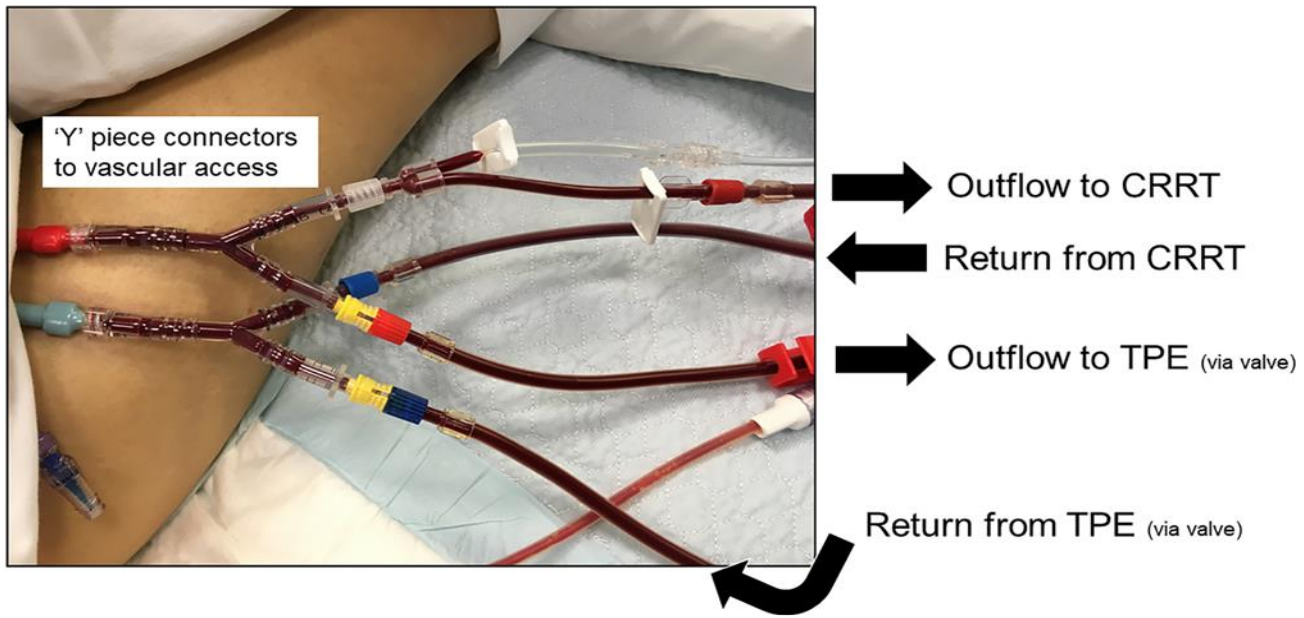


Plasmapheresis



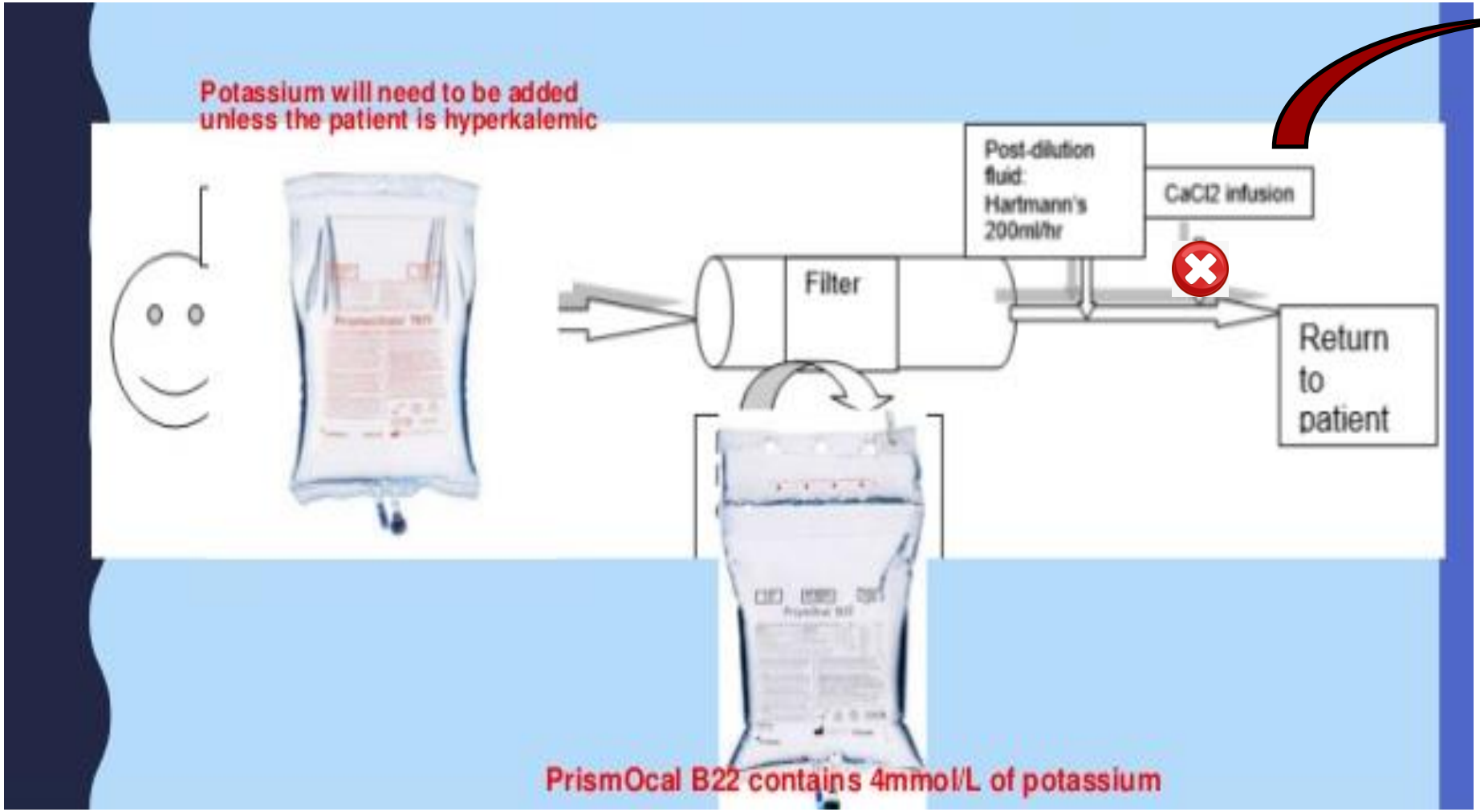
Kaushik et al. J Clin Apher 2020





Baldwin & Todd. J Clin Apher 2022

Regional Citrate Anticoagulation



SID in vitro

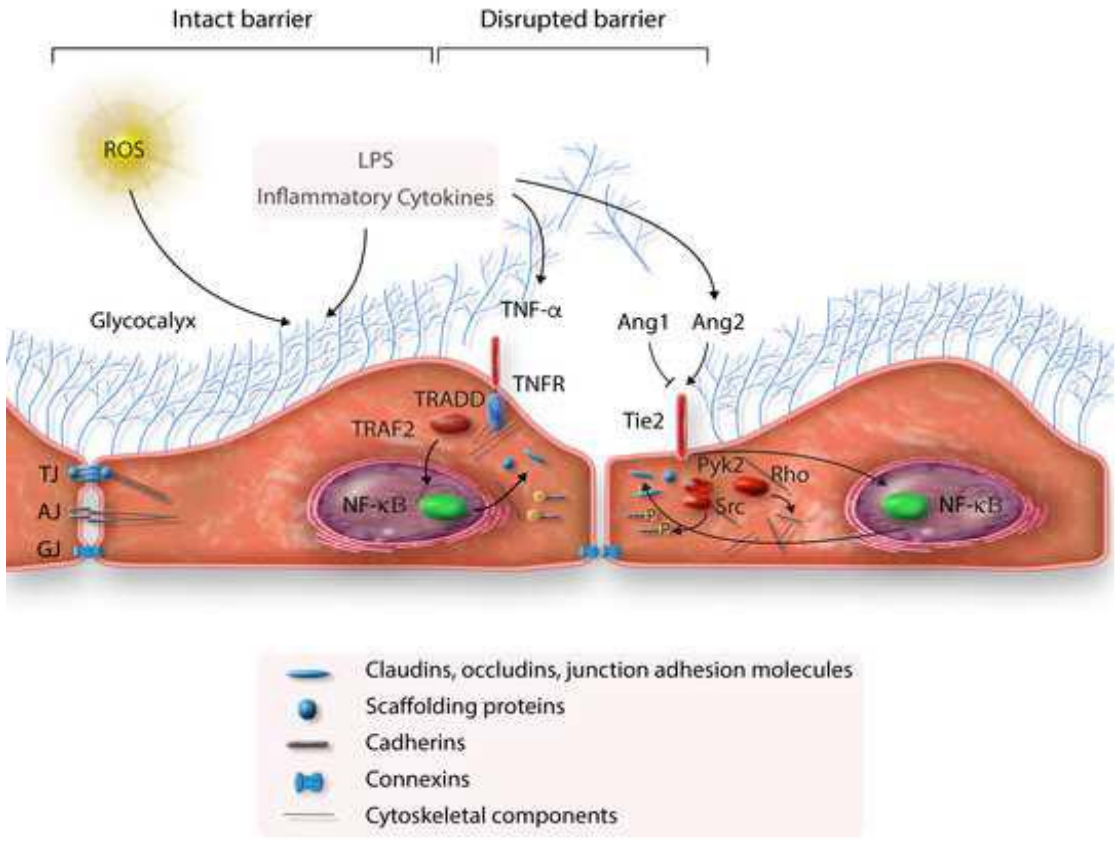
35

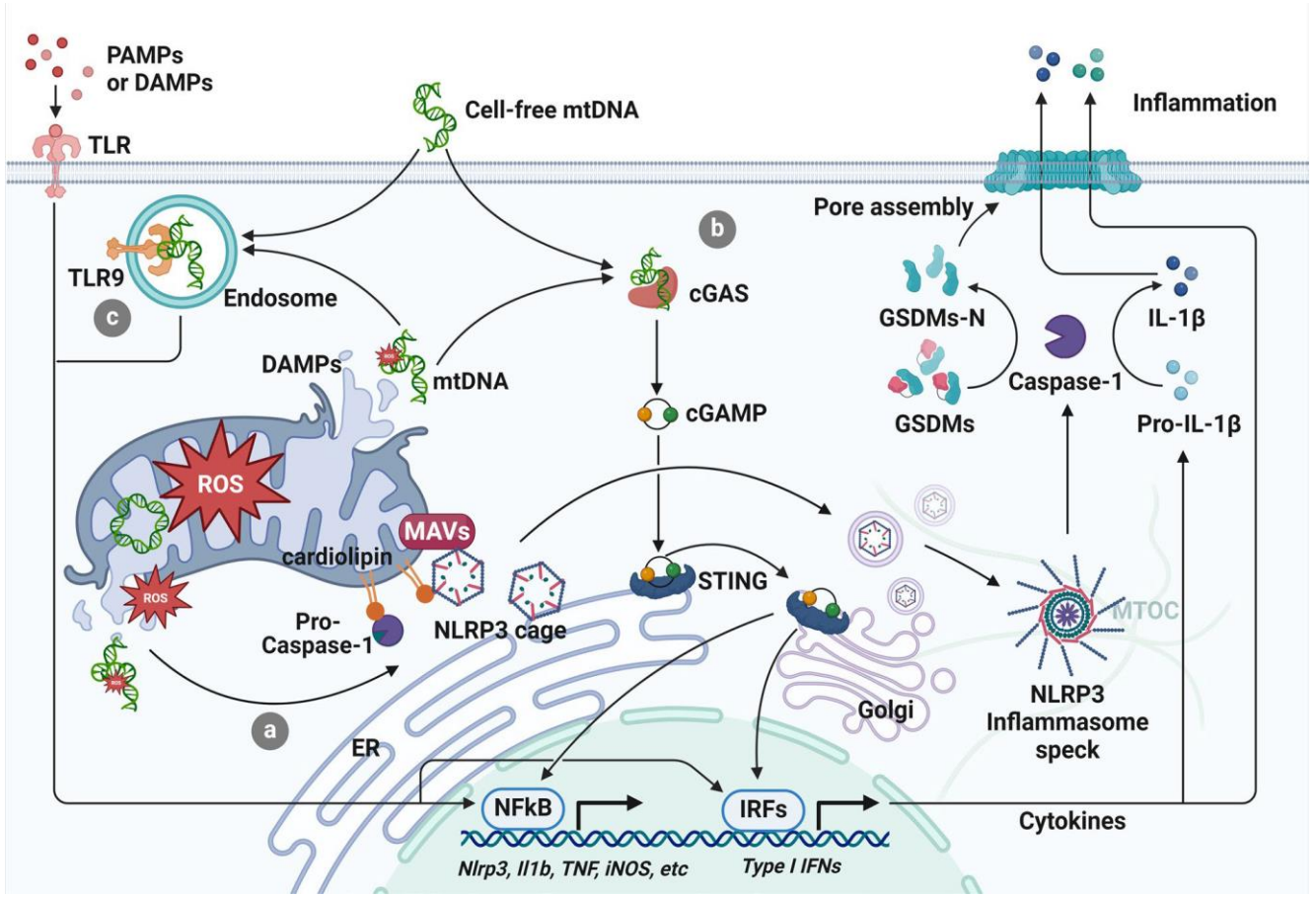
0

SID in vivo

35

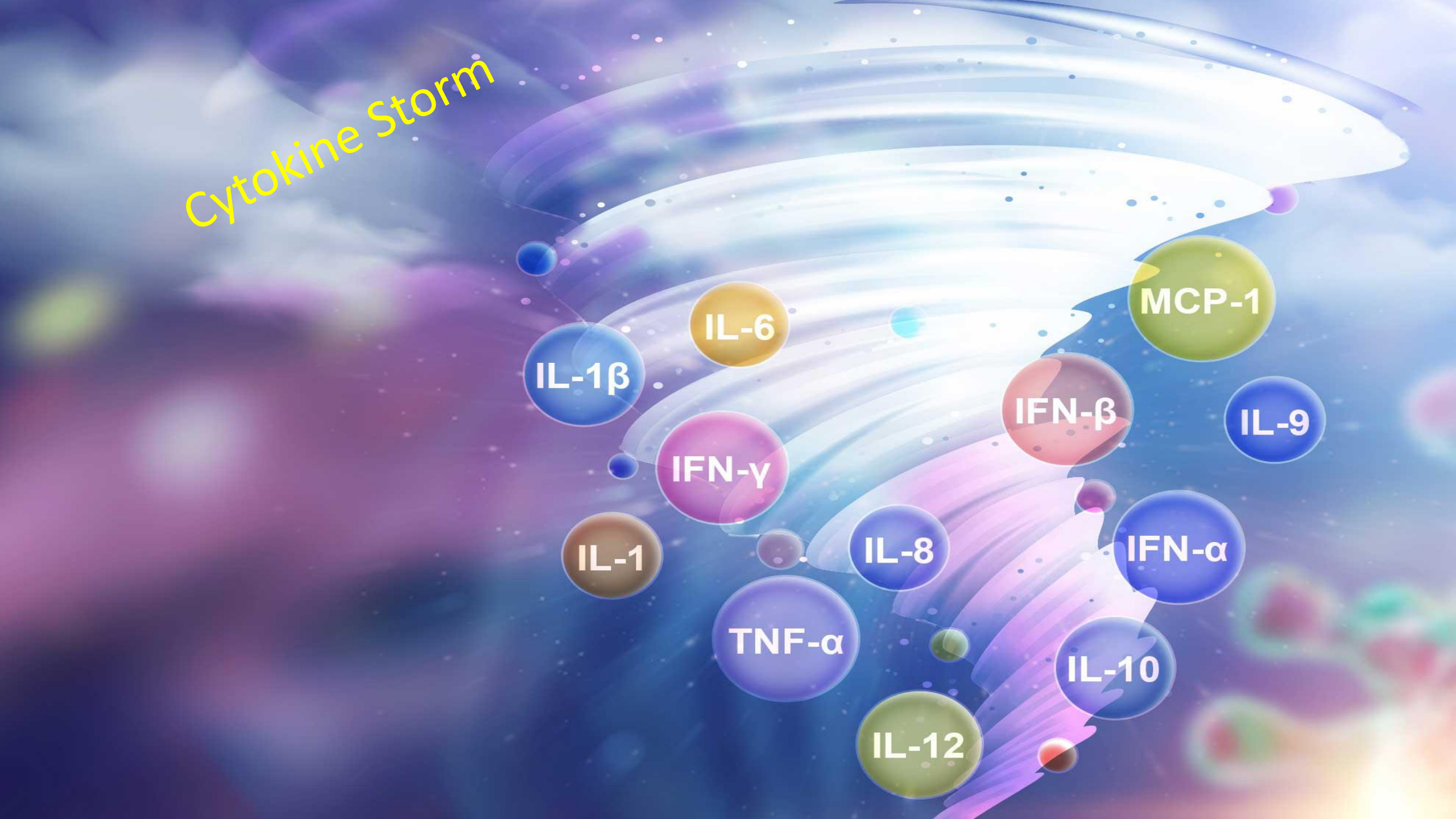
54

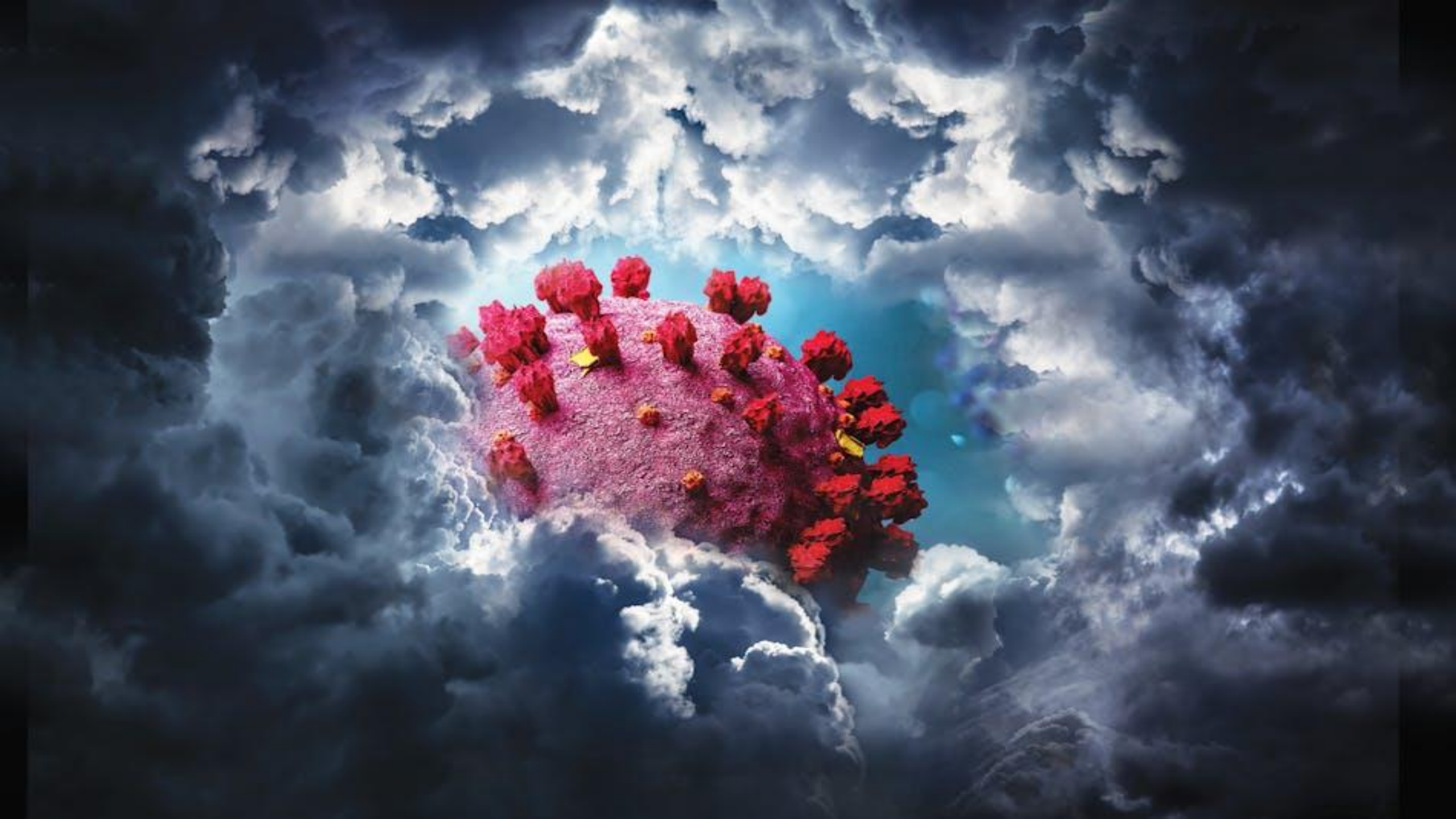


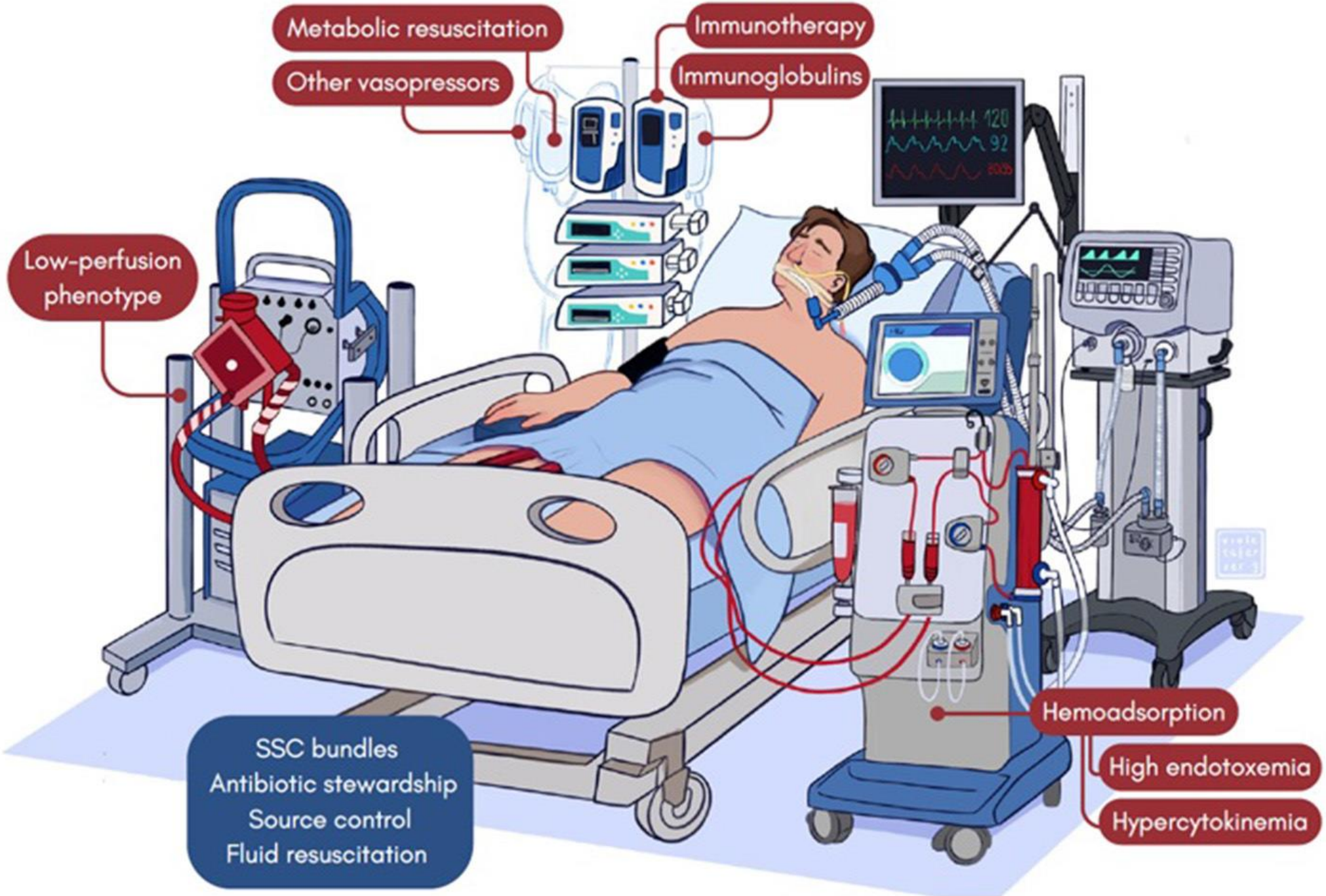


Dolmatova et al. Cardiovasc Res 2021

Hu et al. Crit Care 2024


Cytokine Storm
IL-6
MCP-1
IL-1β
IFN-β
IL-9
IFN-γ
IL-1
IL-8
IFN-α
TNF-α
IL-10
IL-12





Chiscano-Camon et al. Front Med 2024

Table 1
Characteristics of included studies and patients.

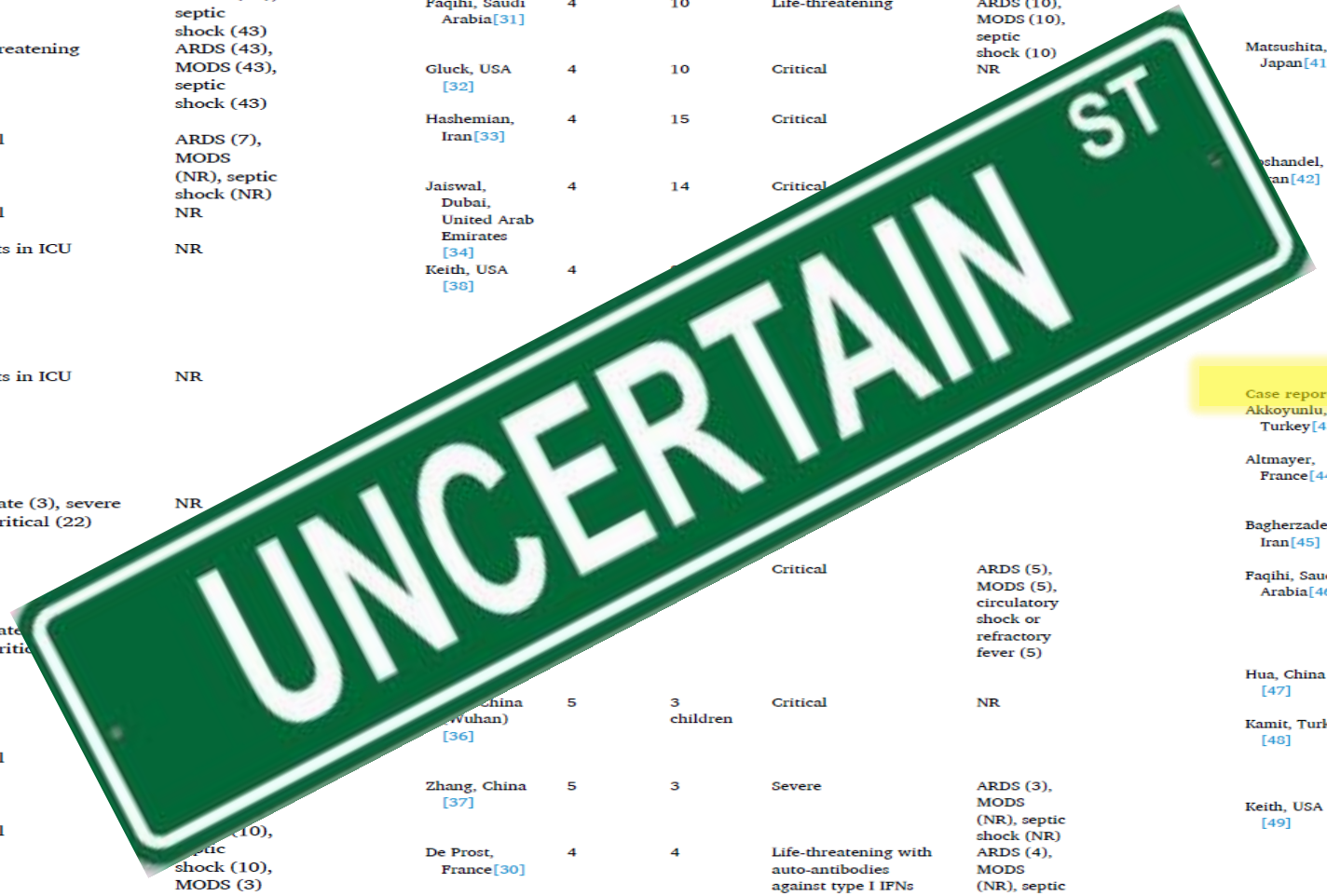
First author, country, study group	Oxford level of evidence	Number of patients	Disease severity	ARDS, MODS and/or septic shock
Randomized controlled clinical trial				
Faqihi, Saudi Arabia[23] TPE group	3	43	Life-threatening	ARDS (43), MODS (43), septic shock (43)
Control group		44	Life-threatening	ARDS (43), MODS (43), septic shock (43)
Matched case-control series				
Arulkumaran, UK[24] TPE group	4	7	Critical	ARDS (7), MODS (NR), septic shock (NR)
Control group		7	Critical	NR
Gucyetmez, Turkey[25] TPE group	4	18 (12 after PSM)	Patients in ICU	NR
Control group		35 (12 after PSM)	Patients in ICU	NR
Kamran, Pakistan [26] TPE group	4	71 (45 after PSM)	Moderate (3), severe (20), critical (22)	NR
Control group		209 (45 after PSM)	Moderate (20), critic	
Khamis, Oman [27] TPE group	4	11	Critical	
Control group		20	Critical	(10), tic shock (10), MODS (3)
Single-group case series				
Adeli, Iran [28]	4	8	Critical	ARDS (8), MODS (1), septic shock (8)
	5	3		

Table 1 (*continued*)

First author, country, study group	Oxford level of evidence	Number of patients	Disease severity	ARDS, MODS and/or septic shock
Alharthy, Saudi Arabia[29]			Life-threatening with associated thromboinflammation and CNS pathology	ARDS (3), MODS (NR), septic shock (NR)
Faqihi, Saudi Arabia[31]	4	10	Life-threatening	ARDS (10), MODS (10), septic shock (10)
Gluck, USA [32]	4	10	Critical	NR
Hashemian, Iran[33]	4	15	Critical	
Jaiswal, Dubai, United Arab Emirates [34]	4	14	Critical	
Keith, USA [38]	4			
			Critical	ARDS (5), MODS (5), circulatory shock or refractory fever (5)
China (Wuhan) [36]	5	3 children	Critical	NR
Zhang, China [37]	5	3	Severe	ARDS (3), MODS (NR), septic shock (NR)
De Prost, France[30]	4	4	Life-threatening with auto-antibodies against type I IFNs	ARDS (4), MODS (NR), septic shock (1)
Fernandez, Spain[39]	4	4	Critical	MODS (3)
Truong, USA [40]	4	6	Critical with hyperviscosity	

Table 1 (*continued*)

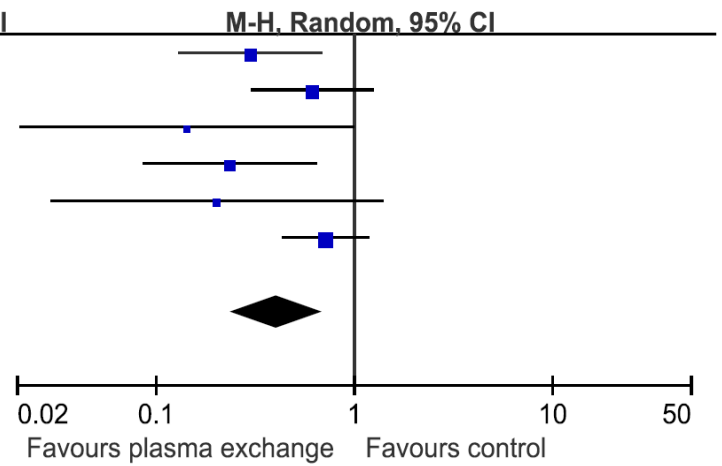
First author, country, study group	Oxford level of evidence	Number of patients	Disease severity	ARDS, MODS and/or septic shock
				ARDS (3), septic shock (4)
Matsushita, Japan[41]	4	5	Severe	ARDS (1)
shandel, an[42]	4	5	Critical	ARDS (5)
Case reports				
Akkoyunlu, Turkey[43]	5	1	Critical	NR
Altmayer, France[44]	5	1	Critical	ARDS
Bagherzade, Iran[45]	5	1	Critical (respiratory arrest and loss of consciousness)	NR
Paqihi, Saudi Arabia[46]	5	1	Life-threatening	ARDS, sepsis
Hua, China [47]	5	1	Critical	NR
Kamit, Turkey [48]	5	1 child	Critical	ARDS, MODS, septic shock
Keith, USA [49]	5	1	Critical	ARDS, MODS, septic shock
Lin, Taiwan [50]	5	1	Critical	NR
Ma, China[51]	5	1	Critical	NR
Ragab, Egypt [52]	5	1	Severe	ARDS



Beraud et al. Transfus Apher Sci 2022

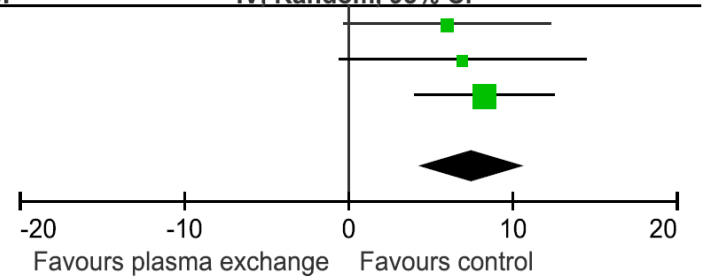
Study or Subgroup	Plasma exchange Events	Total	Control Events	Total	Weight	Risk Ratio M-H, Random, 95% CI
Cegolon 2022	6	43	14	30	19.8%	0.30 [0.13, 0.69]
Faqihi 2021	9	43	15	44	22.8%	0.61 [0.30, 1.25]
Gucyetmez 2020	1	12	7	12	6.3%	0.14 [0.02, 0.99]
Kamran 2021	4	45	17	45	16.1%	0.24 [0.09, 0.64]
Khamis 2020	1	11	9	20	6.3%	0.20 [0.03, 1.39]
Novacescu 2022	10	19	14	19	28.7%	0.71 [0.43, 1.18]
Total (95% CI)		**173**		**170**	**100.0%**	**0.41 [0.24, 0.69]**
Total events	31		76			

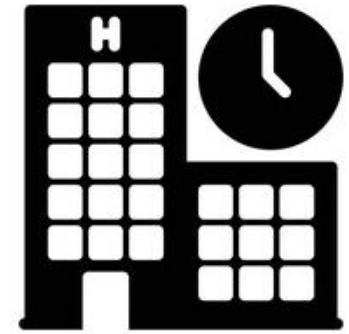
Heterogeneity: Tau² = 0.19; Chi² = 9.55, df = 5 (P = 0.09); I² = 48%
Test for overall effect: Z = 3.34 (P = 0.0008)



Study or Subgroup	Plasma exchange Mean	SD	Total	Control Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Gucyetmez 2020	20	10	12	14	5	12	25.6%	6.00 [-0.33, 12.33]
Khamis 2020	14	10.18	11	7.08	10.37	20	18.1%	6.92 [-0.62, 14.46]
Novacescu 2022	16.84	7.25	19	8.58	6.13	19	56.3%	8.26 [3.99, 12.53]
Total (95% CI)			**42**			**51**	**100.0%**	**7.44 [4.24, 10.64]**

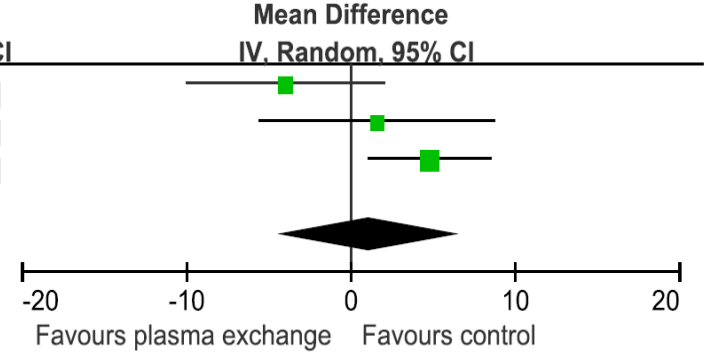
Heterogeneity: Tau² = 0.00; Chi² = 0.36, df = 2 (P = 0.84); I² = 0%
Test for overall effect: Z = 4.55 (P < 0.00001)



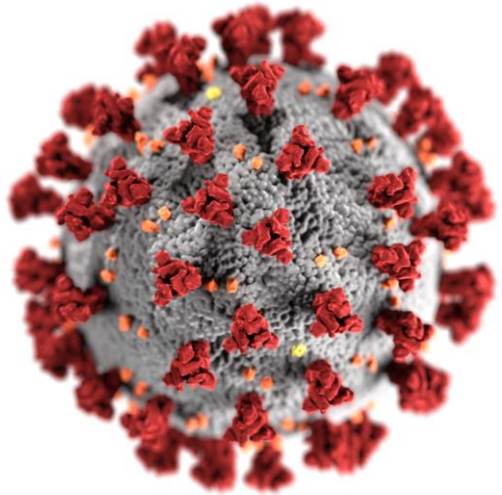


Study or Subgroup	Plasma exchange Mean	SD	Total	Control Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Faqihi 2021	15	10.74	43	19	17.32	44	31.6%	-4.00 [-10.04, 2.04]
Gucyetmez 2020	13.17	11.29	12	11.58	5.79	12	27.3%	1.59 [-5.59, 8.77]
Novacescu 2022	7.1	7.33	19	2.32	3.99	19	41.2%	4.78 [1.03, 8.53]
Total (95% CI)			**74**			**75**	**100.0%**	**1.14 [-4.36, 6.64]**

Heterogeneity: Tau² = 15.47; Chi² = 5.89, df = 2 (P = 0.05); I² = 66%
Test for overall effect: Z = 0.41 (P = 0.68)



Qin et al. Int J Infect Dis 2022



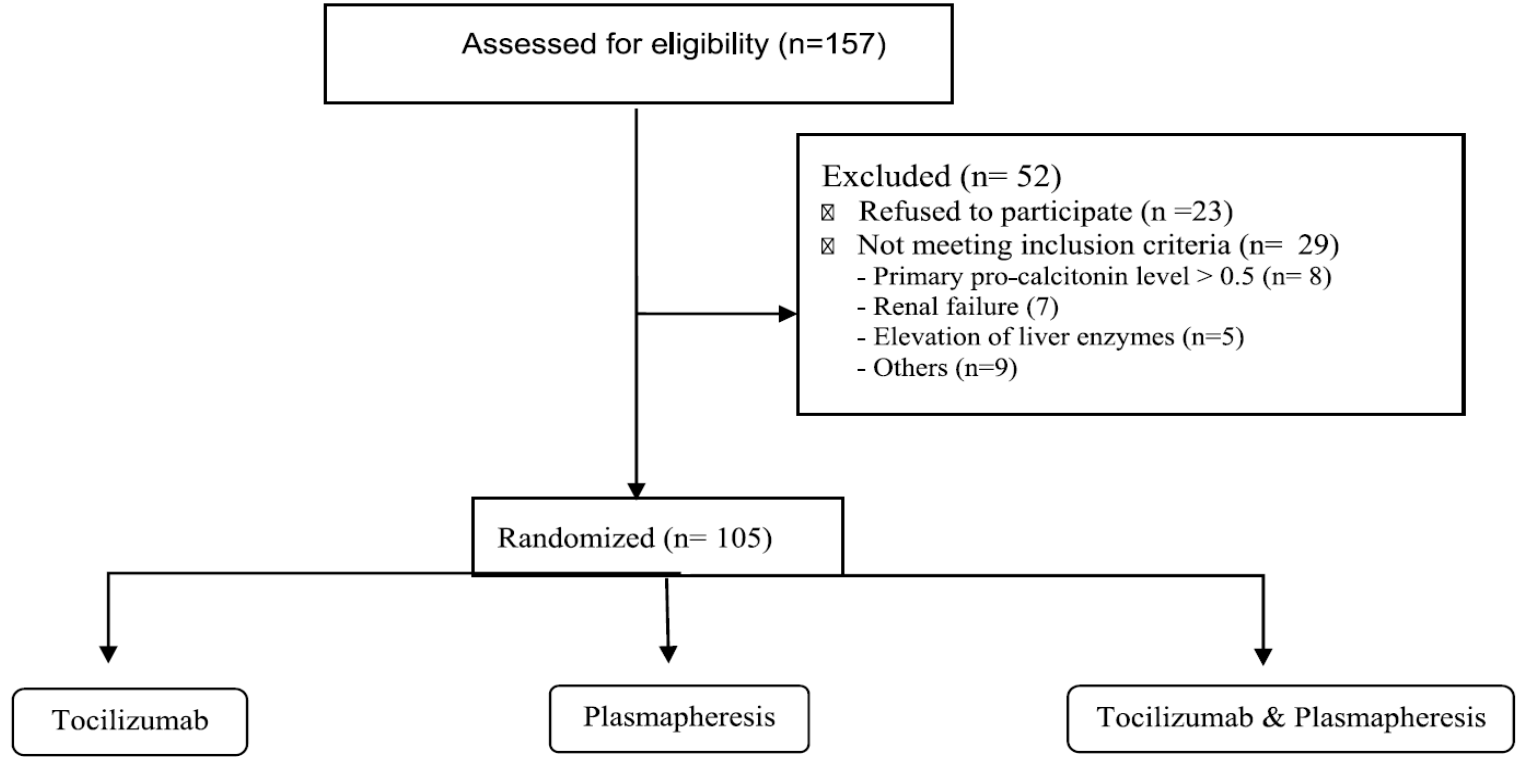


Table 3

Comparison of Outcomes & Complications before and after the intervention in the study groups.

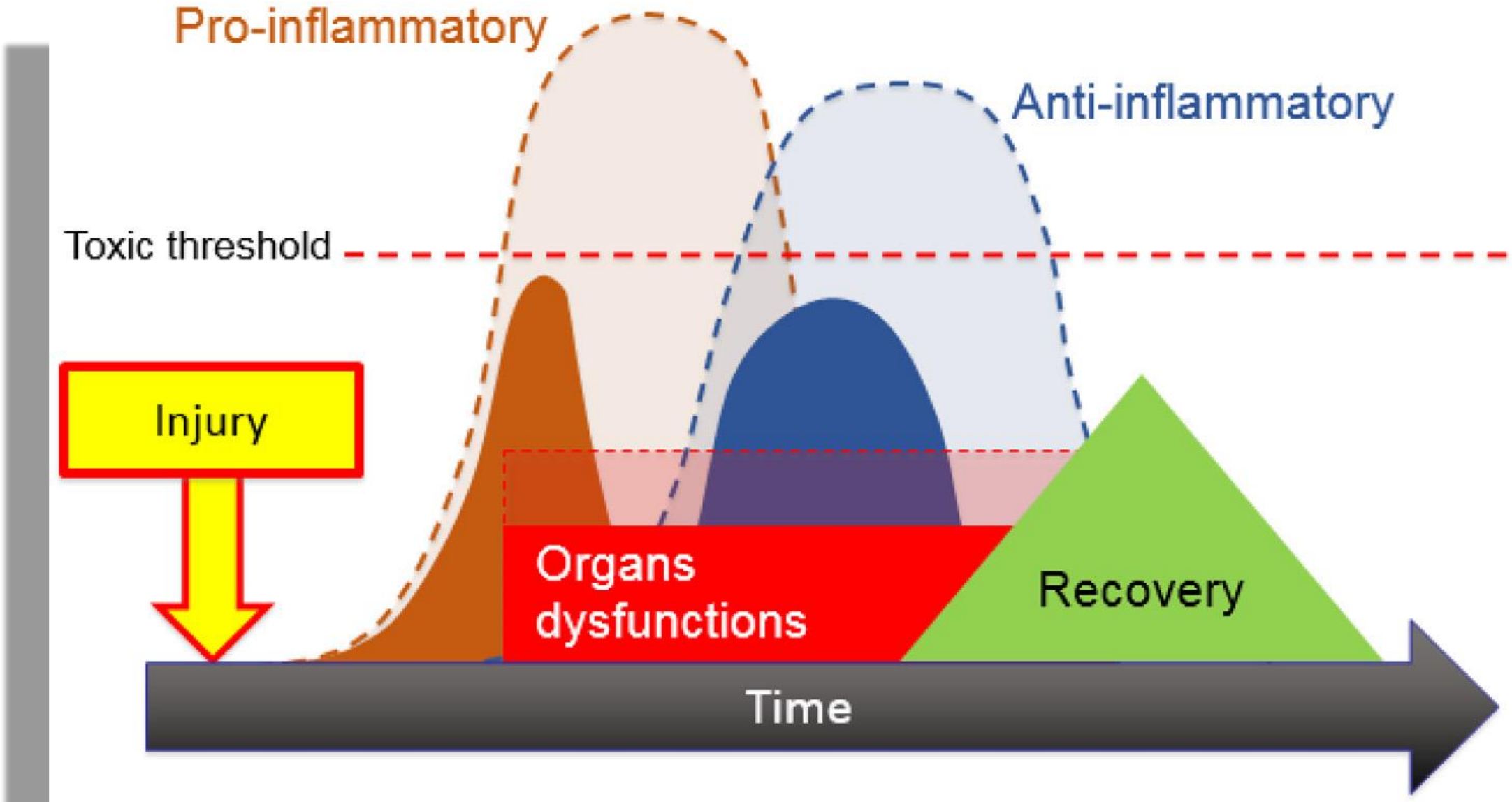
Variable	Tocilizumab	Plasmapheresis	Plasmapheresis & Tocilizumab	p-value
Hospital length of stay, Mean (SD)	12.29(4.71)	13.30(4.57)	13.12(4.90)	0.68
ICU length of stay, Mean (SD)	9.82(4.06)	11.15(4.07)	10.48(4.52)	0.48
O2 saturation ranges at discharge with supplementary o2, Mean (SD)	91.68(1.64)	92.20(2.12)	92.88(2.12)	0.12
Intubation, F (%)	6(21.4)	9(27.3)	8(24.2)	0.87
NIPPV, F (%)	15(53.6)	15(45.5)	13(39.4)	0.54
Death, F (%)	7(25)	9(27.3)	8(24.2)	0.96
Discharge, F (%)	22(78.6)	25(75.8)	26(77.7)	0.95
Complication				
Infection, F (%)	5(17.9)	10(30.3)	6(18.2)	0.40
GI. Bleeding, F (%)	3(10.7)	5(15.2)	2(6.1)	0.49
Thrombosis, F (%)	1(3.1)	3(9.1)	0	0.18

Gholinataj Jelodar et al. Int Immunopharmacol 2023

ELSEVIER

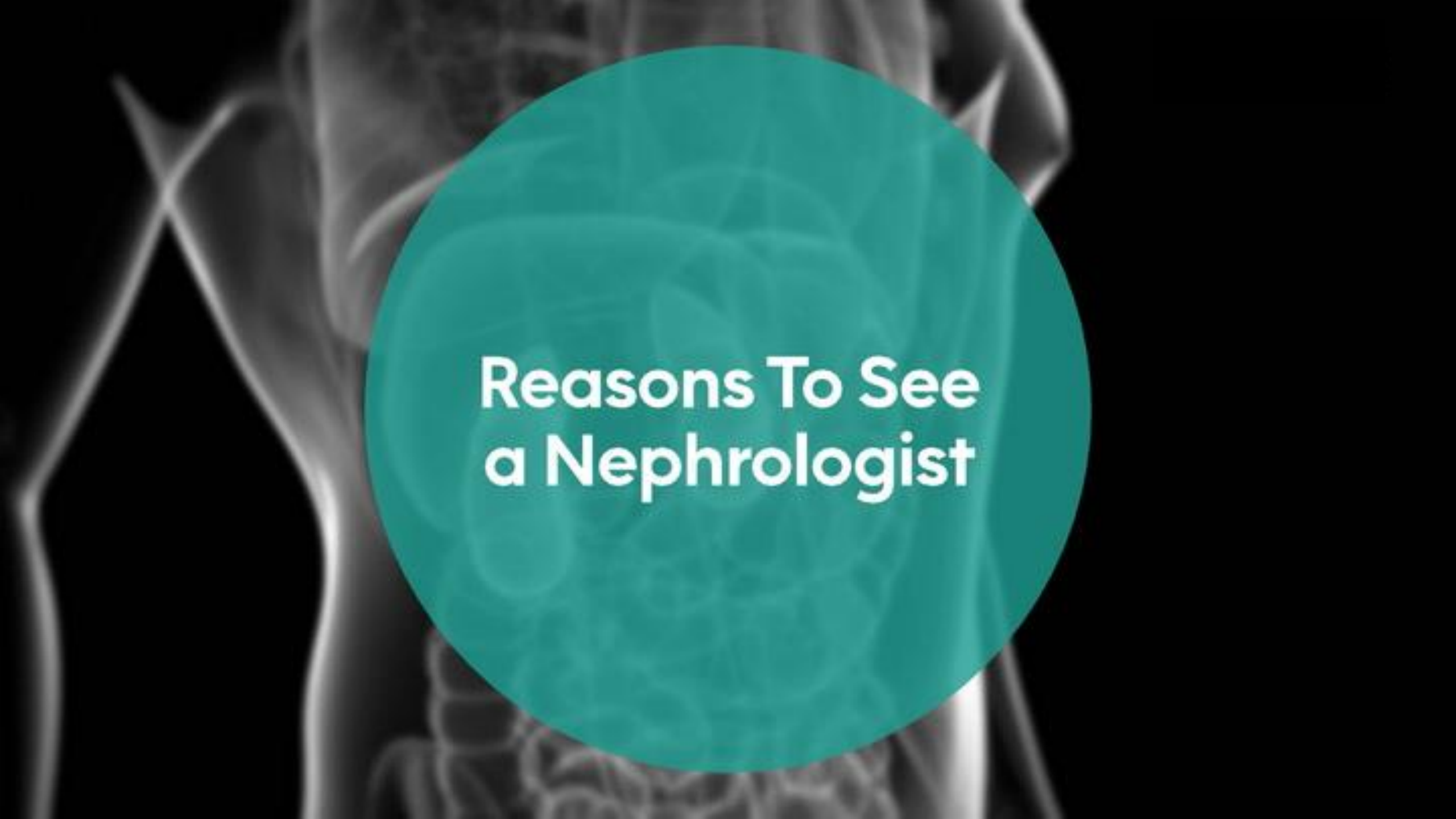
Blood Purification Techniques for Sepsis and Septic AKI

Thibaut Girardot, MD*,† Antoine Schneider, MD, PhD‡ and Thomas Rimmelé, MD, PhD*,†



VOlume in intensive care; NA, not applicable; PAMP, pathogen-associated molecular patterns; RCT, randomized controlled trial; SOFA, sequential organ failure assessment; TNF, tumor necrosis factor.

Girardot et al. Semin Nephrol 2019


Reasons To See
a Nephrologist

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Plasma exchange in the intensive care unit: A 10 year retrospective audit

Emily Paton RN, Grad. Dip (Crit Care Nurs), ACCCN*,
Ian C. Baldwin RN, PhD, (ICU Cert), ACCCN[1]

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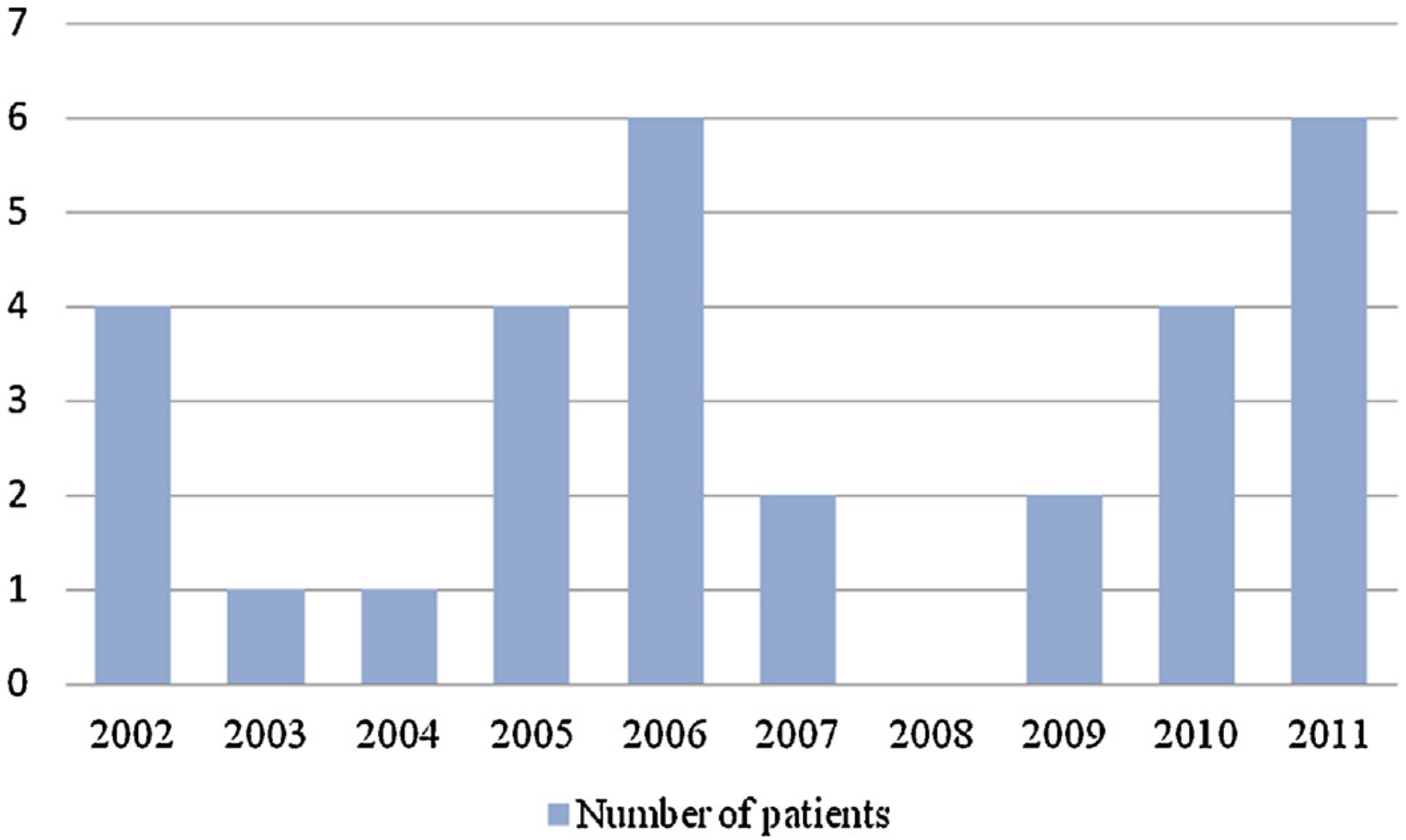

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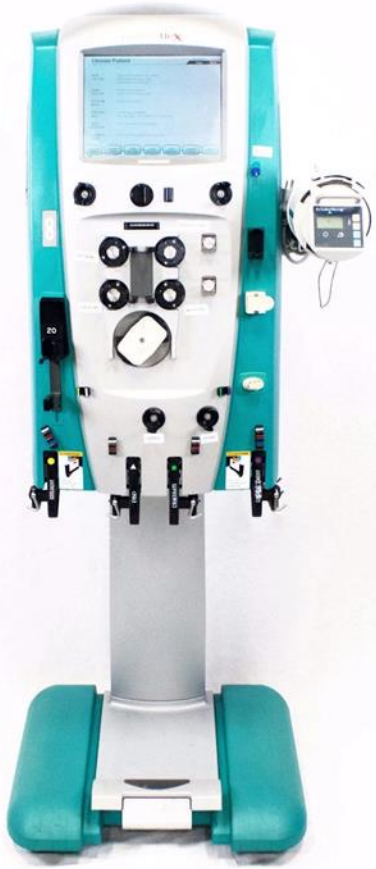


YES
NO

AJKD

Moving Points

Debates in Nephrology

Kidney360

Intensive Care Med
DOI 10.1007/s00134-017-4788-y

Kidney360

EDITORIAL

A nephrologist should be consulted in all cases of acute kidney injury in the ICU: We are not sure

Miet Schetz[1*] and Matthieu Legrand[2,3,4]

John A. Kellum[1*] and Eric A. J. Hoste[2,3]

Hans Flaatten[1*] and Michael Darmon[2,3]


PINK FLOYD ● BACK CATALOGUE