3d Libyan Society of Dialysis Annual Conference

EXPANDED HEMODIALYSIS
HDx: The New Innovation

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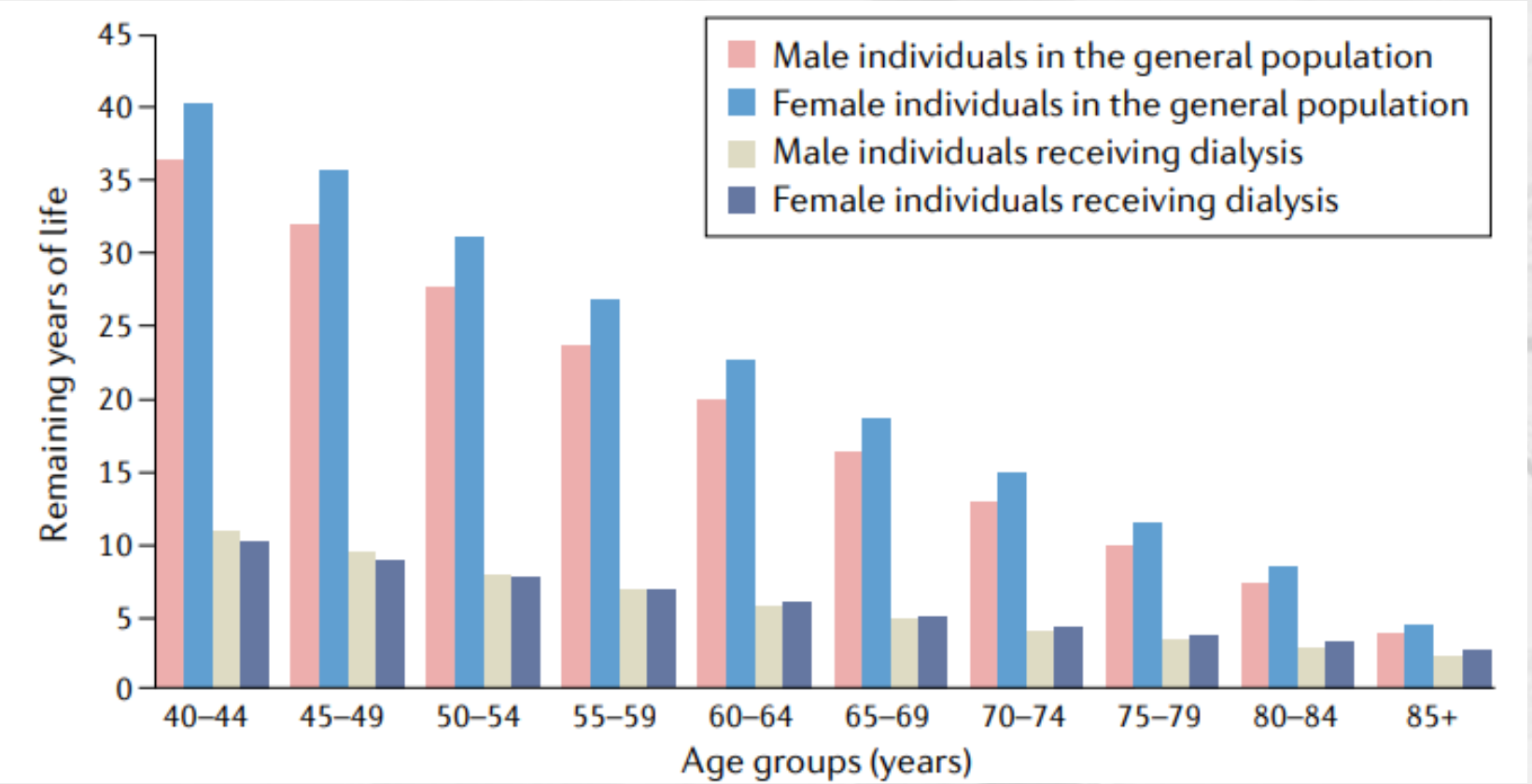
Tripoli, 2023, July 8th

Still a short expected remaining years of life in prevalent patients on dialysis.



Expected remaining lifetime, in years, for the 2018 prevalent kidney failure population and the 2017 general population in the USA. The graph illustrates the markedly shortened projected lifespan for patients with kidney failure compared with that of individuals without kidney failure. I

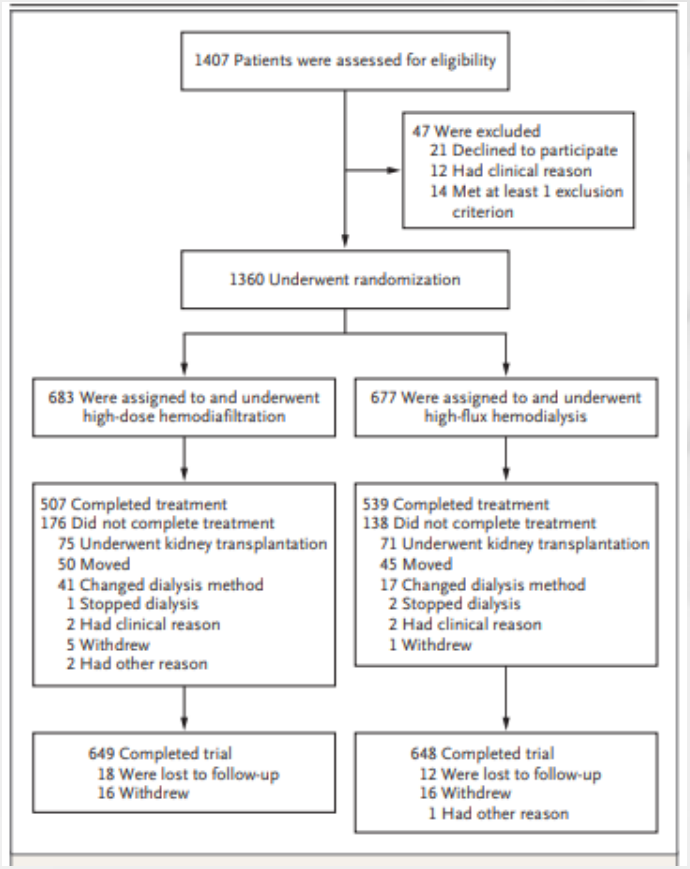
A. K. Bello et al. Nature Review Nephrology 2022; 18:381

The NEW ENGLAND JOURNAL of MEDICINE

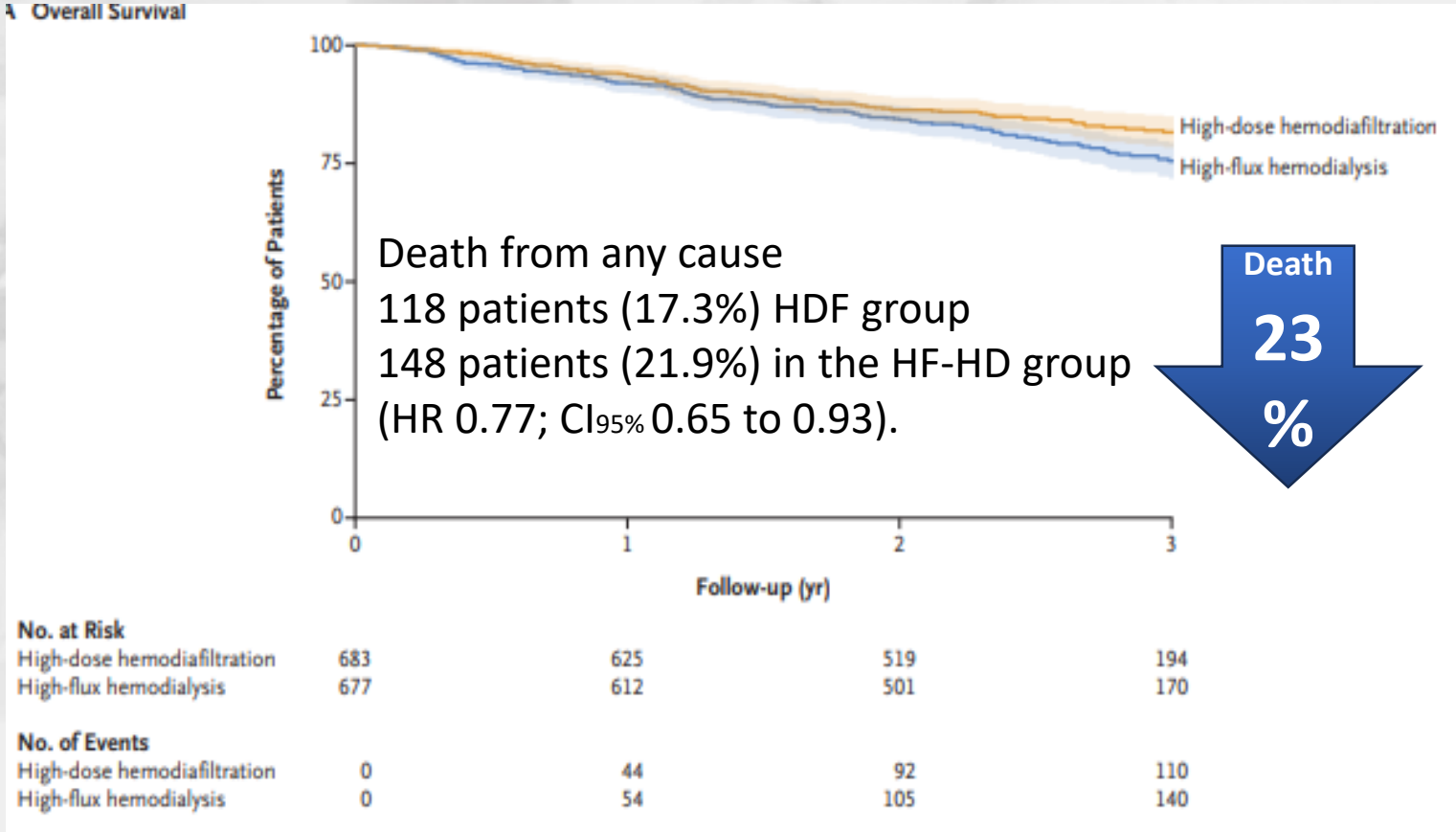
ORIGINAL ARTICLE

Effect of Hemodiafiltration or Hemodialysis on Mortality in Kidney Failure

Peter J. Blankestijn, M.D., Robin W.M. Vernooij, Ph.D., Carinna Hockham, Ph.D., Giovanni F.M. Strippoli, M.D., Bernard Canaud, M.D., Jörgen Hegbrant, M.D., Claudia Barth, M.D., Adrian Covic, M.D., Krister Cromm, M.Sc., Andrea Cucui, M.D., Andrew Davenport, M.D., Matthias Rose, M.D., Marietta Török, M.D., Mark Woodward, Ph.D., and Michiel L. Bots, M.D., for the CONVINCE Scientific Committee Investigators*



pragmatic, multinational, randomized, controlled trial
High Dose HDF (CV>23L) vs HF-HD (mean CV 25.3L per session)
1360 patients underwent randomization
primary outcome was death from any cause.



Death from any cause
118 patients (17.3%) HDF group
148 patients (21.9%) in the HF-HD group
(HR 0.77; $CI_{95\%}$ 0.65 to 0.93).

Death
23
%

published on June 16, 2023, at NEJM.org.

The NEW ENGLAND JOURNAL of MEDICINE

Effect of Hemodiafiltration or Hemodialysis on Mortality in Kidney Failure

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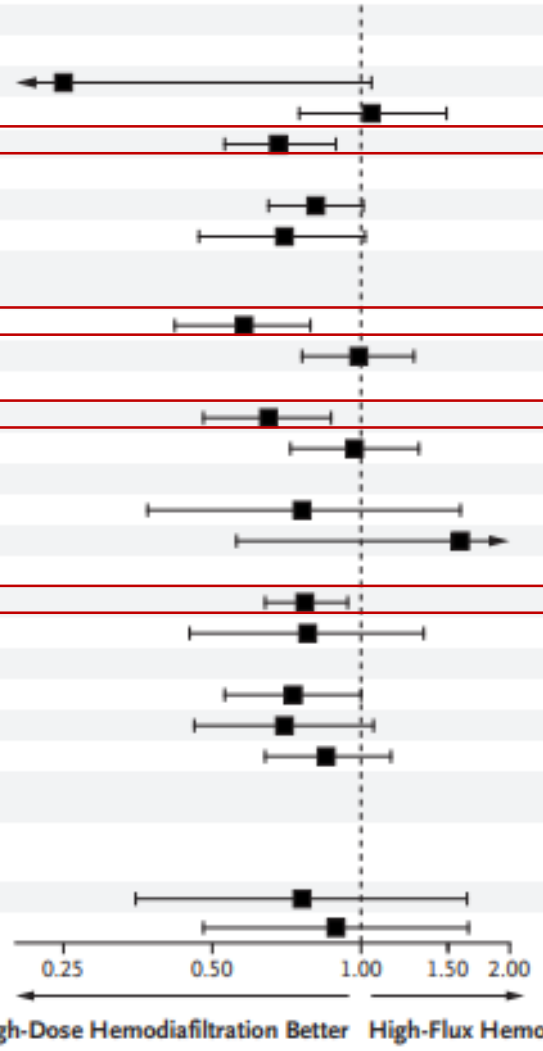
B Risk of Death

Subgroup	High-Dose Hemodia-filtration (no. of events/no. of patients)	High-flux Hemodialysis (no. of events/no. of patients)	High-Dose Hemodia-filtration (rate/100 person-yr)	High-flux Hemodialysis (rate/100 person-yr)	Hazard Ratio (95% CI)
Death from any cause					
Age					
<50 yr	2/121	8/119	0.64	2.57	0.25 (0.06–1.05)
50 to 65 yr	49/264	43/250	7.61	7.13	1.05 (0.75–1.49)
>65 yr	67/298	97/308	9.59	13.92	0.68 (0.53–0.89)
Sex					
Male	83/436	97/420	7.94	9.82	0.81 (0.65–1.01)
Female	35/247	51/257	5.74	8.17	0.70 (0.47–1.02)
Preexisting cardiovascular disease					
No	43/387	66/361	4.40	7.52	0.58 (0.42–0.79)
Yes	75/296	82/316	11.06	11.17	0.99 (0.76–1.28)
Preexisting diabetes					
No	54/453	76/426	4.72	7.24	0.65 (0.48–0.87)
Yes	64/230	72/251	12.50	12.81	0.97 (0.72–1.31)
Residual urinary output					
<1000 ml/24 hr	12/52	17/52	9.23	12.32	0.76 (0.37–1.59)
≥1000 ml/24 hr	6/30	3/26	6.67	4.05	1.59 (0.56–4.45)
Vascular access					
Fistula	97/558	123/557	7.16	9.23	0.77 (0.64–0.94)
Graft or catheter	21/125	25/120	6.98	8.93	0.78 (0.45–1.34)
Dialysis vintage					
<2 yr	37/267	51/281	5.59	7.56	0.73 (0.53–1.00)
2 to 5 yr	34/207	49/207	6.94	9.96	0.70 (0.46–1.06)
>5 yr	46/207	48/188	9.18	10.86	0.85 (0.64–1.15)
Death from cardiovascular causes					
Preexisting cardiovascular disease					
No	12/387	14/361	1.23	1.59	0.76 (0.35–1.64)
Yes	19/296	23/316	2.80	3.13	0.89 (0.48–1.65)



published on June 16, 2023, at NEJM.org.

Long-term Effects of Dialysis

There are Seven major long-term dialysis problems:

1.**Heart disease**: failed

2.**Anaemia:** success (ESA)

3.**Bone disease**: success (Non Ca-based Phosphate binders, Cinacalcet, quality of water)

Vascular calcification & Calciphylaxis (failed)

4. **Amyloidosis**: (success with high flux membrane/beta2microglobulin clearance)

5.**Nerve damage**: failed

6. **Cachexia**: failed (MIA syndrome)

7. **Post dialysis Fatigue**

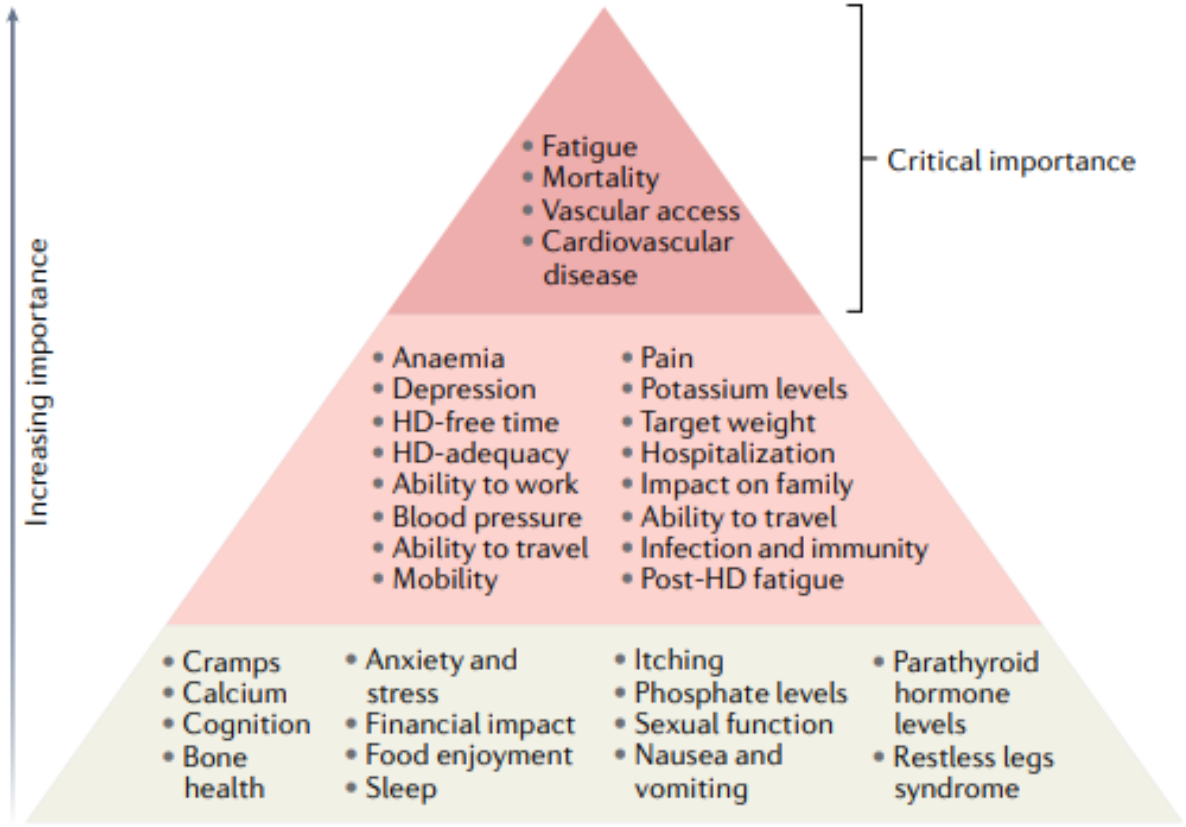


Fig. 1 | **Hierarchy of importance of haemodialysis outcomes to patients, caregivers and clinicians.** The Standardized Outcomes in Nephrology in Haemodialysis initiative has identified a hierarchy of HD outcomes according to their level of importance to stakeholder groups[22,24–29]. The outcomes in the top tier are critically important to all stakeholder groups, those in the middle tier are critically important to some stakeholder groups and those in the bottom tier are important to some or all stakeholder groups. Adapted with permission from Tong et al.[263], Elsevier.

A. K. Bello et al. Nature Review Nephrology 2022; 18:381

PROMs

Patient-reported outcome measures

Measure	Definition	Prevalence or incidence	Clinical impact	Refs
Fatigue	Subjective, complex and multidimensional experience (for example, weakness and/or lethargy) that encompasses both physical and psychological domains	Widely variable prevalence; 60–97%	Reduced sleep quality; poor QOL; increased risk of CVD, hospitalization and all-cause mortality	123–134
Life participation	Ability to engage in everyday life events (for example, work, travel, recreation, study and/or physical activity)	Prevalence is highly variable and difficult to measure; influenced by multiple factors: method of HD delivery (in-centre HD versus home HD), treatment schedule, need for repeated invasive procedures, HD symptoms (for example, post-dialysis fatigue) and complications (for example, pruritus, dizziness or headaches)	Affects patients' choices of treatment and modalities, as well as outcomes; can impact QOL	22,24,142,143
Depression	A mood disorder that causes a persistent feeling of sadness and loss of interest in everyday life activities, and leads to a variety of emotional and physical consequences	Variable; global representative data suggest a prevalence of 22.8% (95% CI 18.6–27.6%) based on interview and 39.3% (95% CI 36.8–42.0%) based on self-report scales	Increased risk of mortality, hospitalizations, non-adherence to dialysis and lower HR-QOL	145–156
Anxiety	Anticipation of a future concern; associated with muscular tension and avoidance behaviour	Variable; systematic review of 61 observational studies from Europe, North America, Asia and Africa reported a high prevalence (42%) of elevated anxiety symptoms	Increased risk of functional symptoms such as depression; affects mineral bone metabolism (decreased parathyroid hormone levels); increased length of hospitalization and decreased perceived QOL and vitality levels	162–164
Cramps	Intradialytic painful involuntary musculature contraction	Incidence 24–86%	Reduced quality of dialysis (reduced time on treatment and interruptions); reduced QOL	165–168
Pain	Localized or generalized unpleasant bodily sensation leading to mild to severe physical discomfort and emotional distress	A systematic review and meta-analysis of 48 studies involving 8,464 patients from 23 countries reported a 60.5% mean prevalence of chronic pain	Insomnia and depression; reduced QOL	171,173
Pruritus	Unpleasant skin sensation that provokes a desire to scratch for relief	A large prospective study reported that 42% of 18,801 experienced moderate to extreme pruritus	Increased mortality risk; poor sleep; reduced QOL; depression	177–179
Restless legs syndrome	Desire to move the extremities, associated with paraesthesias and/or dysaesthesias, motor restlessness and worsening of symptoms at rest with at least temporary relief by activity	Variably reported; prevalence 12–62%	Sleep disturbances; decreased QOL; premature withdrawal from dialysis; increased CVD morbidity and mortality	181–184
Sexual dysfunction	Persistent, recurrent problems with sexual response, desire, orgasm or pain that affect sexual relationships	A systematic review found that the prevalence of erectile dysfunction in male patients was 75% (95% CI 72–77%) Only one study reported on sexual dysfunction in 138 female patients, and observed a prevalence of 29.7%	Decreased QOL; increased risk of CVD morbidity and mortality.	187
Sleep quality	A measure of whether sleep is restful and restorative	An assessment of sleep quality in 11,351 patients from 308 HD units in 7 countries reported a 49% prevalence of poor sleep quality	Increased mortality; increased risk of CVD; decreased QOL	189

Uremia retention solutes: Uremia toxins

Table 1. Main known uremic retention solutes

Small water soluble solutes	Protein-bound solutes	Middle molecules
Asymmetric dimethylarginine	3-Deoxyglucosone	Adrenomedullin
Benzylalcohol	CMPF	Atrial natriuretic peptide
β-Guanidinopropionic acid	Fructoselysine	β_2-Microglobulin
β-Lipotropin	Glyoxal	β-Endorphin
Creatinine	Hippuric acid	Cholecystokinin
Cytidine	Homocysteine	Clara cell protein
Guanidine	Hydroquinone	Complement factor D
Guanidinoacetic acid	Indole-3-acetic acid	Cystatin C
Guanidinosuccinic acid	Indoxyl sulfate	Degranulation inhibiting protein I
Hypoxanthine	Kinurenine	Delta-sleep-inducing peptide
Malondialdehyde	Kynurenic acid	Endothelin
Methylguanidine	Methylglyoxal	Hyaluronic acid
Myoinositol	N-carboxymethyllysine	Interleukin 1β
Orotic acid	P-cresol	Interleukin 6
Orotidine	Pentosidine	Kappa-Ig light chain
Oxalate	Phenol	Lambda-Ig light chain
Pseudouridine	P-OHhippuric acid	Leptin
Symmetric dimethylarginine	Quinolinic acid	Methionine-enkepahlin
Urea	Spermidine	Neuropeptide Y
Uric acid	Spermine	Parathyroid hormone
Xanthine		Retinol binding protein
		Tumor necrosis factor alpha

CMPF is carboxy-methyl-propyl-furanpropionic acid.

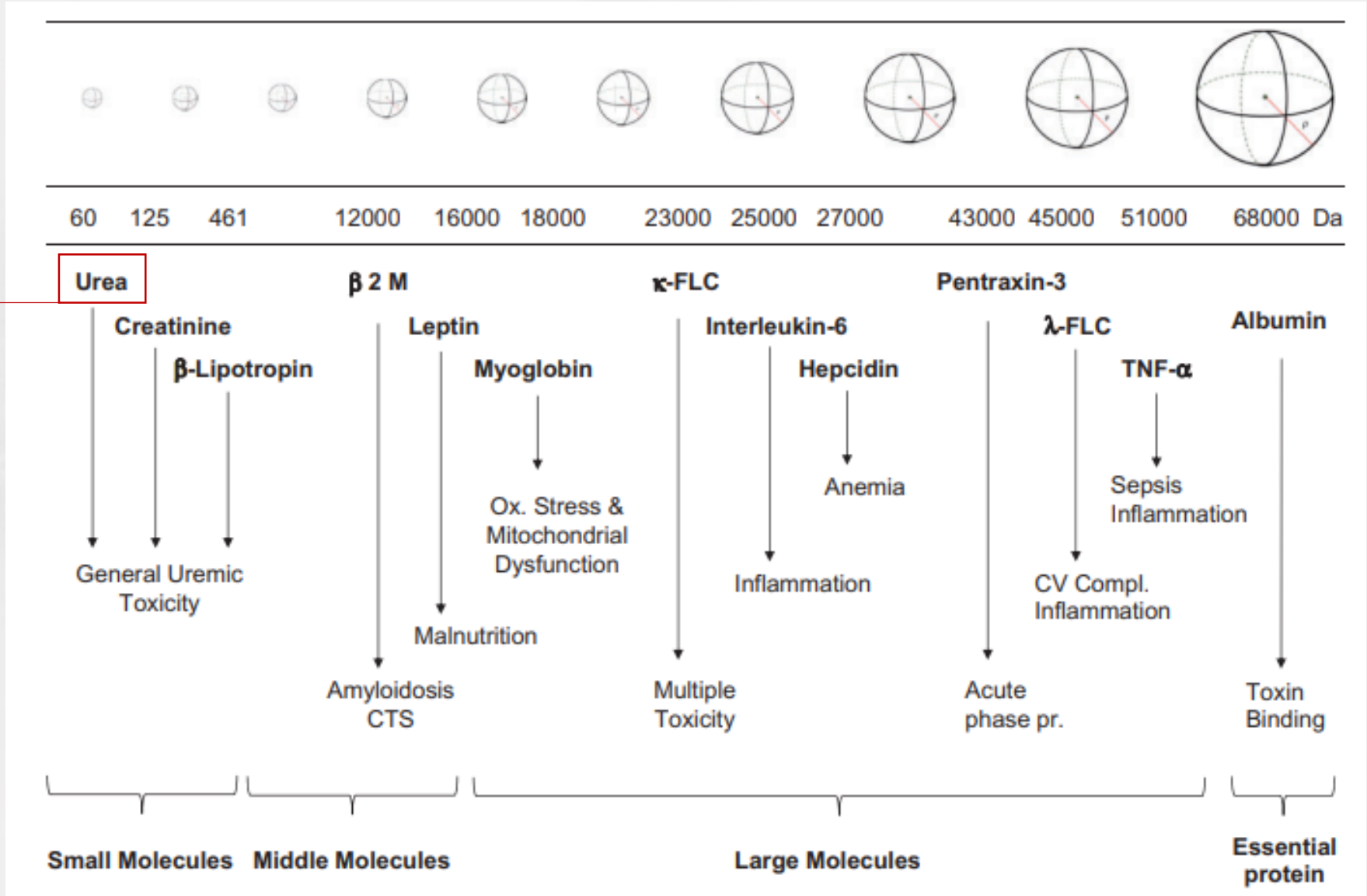
Kt/V

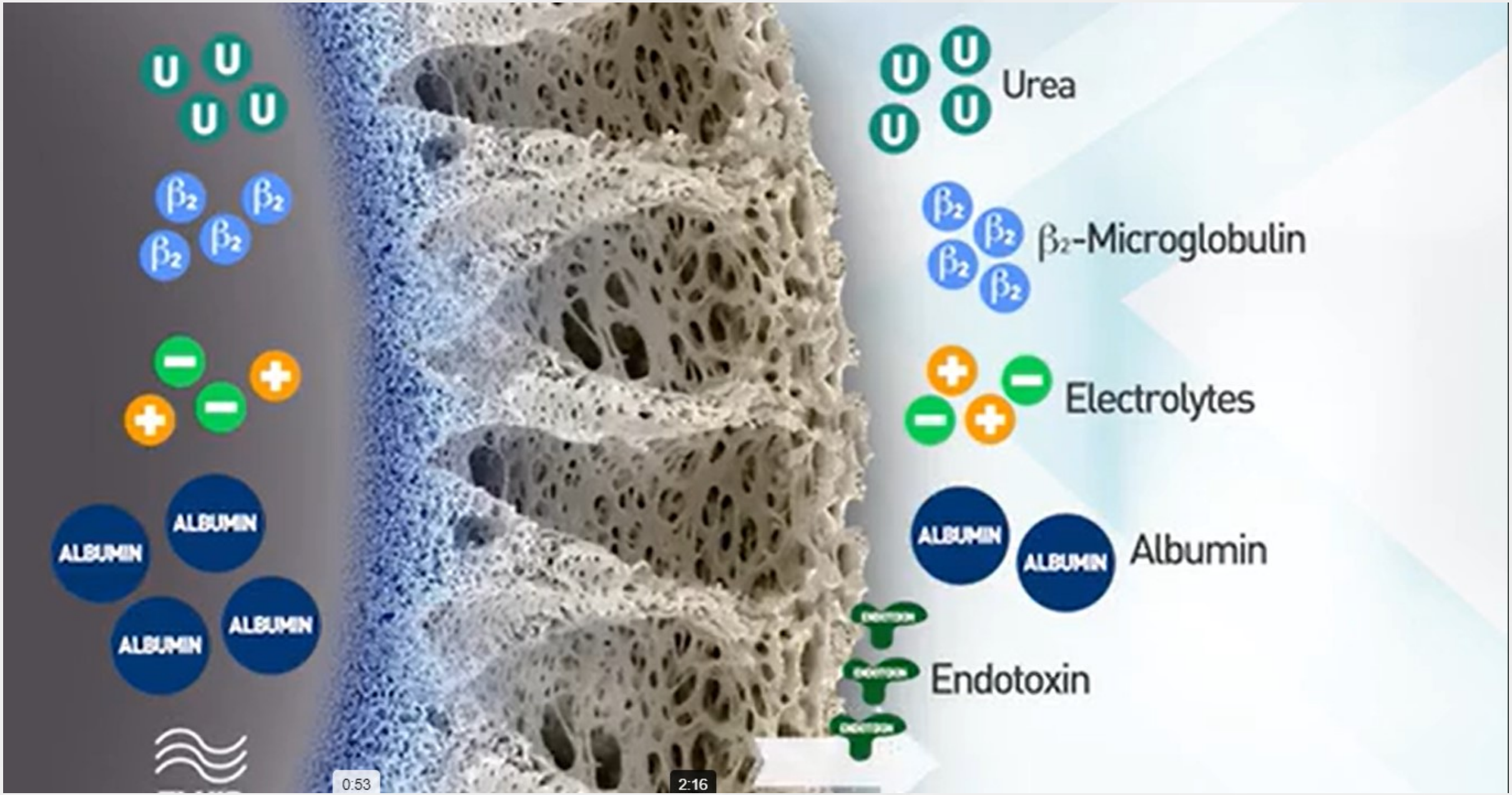
A formula for measuring and expressing the degree of dialysis small solute clearance using biochemical parameters

K: dialyzer clearance (that is, the rate at which blood passes through the dialyzer) in ml/min;

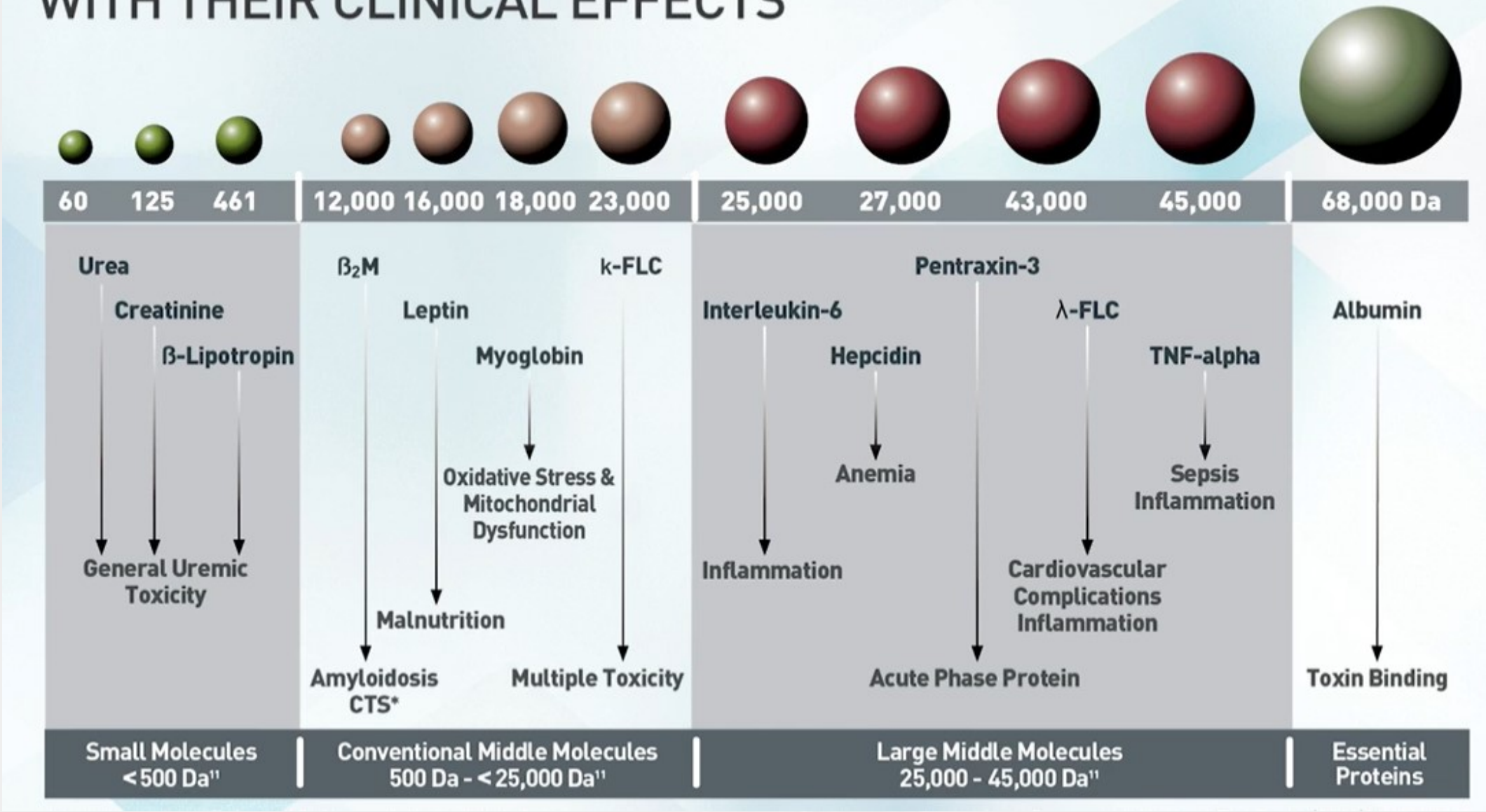
t, time;

V, volume of total body water




U
U
U
U
β2
β2
β2
β2
ALBUMIN
ALBUMIN
ALBUMIN
ALBUMIN
Urea
β2-Microglobulin
Electrolytes
Albumin
Endotoxin
0:53
2:16

CLASSIFICATION OF UREMIC TOXINS WITH THEIR CLINICAL EFFECTS



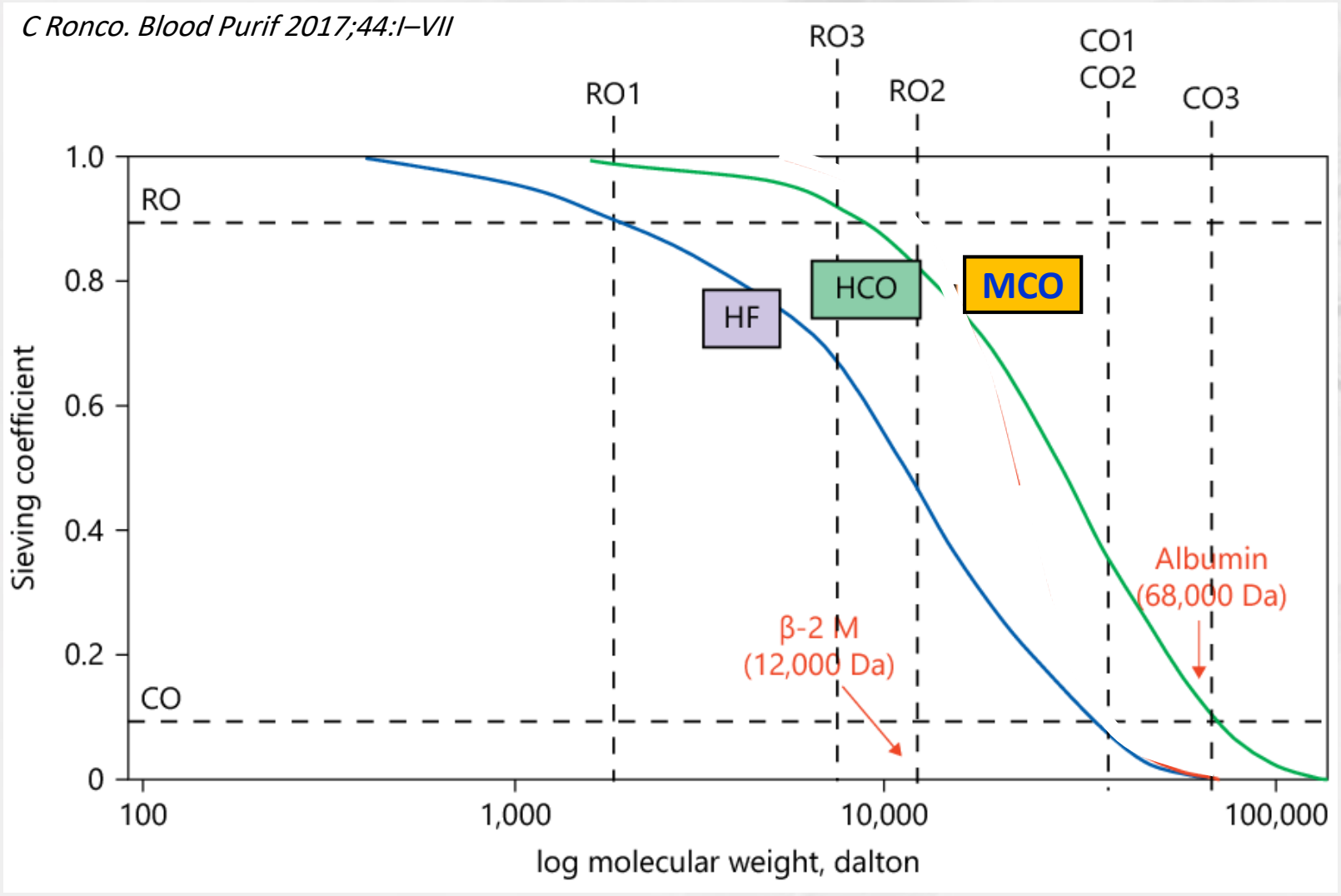
Sieving curves of classic HF and MCO & HCO membranes.

HCO = Albumin loss
HF & HCO = wide MWRO-MWCO

When 90% of the solute is retained in the filtration process (sieving = 0.1), the corresponding MW of that solute defines the cut-off value of the membrane (MWCO).

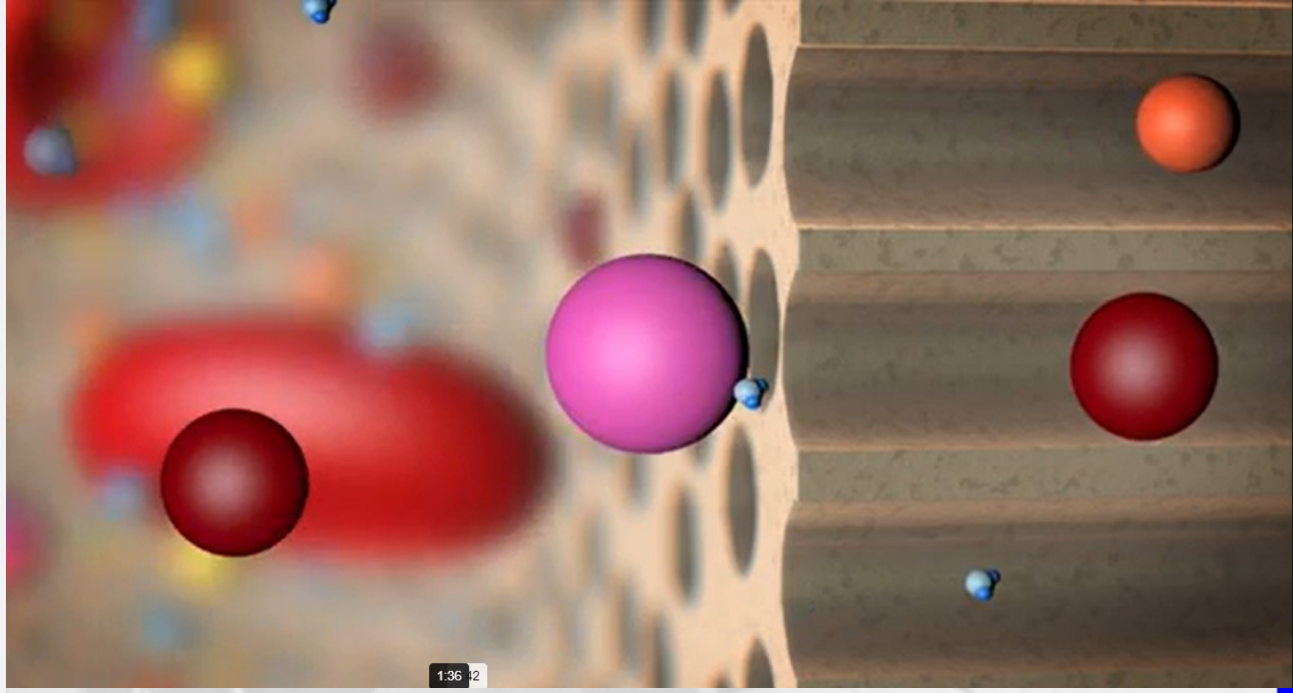
On the other side of the sieving curve, the MW at which 10% of the solute is retained (sieving = 0.9) defines the retention onset of the membrane (MWRO).

C Ronco. Blood Purif 2017;44:I–VII

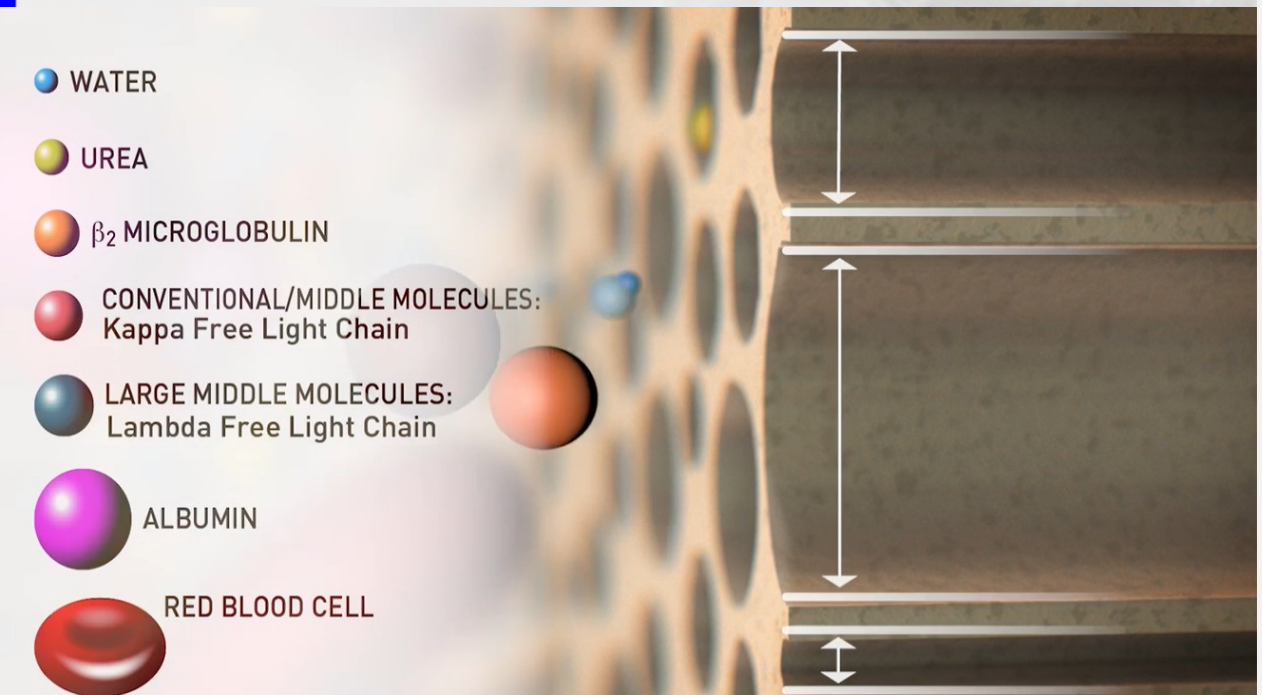


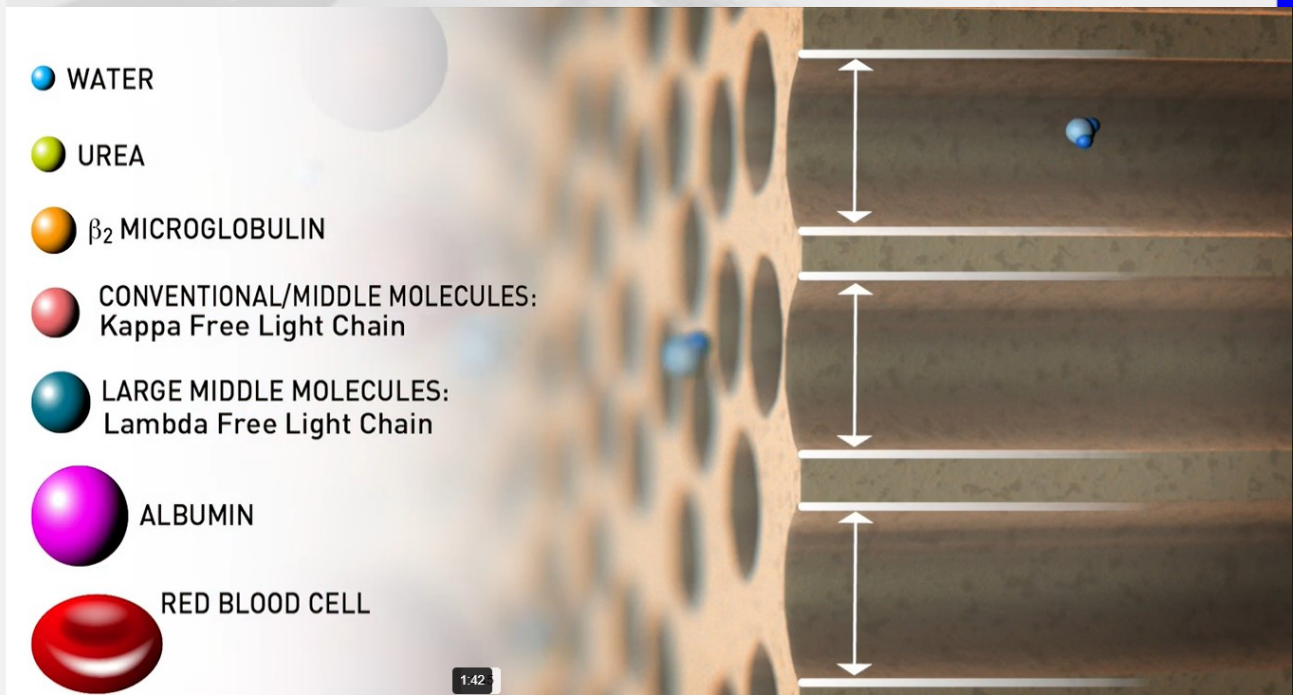
The MWCO and MWRO characterize the shape of the sieving curve for each membrane and ultimately define the permeability properties

HF membrane

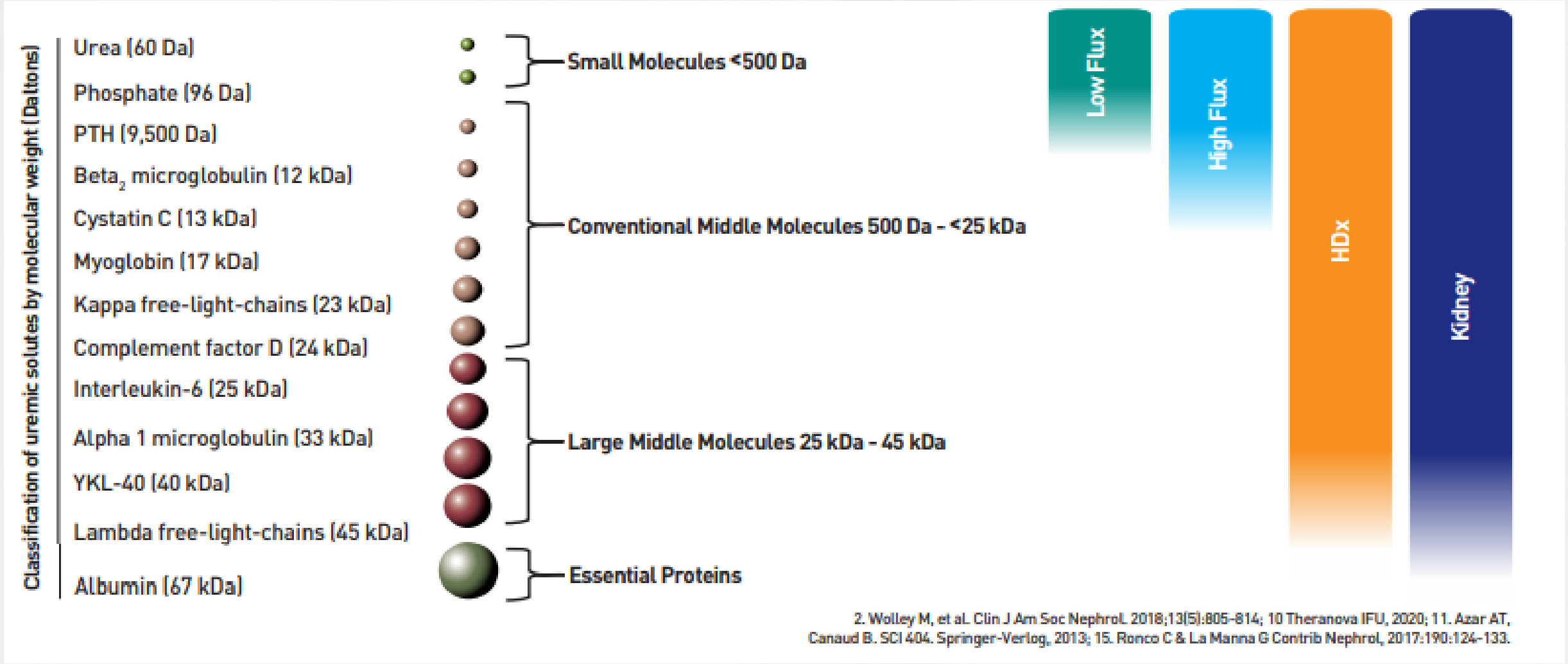


MCO Theranova membrane

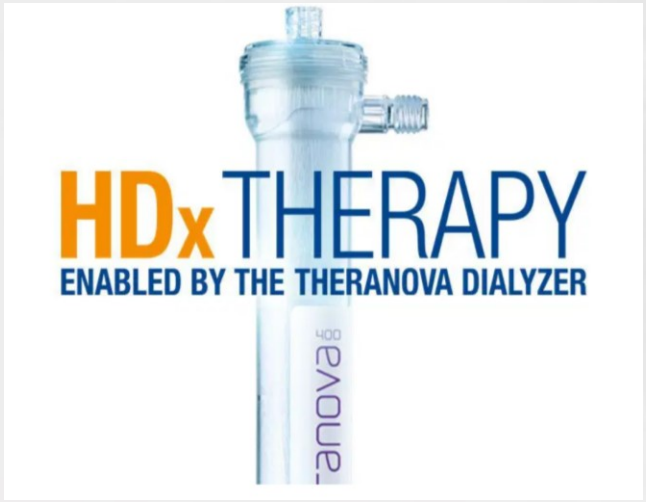




Traditional high-flux membranes have limited ability to remove conventional and large middle molecular uremic toxins (up to 45,000 Da)



2. Wolley M, et al. Clin J Am Soc Nephrol. 2018;13(5):805-814; 10 Theranova IFU, 2020; 11. Azar AT, Canaud B. SCI 404. Springer-Verlog, 2013; 15. Ronco C & La Manna G Contrib Nephrol, 2017:190:124-133.


HDx THERAPY
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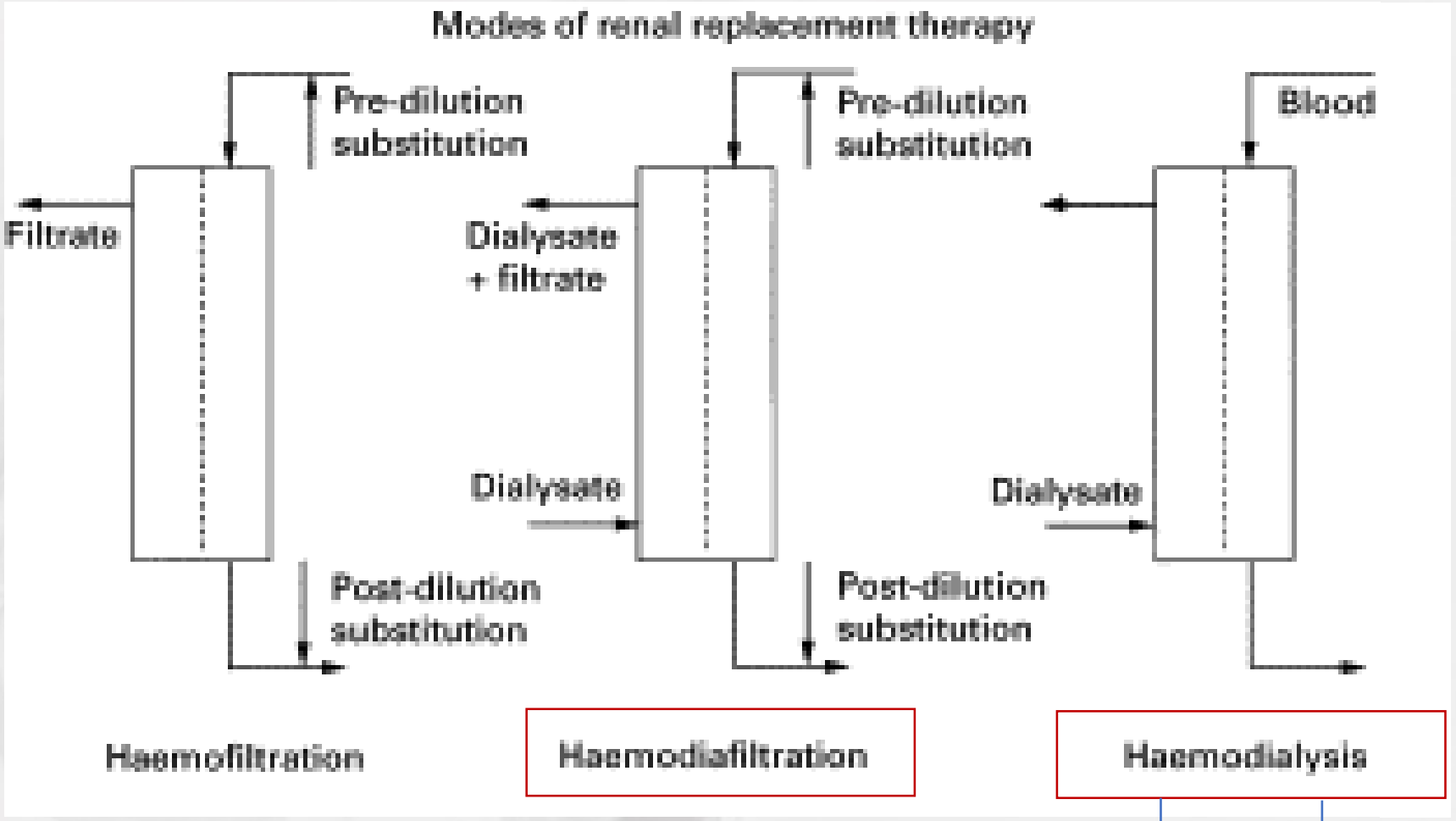
Modes of renal replacement therapy
Pre-dilution substitution
Filtrate
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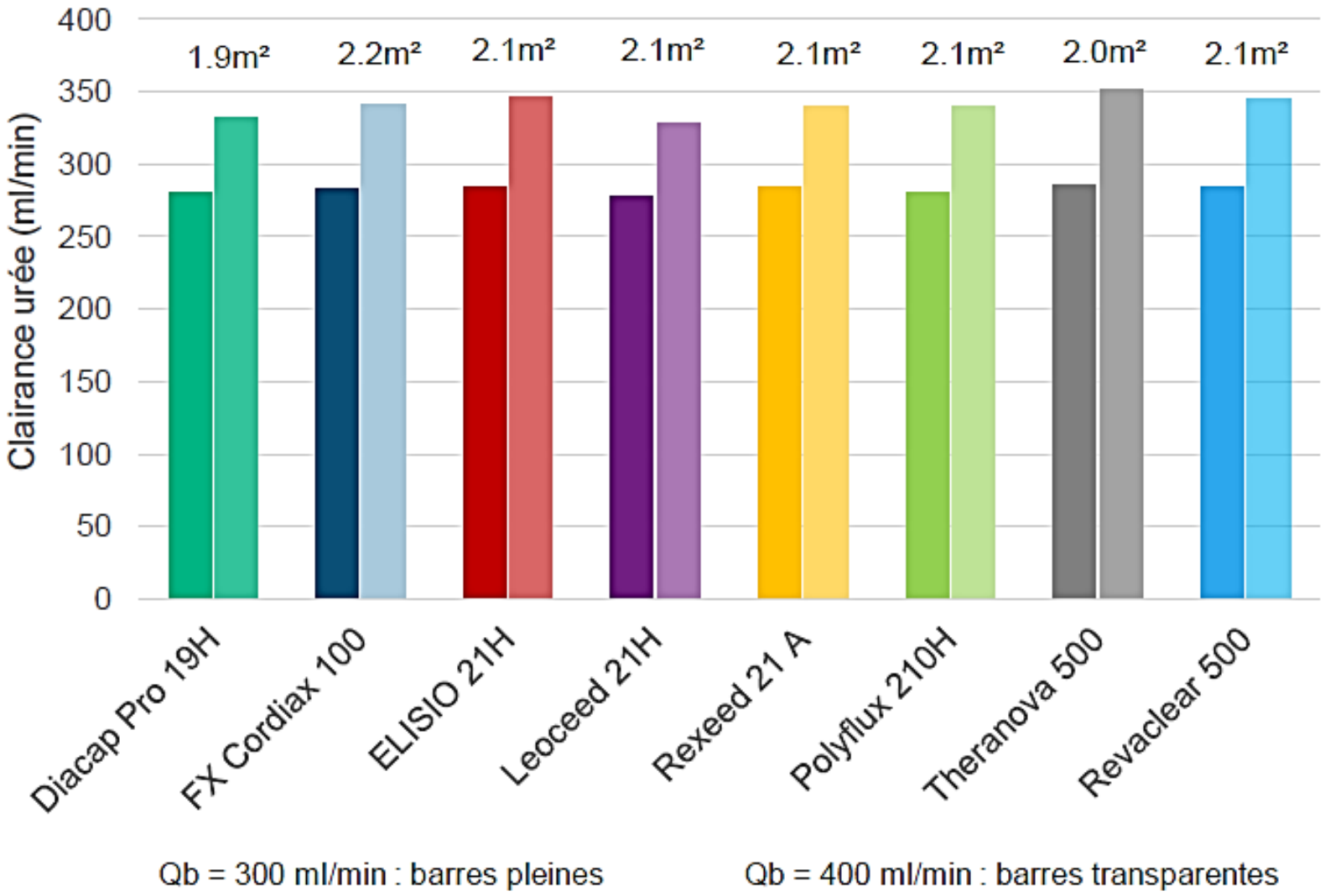
Haemofiltration
Pre-dilution substitution
Dialysate + filtrate
Dialysate
Post-dilution substitution
Haemodiafiltration
Blood
Dialysate
Haemodialysis
HFHD
LFHD

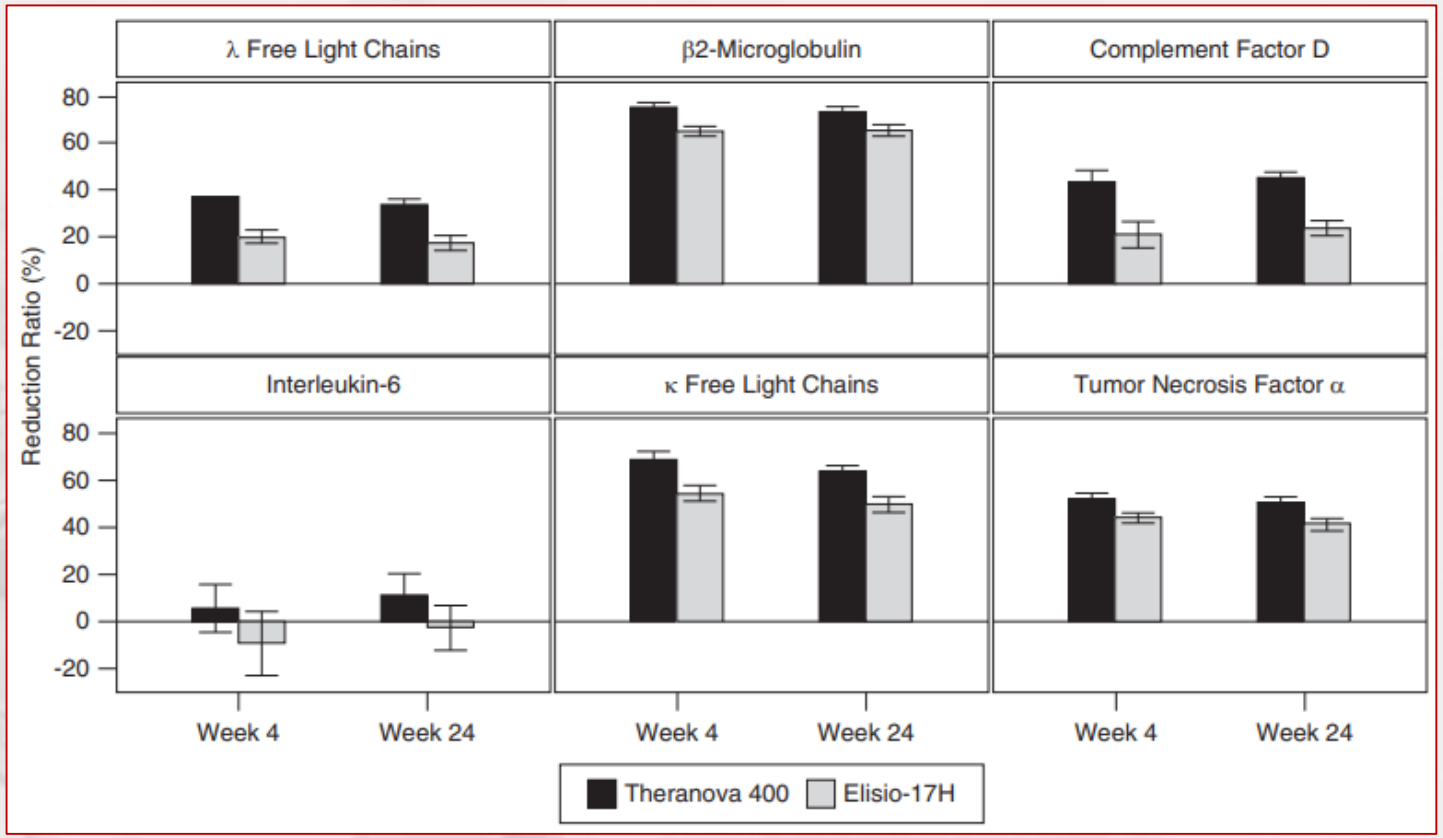
Clearance of Small Molecules



(1) Analyse de la concurrence. Données comparées pour Qb = 300 ml/min et Qb = 400 ml/min avec Qd = 500 ml/min et Qf = 0 ml/min

Efficacy and Safety of Expanded Hemodialysis with the Theranova 400 Dialyzer: A Randomized Controlled Trial

Removal of middle molecules at 4 and 24 weeks. The reduction ratios of FLC λ, complement factor D, FLC κ, TNFα, and β2-microglobulin were significantly higher in the Theranova group compared with the Elisio-17H group (P 0.001 for all). For IL-6, the difference was not statistically significant



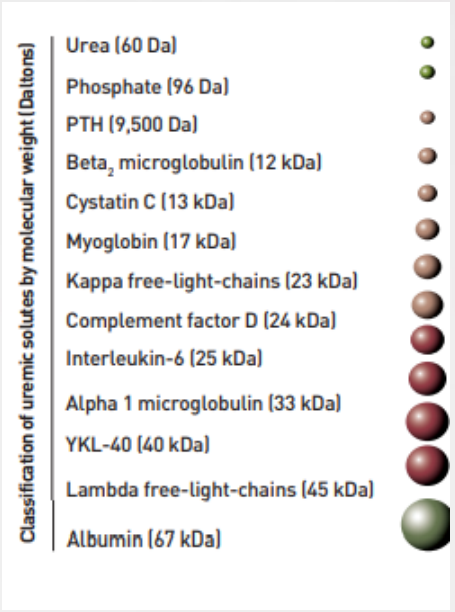


Table 2. Primary safety outcome: Predialysis serum albumin assessment after 24 weeks

Parameter	Dialyzer	n	Mean (SD)	Median	Minimum, Maximum	Two-Sided 95% Confidence Interval[a]
Predialysis serum albumin after 24 wk, g/dl	Theranova 400	64	4.0 (0.3)	4.0	3.5, 4.7	−0.12 to 0.05
	Control	65	4.1 (0.4)	4.0	3.2, 4.9	

[a]If the lower bound of the two-sided 95% confidence interval around the mean estimated treatment difference between Theranova 400 and the control is >−0.1765, then noninferiority can be claimed. If the lower bound of the two-sided 95% confidence interval is >0, then superiority may be concluded.

D E. Weiner et al. C-JASN 2020;15: 1310–1319

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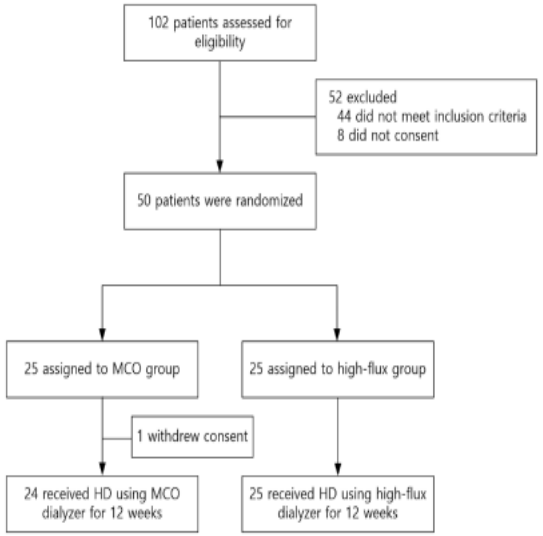
Randomized controlled trial of medium cut-off versus high-flux dialyzers on quality of life outcomes in maintenance hemodialysis patients

Jeong-Hoon Lim[1], Yeongwoo Park[2], Ju-Min Yook[1], Soon-Youn Choi[1], Hee-Yeon Jung[1], Ji-Young Choi[1], Sun-Hee Park[1], Chan-Duck Kim[1], Yong-Lim Kim[1] & Jang-Hee Cho[1]✉



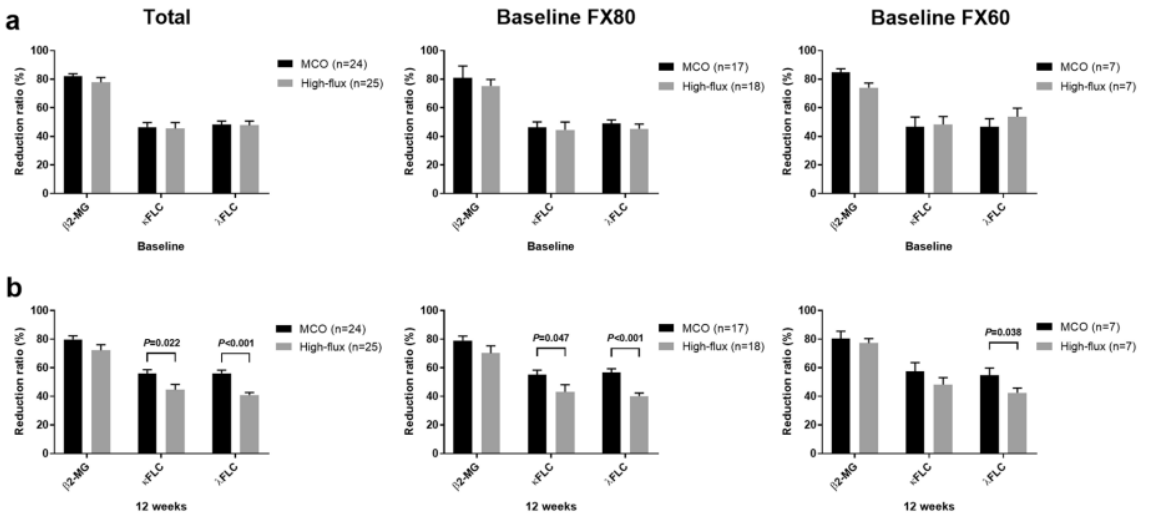
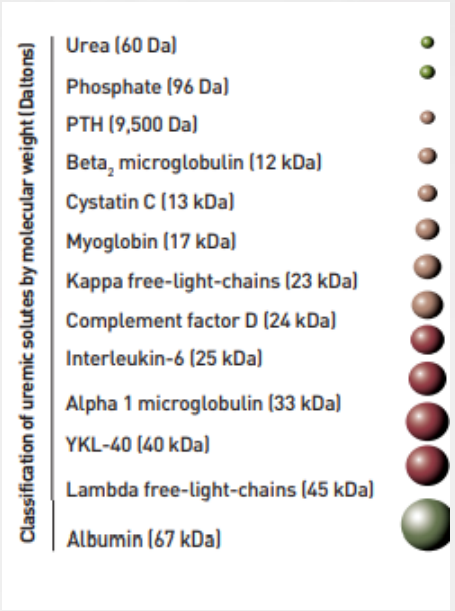


Figure 2. Reduction ratios of middle molecules. (**a**) Reduction ratio at baseline. (**b**) Reduction ratio at 12

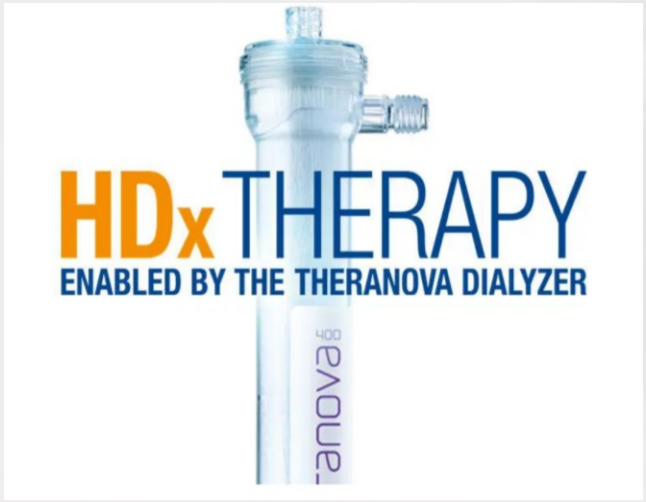
a randomized, prospective, controlled, open-label, phase 4, monocenter, trial
12 HD patients HF-HD were randomly assigned to either an MCO (Theranova 400, Baxter) or a high-fux (FX CorDiax 80 or 60)



Reduction ratio of uremic retention solutes

	Reduction ratio (%)	Baseline			12 weeks		
		MCO	High-flux	*P*	MCO	High-flux	*P*
12kDa	β2-microglobulin	82.1 ± 7.8	77.8 ± 16.2	0.265	79.8 ± 12.2	72.3 ± 18.2	0.109
23kDa	κFLC	46.5 ± 15.7	45.5 ± 21.0	0.851	55.8 ± 13.7	44.6 ± 18.9	**0.022**
45kDa	λFLC	48.3 ± 11.6	47.7 ± 14.8	0.865	56.1 ± 11.4	40.9 ± 9.0	**<0.001**

Lim JH et al. Nature/Sci Rep. 2020; 10:7780.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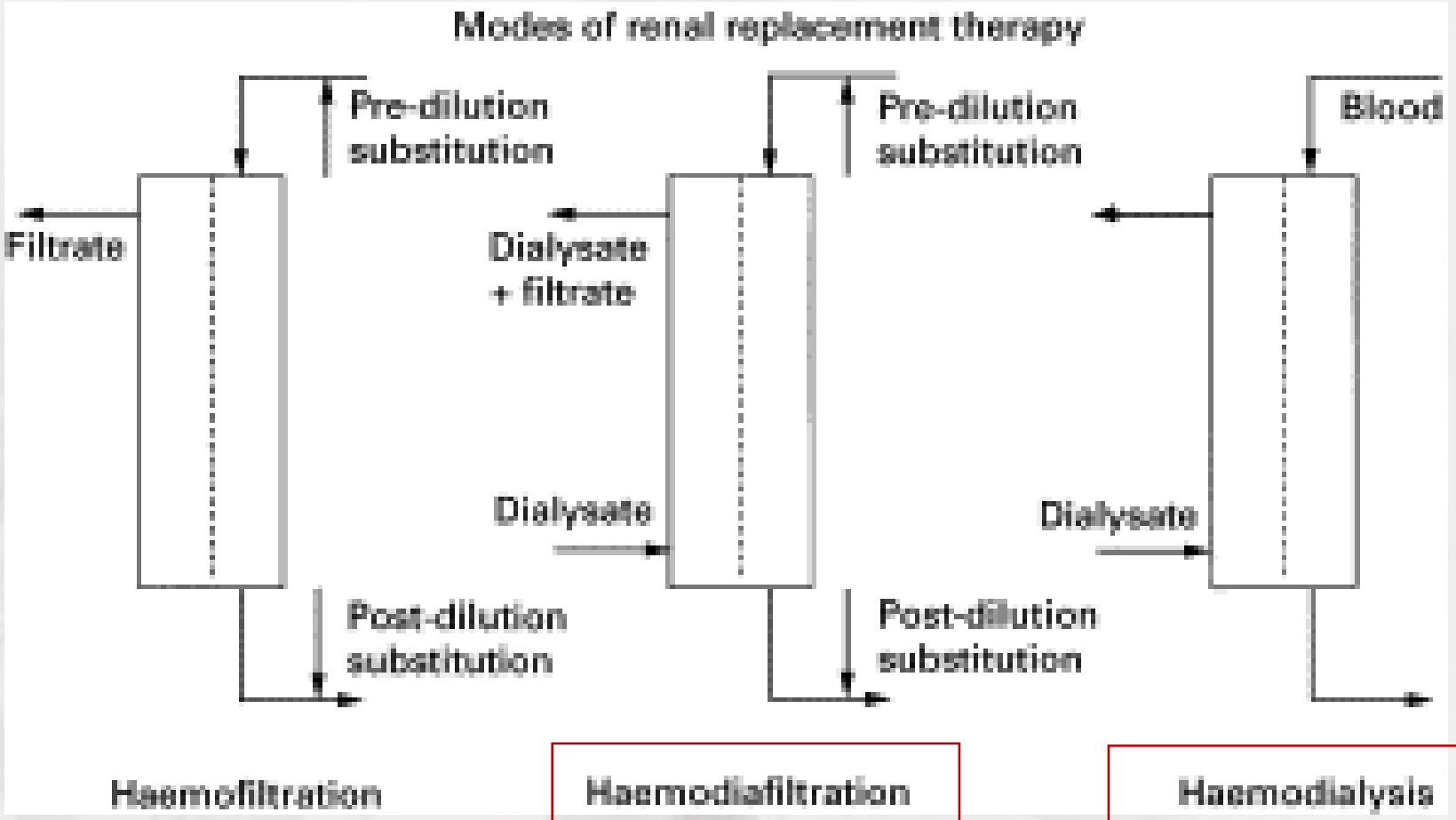
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Haemodiafiltration
Blood
Dialysate
Haemodialysis

HFHD

LFHD

Blood Purification

Research Article

Blood Purif
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Medium Cut-Off Dialyzer versus Eight Hemodiafiltration Dialyzers: Comparison Using a Global Removal Score

Francisco Maduell[a] Lida Rodas[a] José Jesús Broseta[a] Miquel Gomez[a]
Marc Xipell[a] Elena Guillen[a] Enrique Montagud-Marrahi[a]
Marta Arias-Guillén[a] Néstor Fontseré[a] Manel Vera[a] Nayra Rico[b]

	Theranova 400	Leoceed 18HX	Xevonta H18	Philter 17G	Elisio 9H	Revaclear 400	Toraylight NS-18S	FX80 Cordiax	Solacea 19H
Membrane	Polyarylethersulfone	Polysulfone	Polysulfone	Polyphenylene	PES Nipro	Polyarylethersulfone	Polysulfone	Helixone	ATA
Commercial brand	Baxter	Asahi	BBraun	Medtronic		Baxter	Palex	FMC	Nipro
KUF, mL/h/mm Hg	48	86	99	53	76	54	67	64	72
Wall thickness, µm	35	35	35	30	40	35	40	35	25
Inner diameter, µm	180	200	195	200	200	190	200	185	200
SC B_2-microglobulin	1.0	0.8	0.8	0.8	0.8	0.7	0.9	0.9	0.85
SC myoglobin	0.9	0.5	ND	ND	ND	ND	ND	0.5	0.8
SC albumin	0.008	0.001	0.001	0.002	0.002	0.01	0.003	0.001	0.013
Surface, m^2	1.7	1.8	1.8	1.7	1.9	1.8	1.8	1.8	1.9
Sterilization	Steam	Gamma-ray	Gamma-ray	Gamma-ray	Gamma-ray	Steam	Gamma-ray	Steam	Gamma-ray

PES, polyethersulfone; ATA, asymmetric cellulose triacetate; KUF, ultrafiltration coefficient; SC, sieving coefficient.

	Theranova 400	Leoceed 18HX	Xevonta H18	Philter 17G	Elisio 19H	Revaclear 400	Toraylight NS-18S	HF80 Cordiax	Solacea 19H
Qb, mL/min	433±37	433±37	433±37	433±37	433±37	433±37	433±37	433±37	433±37
Blood processed, L	124.8±13	123.5±13	122.9±13	124.0±13	123.5±13	122.4±15	123.6±13	123.9±12	123.5±13
Recirculation, %	14.4±2.7	14.2±2.7	13.3±2.2	13.5±2.9	13.6±2.1	13.7±3.3	14.7±3.2	14.8±2.9	14.5±3.3
Real Td, min	287.9±16	286.1±16	285.3±16	286.3±16	286.3±15	284.2±16	286.5±15	285.4±16	285.2±16
Final weight, kg	68.6±15.9	69.0±15.9	68.9±15.8	68.8±16.0	68.7±16.0	68.6±15.9	68.5±16.2	68.6±16.0	68.4±15.7
Weight gain, kg	2.65±0.97	2.62±1.09	2.48±1.02	2.74±1.20	2.22±1.19	2.60±1.00	2.71±1.21	2.62±1.12	2.52±0.97
Initial hematocrit, %	28.4±4.5	29.0±4.4	29.1±4.0	28.5±4.5	28.5±3.9	29.2±5.8	29.2±4.7	29.7±4.3	29.7±4.3
Final hematocrit, %	34.6±5.6	35.1±6.6	34.9±5.8	34.5±5.7	34.6±6.3	35.6±7.2	35.8±6.3	36.2±6.0	36.0±6.0
Arterial pressure, mm Hg	−213±20	−217±30	−214±27	−214±22	−210±21	−218±27	−214±25	−218±20	−215±21
Venous pressure, mm Hg	205±23	205±33	208±28	202±25	194±25	205±34	203±26	206±30	211±34
TMP, mm Hg	31±7*	197±23	192±21	198±24	200±20	197±19	198±17	196±21	202±13
Replacement volume, L	Not applicable	31.6±4.5	34.7±4.2	31.7±3.6	33.2±5.4	32.9±4.9	33.5±4.4	33.3±4.3	34.7±4.1

* $p < 0.001$ versus all dialyzers (ANOVA for repeated data).
Qb, blood flow; Td, dialysis time; TMP, transmembrane pressure.

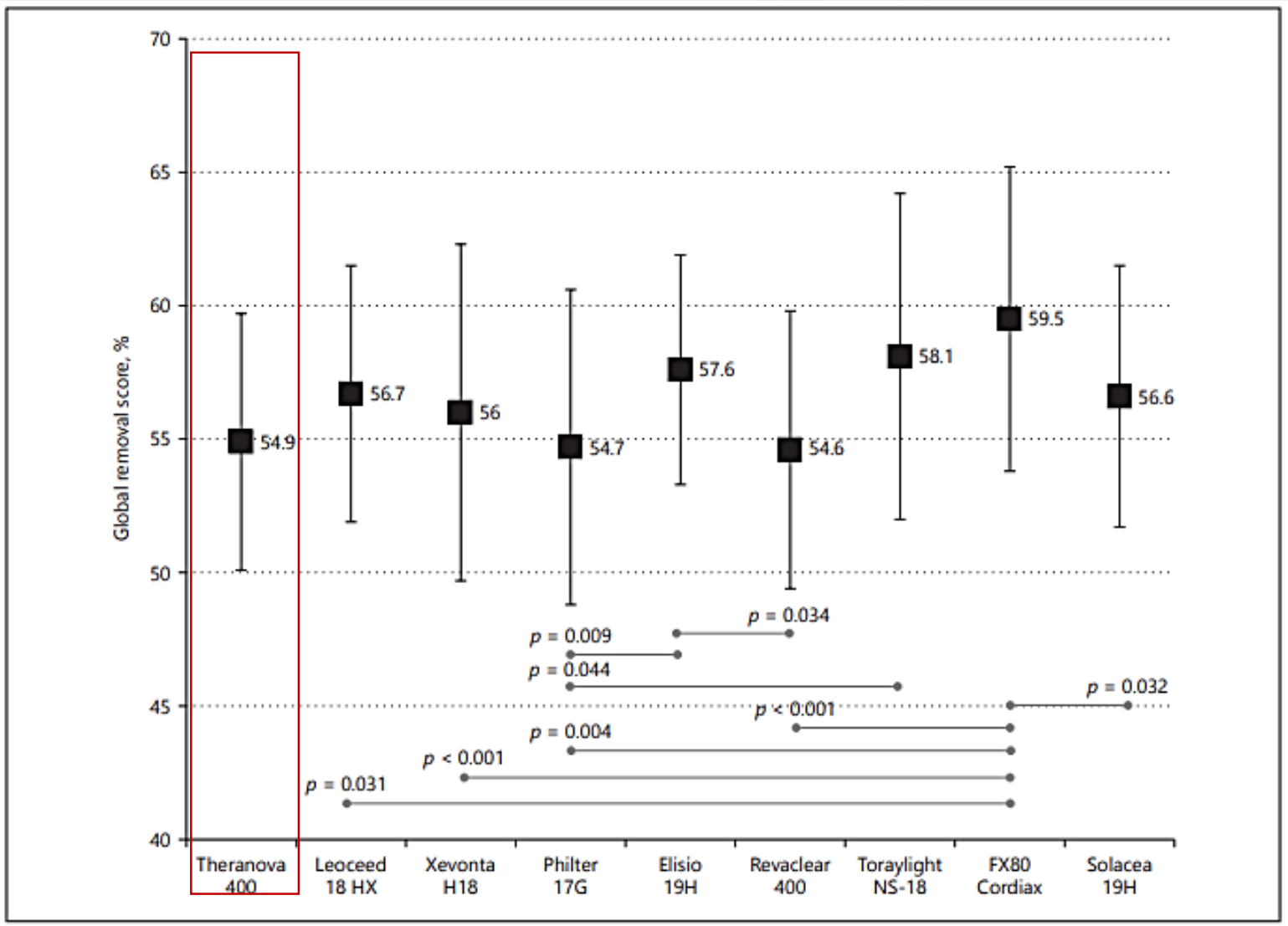


Fig. 2. Global evaluation of removal efficacy for medium-size molecules and albumin loss in all study situations (ANOVA for repeated data). Global removal efficacy = ([$Urea_{RR}$ + β_2-m_{RR} + $myoglobin_{RR}$ + $prolactin_{RR}$ + α_1-$microglobulin_{RR}$ + α_1-acid $glycoprotein_{RR}$]/6 – $albumin_{RR}$).

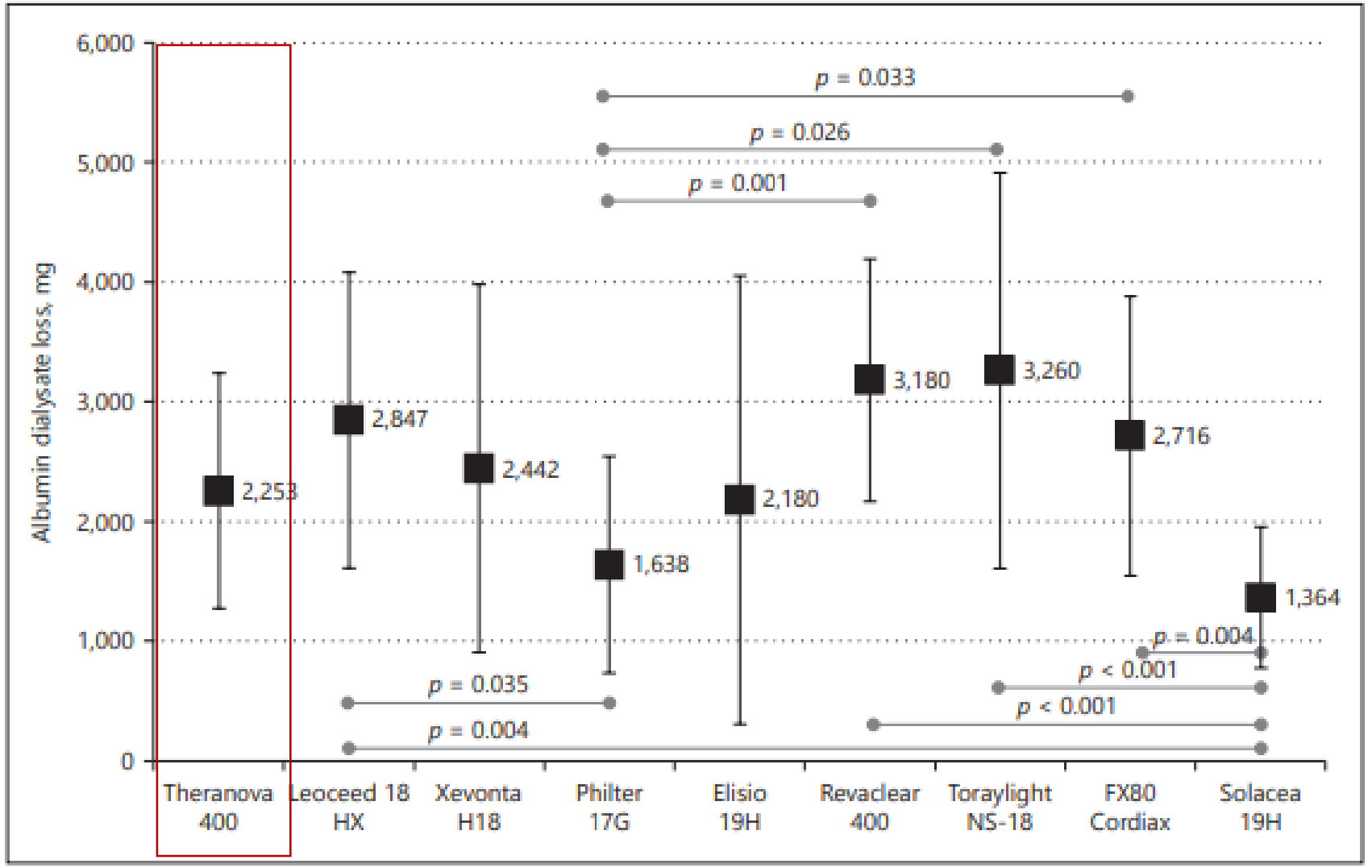


Fig. 1. Comparison of albumin loss in dialysate in MCO dialyzer in hemodialysis treatment versus 8 current high-flux dialyzers in high-volume OL-HDF (ANOVA for repeated data).

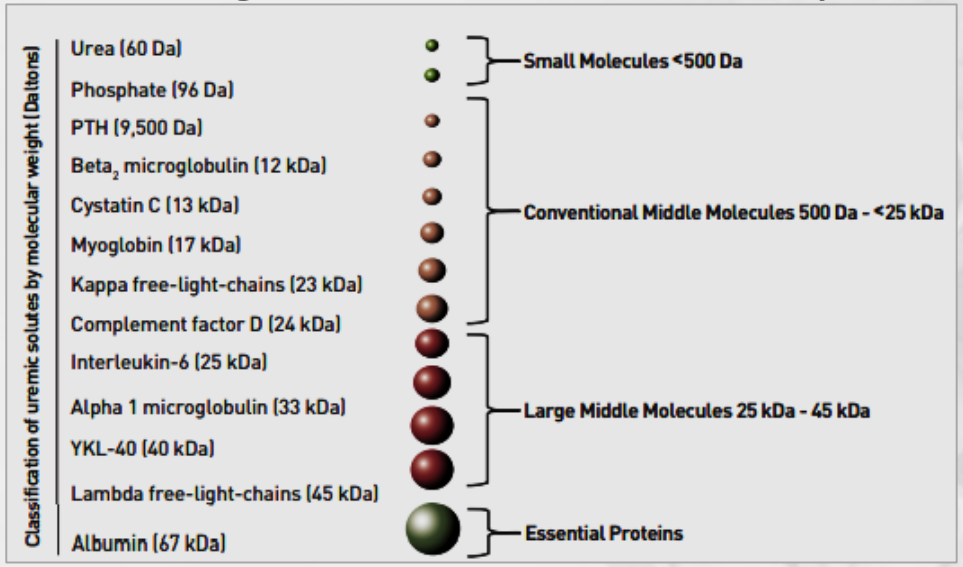
Table 3. Dialysis dose measured by ionic dialysance and solute reduction ratios in the 9 study sessions

	Theranova 400	Leoceed 18HX	Xevonta H18	Philter 17G	Elisio 19H	Revaclear 400	Toraylight NS-18S	FX80 Cordiax	Solacea 19H
Kt, L	69.6±4.7	75.7±5.6* $p < 0.001$	76.5±6.6* $p < 0.001$	73.8±6.1* $p = 0.021$	75.5±9.6* $p = 0.033$	76.2±7.5* $p = 0.002$	72.8±7.2	74.2±7.8	77.5±6.0* $p < 0.001$
Urea (60 Da) RR, %	84.1±4.4	84.2±3.6	85.5±3.8	84.1±3.9	85.7±4.6	85.8±4.4	85.0±3.8	84.6±3.8	85.2±3.5
Creatinine (113 Da) RR, %	77.8±5.0	78.3±4.8	79.4±4.4	78.3±5.3	79.1±6.4	79.1±6.1	78.3±4.2	78.4±4.8	79.3±4.8
β2-microglobulin (11,800 Da) RR, %	80.9±5.5	84.2±4.3	83.8±4.7	82.2±5.3	85.2±3.5* $p = 0.046$	82.8±4.1	84.7±3.9	85.2±3.9	81.3±4.9
Myoglobin (17,200 Da) RR, %	71.5±6.1	72.9±7.7	71.4±9.1	73.9±8.1	76.3±5.7* $p = 0.001$	72.3±7.4	77.0±6.7* $p = 0.006$	78.5±6.1* $p < 0.001$	80.5±5.8* $p < 0.001$
Prolactin (23,000 Da) RR, %	68.2±9	70.0±10	66.8±12	68.3±9	72.2±7	63.3±10	71.6±12	74.0±9	70.0±11
α_1-microglobulin (33,000 Da) RR, %	21.9±14	23.2±9	23.5±12	20.4±14	21.0±14	19.5±11	23.2±18	26.1±12	21.3±12
α_1-acid glycoprotein (41,000 Da) RR, %	12.9±8.4	16.0±7.5	15.6±8.6	10.3±9.8	14.3±7.9	13.9±10.6	17.6±9.8	18.1±9.4	10.0±7.2
Albumin (66,000 Da) RR, %	10.3±6.5	10.5±8.4	11.1±6.8	10.8±8.8	9.3±7.0	10.2±6.8	10.8±8.3	9.5±7.7	8.8±6.2

* Statistical significance versus Theranova 400 dialyzer (ANOVA for repeated data).
RR, removal ratio.

ACCUMULATION OF CONVENTIONAL/LARGE MIDDLE MOLECULES MAY CONTRIBUTE TO DISEASE BURDEN IN KIDNEY FAILURE PATIENTS

In a National Kidney Foundation (NKF) online survey, majority of patients (n=359) receiving in-center hemodialysis reported experiencing interdialytic symptoms:



62% of patients feel fatigue/washed out

40% of patients report 4+ hours of recovery time

6% of patients skipped a dialysis session

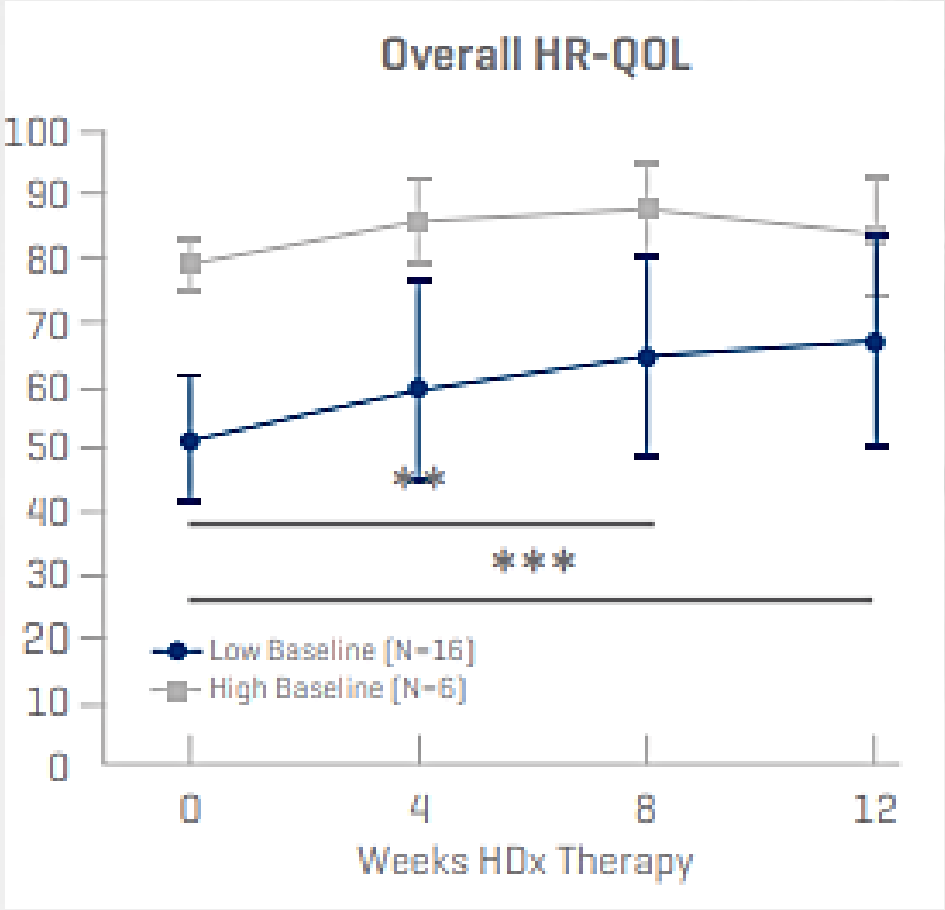
These QoL symptoms were severe and correlated with longer recovery time following hemodialysis, as well as shortened and skipped hemodialysis sessions.

1. Lim JH et al. Nature/Sci Rep. 2020; 10:7780.
2. Wolley M, et al. Clin J Am Soc Nephrol 2018;13:805-814.
3. Alvarez L, et al. Kidney Med. 2020;2(2)125-130.

Impact of expanded hemodialysis using medium cut-off dialyzer on quality of life: application of dynamic patient-reported outcome measurement tool.

KDQoL

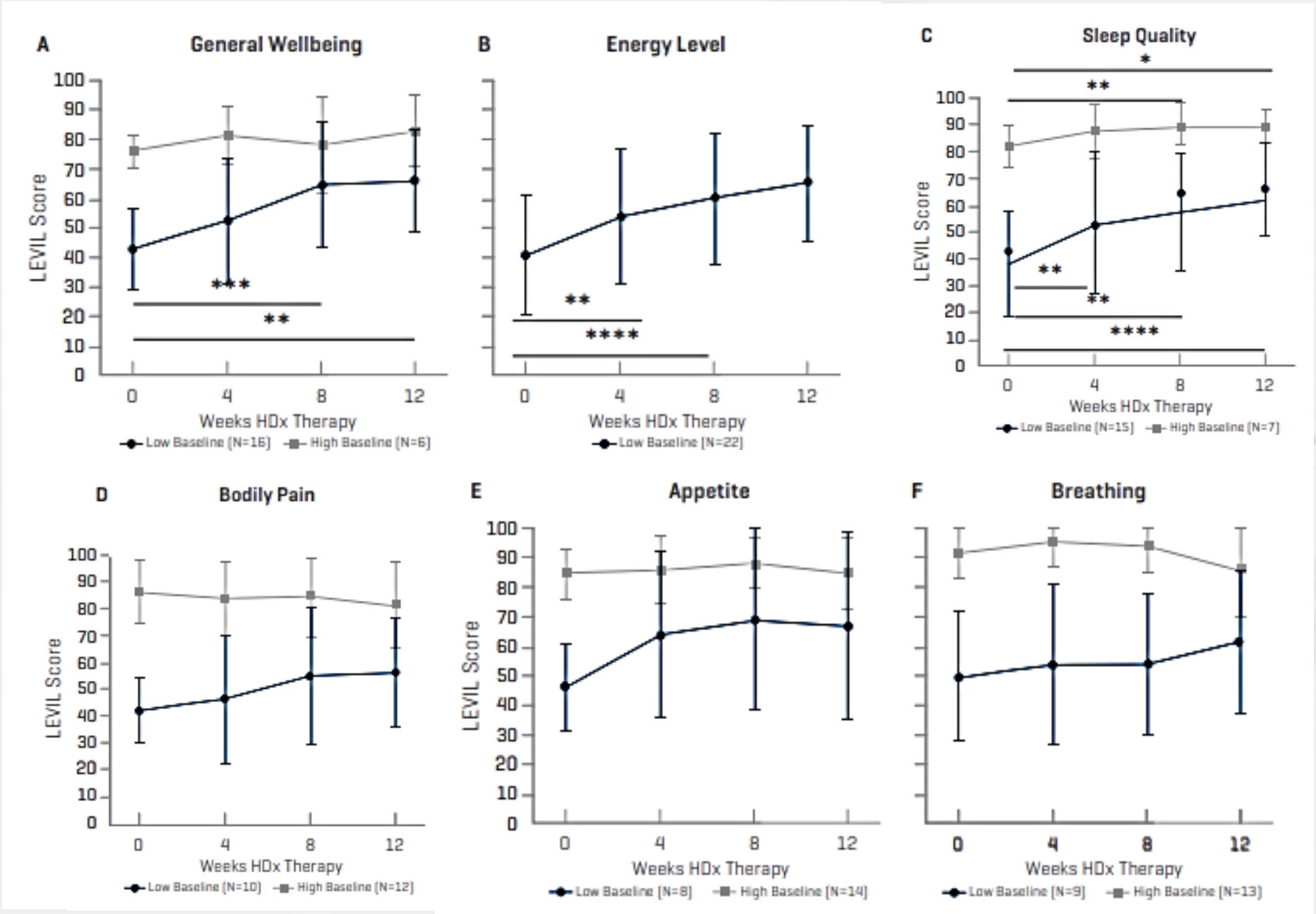
Study limitations: small sample size in a single-center setting and nonrandomized unblinded design.



Penny JD, et al. Kidney Med. 2021; 3(6):992-1002.e1

TABLE 1. LEVIL scores at baseline and 4, 8, and 12 weeks of **HDx** therapy; Total population and stratified groups. Adapted from Penny, et al.

	Total Population							
Initial Study	**N**	**Baseline**	**4-wk HDx**	***P***	**8-wk HDx**	***P***	**12-wk HDx**	***P***
Overall HRQoL	22	59.1±14.4	66.8±17.5	0.12	70.9±17.6	<0.001	71.9±16.8	<0.001
Subgroup analysis								
General well-being	22	52.2±19.6	60.9±23	0.28	69±21.1	0.001	71±17.9	0.002
Energy	22	40.3±20.5	53.4±23.3	0.16	59.9±22.8	0.001	64.7±19.6	<0.001
Sleep quality	22	49.4±26.8	62.2±27.9	<0.001	65.6±24.2	<0.001	68.9±24.5	<0.001
Bodily pain	22	67.3±25.5	68±26.8	>0.99	72.5±25.2	>0.99	71.5±22.1	>0.99
Appetite	22	70.3±21.8	77.9±21.6	>0.99	81.1±21.2	0.28	78.0±22.5	>0.99
Breathing	22	78.2±27.5	77.4±25.8	>0.99	75.9±22.9	>0.99	49.6±22.2	>0.99
Scores < 70 at Baseline: Low								
Initial Study	**N**	**Baseline**	**4-wk HDx**	***P***	**8-wk HDx**	***P***	**12-wk HDx**	***P***
Overall HRQoL	16	51.5±10.2	59.5±14.4	0.33	64.6±16.2	0.001	67.2±16.9	<0.001
Subgroup analysis								
General well-being	16	43±14.1	52.9±21.4	>0.99	65.2±21.9	<0.001	66.3±17.7	0.002
Energy	22	40.3±20.5	53.4±23.3	0.16	59.9±22.8	0.001	64.7±19.6	<0.001
Sleep quality	16	37.2±20.1	52.8±26.7	0.01	57±22.2	0.002	61.7±24.5	<0.001
Bodily pain	10	43.2±12.3	47.4±24	>0.99	56.2±25.7	0.23	57.3±20.5	0.15
Appetite	8	46.1±14.8	63.8±28	>0.99	67±30.8	0.05	66.9±31.8	0.39
Breathing	9	49.6±22.2	53.7±27.3	>0.99	53.7±23.5	>0.99	61.6±24.6	0.11
Scores ≥ 70 at Baseline: High								
Initial Study	**N**	**Baseline**	**4-wk HDx**	***P***	**8-wk HDx**	***P***	**12-wk HDx**	***P***
Overall HRQoL	6	79.2±4.3	86.1±6.8	>0.99	87.7±7.4	0.15	83.6±9.6	>0.99
Subgroup analysis								
General well-being	6	76.6±5.6	82.1±9.7	.71	78.9±16.6	>0.99	83.5±12.2	>0.99
Energy	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Sleep quality	6	81.8±8.3	87.3±10.4	.15	88.8±9.8	<0.01	89.2±6.3	0.04
Bodily pain	12	87.4±12.1	85.2±13.8	>0.99	86.1±15.3	>0.99	82.9±16.1	0.68
Appetite	14	84.3±8.8	85.9±11.9	>0.99	88±8.6	>0.99	84.4±12.4	>0.99
Breathing	13	92±9	95.2±8.4	>0.99	93.8±9.2	>0.99	85.8±16	>0.99


A
General Wellbeing
LEVIL Score
Weeks HDx Therapy
Low Baseline (N=16)
High Baseline (N=6)
B
Energy Level
Weeks HDx Therapy
Low Baseline (N=22)
C
Sleep Quality
LEVIL Score
Weeks HDx Therapy
Low Baseline (N=15)
High Baseline (N=7)
D
Bodily Pain
LEVIL Score
Weeks HDx Therapy
Low Baseline (N=10)
High Baseline (N=12)
E
Appetite
LEVIL Score
Weeks HDx Therapy
Low Baseline (N=8)
High Baseline (N=14)
F
Breathing
Weeks HDx Therapy
Low Baseline (N=9)
High Baseline (N=13)

Blood Purification

Research Article

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Impact of Medium Cut-Off Dialyzers on Patient-Reported Outcomes: COREXH Registry

Juan Carlos Alarcon[a] Alfonso Bunch[a] Freddy Ardila[b] Eduardo Zuñiga[b] Jasmin I. Vesga[b] Angela Rivera[c] Ricardo Sánchez[d] Rafael Mauricio Sanabria[a] on behalf of the Colombian Registry of Expanded Hemodialysis Investigators

a prospective, multicenter, observational cohort study 992 patients from 12 renal clinics in Colombia
Withdrew from study, n 354 (35.7%) switched from high-flux HD to MCO observed for 12 months.

KDQoL

Table 3. Changes in KDQoL-36 score over 12 months of follow-up

KDQoL-36 domain	Statistic	Baseline, $n = 971$	6 months, $n = 808$	12 months, $n = 642$	p value[a]
Symptoms/problems	Mean	78.6	81.0	81.5	<0.0001
	SD	15.8	15.4	14.9	
Effects of kidney disease	Mean	69.7	72.8	75.1	<0.0001
	SD	22.3	22.0	21.0	
Burden of kidney disease	Mean	46.2	48.9	50.2	<0.001
	SD	27.5	29.9	32.3	
SF-12 physical	Mean	41.1	41.0	41.7	0.3
	SD	11.1	11.2	10.5	
SF-mental	Mean	51.1	51.9	52.3	0.02
	SD	11.6	11.3	11.1	

KDQoL-36, Kidney Disease Quality of Life 36-Item Short Form Survey; SD, standard deviation; SF, short form. [a] For hypothesis testing, type-I error significance was set at $p = 0.01$.

Alarcon JC et al. Blood Purif 2021;50:110–118

	Baseline			12 weeks		
	MCO ($n=24$)	High-flux ($n=25$)	P	MCO ($n=24$)	High-flux ($n=25$)	P
Total score	63.7 ± 13.8	57.0 ± 16.4	0.134	63.9 ± 14.4	59.0 ± 17.3	0.283
Kidney disease targeted items	67.9 ± 11.4	62.9 ± 12.3	0.142	66.2 ± 13.3	66.2 ± 12.9	0.995
Symptoms	81.9 ± 13.8	75.4 ± 14.0	0.107	81.3 ± 14.9	78.3 ± 14.6	0.471
Effects of kidney disease	67.6 ± 14.9	60.7 ± 18.9	0.163	65.1 ± 20.3	67.6 ± 18.9	0.654
Burden of kidney disease	40.9 ± 24.4	31.5 ± 26.1	0.200	39.3 ± 27.2	30.8 ± 23.5	0.244
Work status	14.6 ± 27.5	14.0 ± 30.7	0.945	12.5 ± 26.6	18.0 ± 35.0	0.540
Cognitive function	82.5 ± 19.0	83.7 ± 13.6	0.795	78.1 ± 24.1	84.0 ± 17.6	0.328
Quality of social interaction	67.8 ± 18.3	60.5 ± 15.0	0.136	68.1 ± 22.7	67.5 ± 20.3	0.927
Sexual function	57.5 ± 28.8	40.6 ± 42.5	0.500	45.8 ± 35.9	50.0 ± 70.7	0.911
Sleep	64.1 ± 19.3	60.9 ± 17.7	0.553	62.6 ± 15.1	61.6 ± 18.6	0.837
Social support	66.0 ± 22.2	66.0 ± 23.3	0.997	61.8 ± 23.3	73.3 ± 22.1	0.082
Dialysis staff encouragement	87.0 ± 14.0	85.5 ± 16.4	0.736	85.9 ± 15.3	85.5 ± 17.9	0.927
Patient satisfaction	61.8 ± 23.8	60.7 ± 23.0	0.866	61.1 ± 20.1	59.3 ± 22.6	0.773
Short form 36 items	58.9 ± 18.7	50.4 ± 22.6	0.158	61.5 ± 17.7	51.0 ± 24.1	0.088
PCS	61.4 ± 21.7	51.4 ± 25.8	0.150	62.8 ± 20.5	51.7 ± 25.8	0.100
Physical functioning	72.1 ± 23.7	59.4 ± 28.3	0.096	75.2 ± 20.8	59.8 ± 30.1	**0.042**
Role-physical	56.3 ± 39.2	44.0 ± 40.4	0.287	61.5 ± 37.6	39.0 ± 39.6	**0.047**
Pain	70.9 ± 22.9	65.0 ± 28.2	0.424	72.2 ± 24.9	69.3 ± 24.1	0.682
General health	37.9 ± 18.7	36.0 ± 26.0	0.768	35.4 ± 20.1	38.4 ± 27.3	0.666
MCS	55.8 ± 18.1	49.2 ± 21.1	0.249	60.2 ± 16.4	50.5 ± 23.8	0.104
Emotional well-being	54.7 ± 16.0	57.9 ± 18.6	0.515	61.7 ± 16.1	53.4 ± 21.8	0.141
Role-emotional	61.1 ± 40.1	38.7 ± 44.8	0.071	62.5 ± 38.5	45.3 ± 45.0	0.159
Social function	70.3 ± 21.1	62.0 ± 28.1	0.249	69.8 ± 23.6	64.0 ± 26.6	0.425
Energy/fatigue	45.8 ± 20.7	39.8 ± 18.6	0.289	51.7 ± 17.9	43.8 ± 21.6	0.173
Health status compared to one year ago	51.0 ± 21.5	46.0 ± 25.7	0.461	53.1 ± 23.7	46.0 ± 24.7	0.308
Overall health rate	57.9 ± 22.1	56.4 ± 25.2	0.824	58.8 ± 22.5	50.0 ± 26.3	0.218

Lim JH et al. Nature/Sci Rep. 2020; 10:7780.

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Research Article

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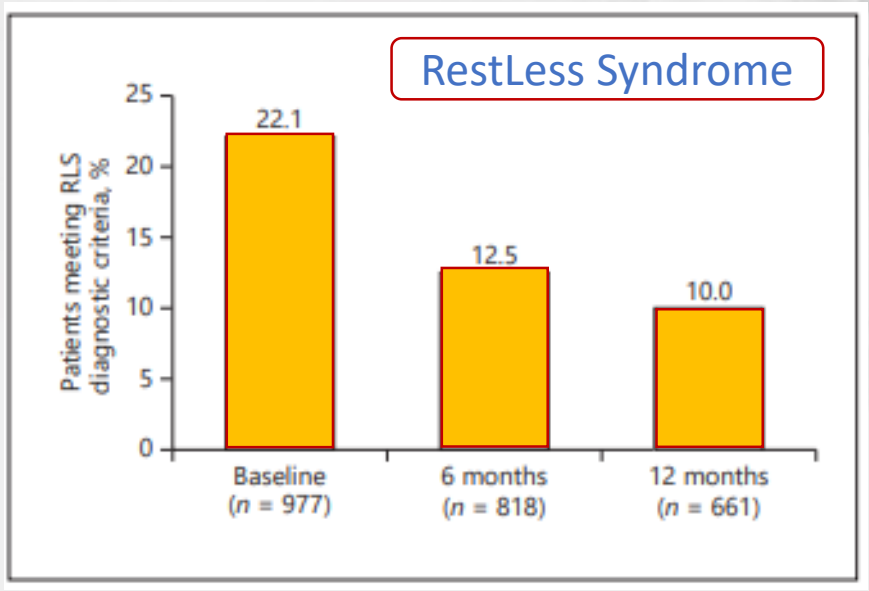


Table 2. Dialysis and laboratory parameters at baseline and 12 months of follow-up

	Baseline, n = 992	12 months, n = 638
Dialysis parameters		
Vascular access, % (n)		
AV fistula	83.06 (824)	83.54 (533)
Catheter	14.52 (144)	13.95 (89)
Graft	2.42 (24)	2.51 (16)
Treatments/week, % (n)		
3	99.19 (984)	99.06 (632)
4	0.71 (7)	0.94 (6)
5	0.10 (1)	–
Duration of a dialysis session, mean (SD), h	4.01 (0.11)	4.01 (0.11)
Dialysate flow, mean (SD), mL/min	486.99 (52.21)	481.50 (54.56)
Blood flow, mean (SD), mL/min	352.05 (51.31)	355.43 (49.97)
Dialyzer type, % (n)		
Dicea 110 G (1.1 m^2)	0.20 (2)	–
Xenium XPH-210 (2.1 m^2)	0.40 (4)	–
Polyflux 140H (1.4 m^2)	2.22 (22)	–
Revaclear 300 (1.6 m^2)	78.02 (774)	–
Revaclear 400 (1.8 m^2)	19.15 (190)	–
Theranova 400 (1.7 m^2)	–	91.22 (582)
Theranova 500 (2.0 m^2)	–	8.78 (56)
Clinical laboratory parameters		
Albumin, mean (SD), g/dL	4.04 (0.33)	3.98 (0.34)
Hemoglobin, mean (SD), g/dL	11.89 (1.72)	11.87 (1.66)
Phosphorous, mean (SD), mg/dL	4.60 (1.38)	4.54 (1.32)
PTHi, median (IQR), pg/mL	327.80 (165.30, 625.30)	309.50 (173.00, 562.00)
hsCRP, mean (SD), mg/L	1.11 (2.83)	2.36 (15.68)
spKt/V_{urea}, mean (SD)	1.62 (0.34)	1.71 (0.36)

AV, arteriovenous; hsCRP, high-sensitivity C-reactive protein; IQR, interquartile range; PTHi, parathyroid hormone; SD, standard deviation; spKt/V_{urea}, standardized Kt/V_{urea}.

Clinical Assessment of Dialysis Recovery Time and Symptom Burden: Impact of Switching Hemodialysis Therapy Mode Patient Related Outcome Measures Bolton S,et al. 2021. doi: 10.2147/PROM.S325016

Retrospective cohort Study
Follow up 12 months
90 patients (80, 72, 68, and 59 patient response at 3, 6, 9, and 12 months were respectively
regular high-flux membranes (Revaclear dialyzer in HD and Polyflux H dialyzer in HDF;
Transition at T0 to HDx therapy Theranova

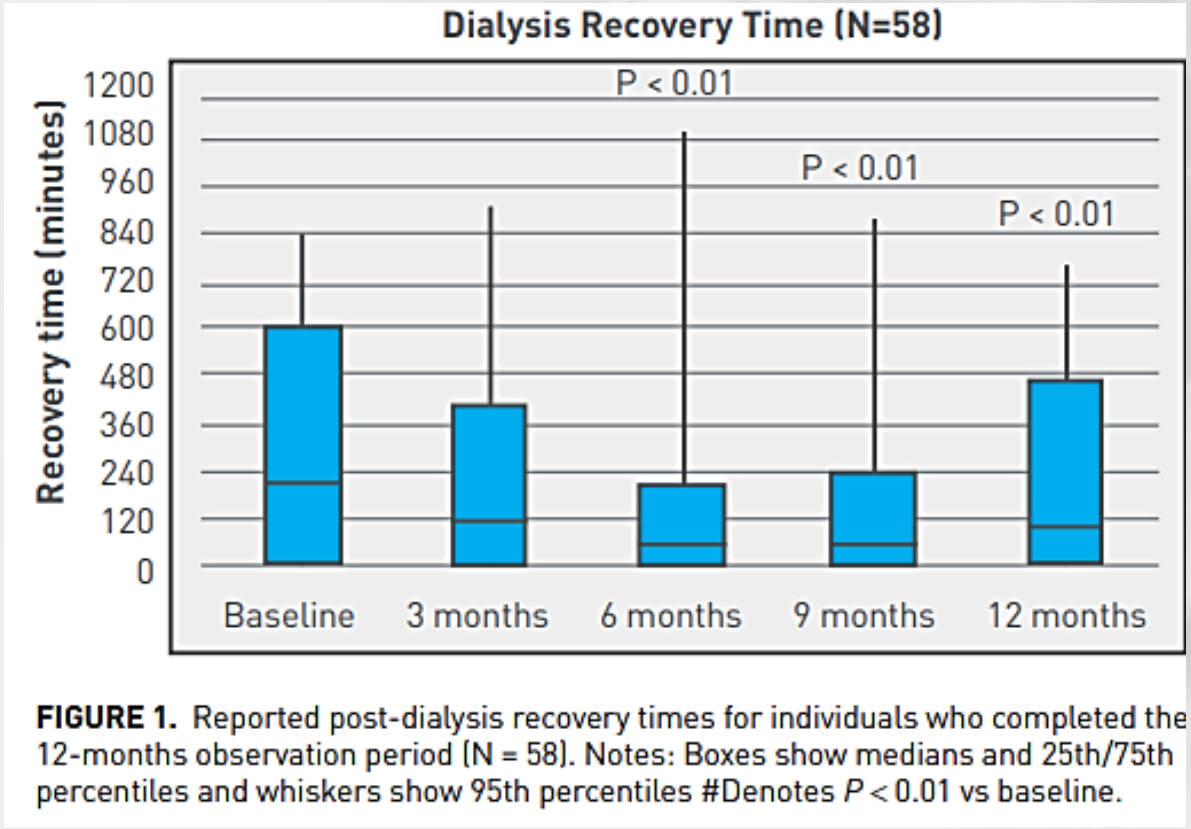
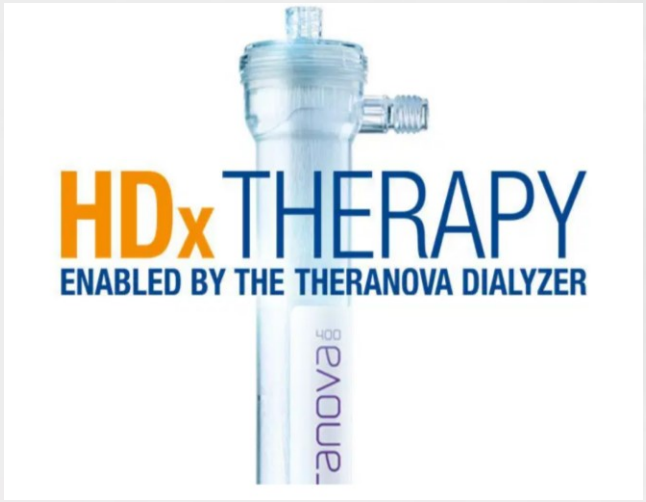


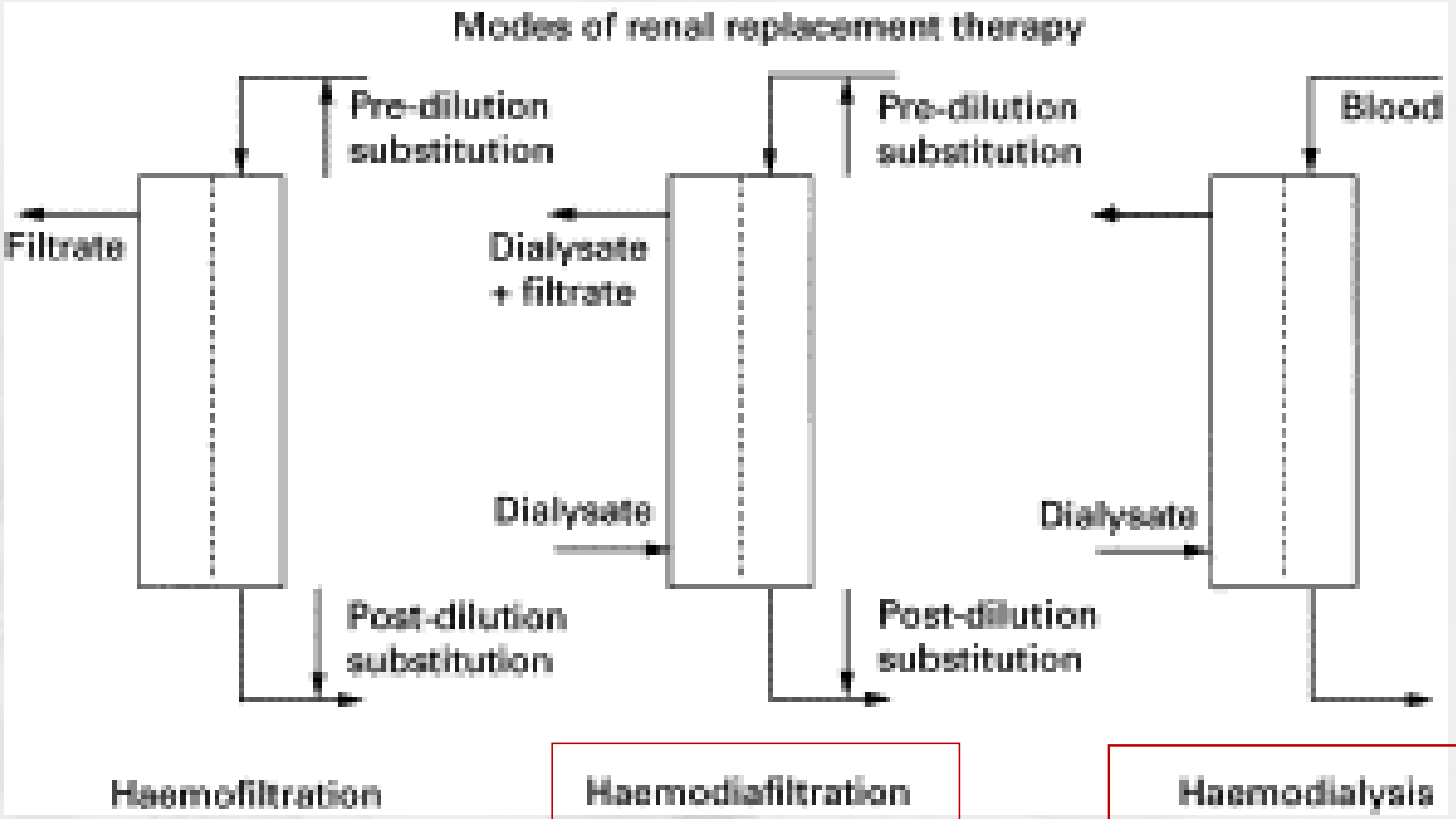
FIGURE 1. Reported post-dialysis recovery times for individuals who completed the 12-months observation period (N = 58). Notes: Boxes show medians and 25th/75th percentiles and whiskers show 95th percentiles #Denotes $P < 0.01$ vs baseline.

Post-dialysis Recovery Time Overall,
the median self-reported recovery time at baseline was 240 min (IQR: 60–720; N = 89).

At follow-up, the recovery time was shorter:
- 120 min (22–435) at 3 months,
- 60 min (0–240) at 6 months ($p < 0.01$),
- 60 min (0– 240) at 9 months ($p < 0.01$), and
- 105 min (0–180) at 12 months ($p < 0.01$).

Safety

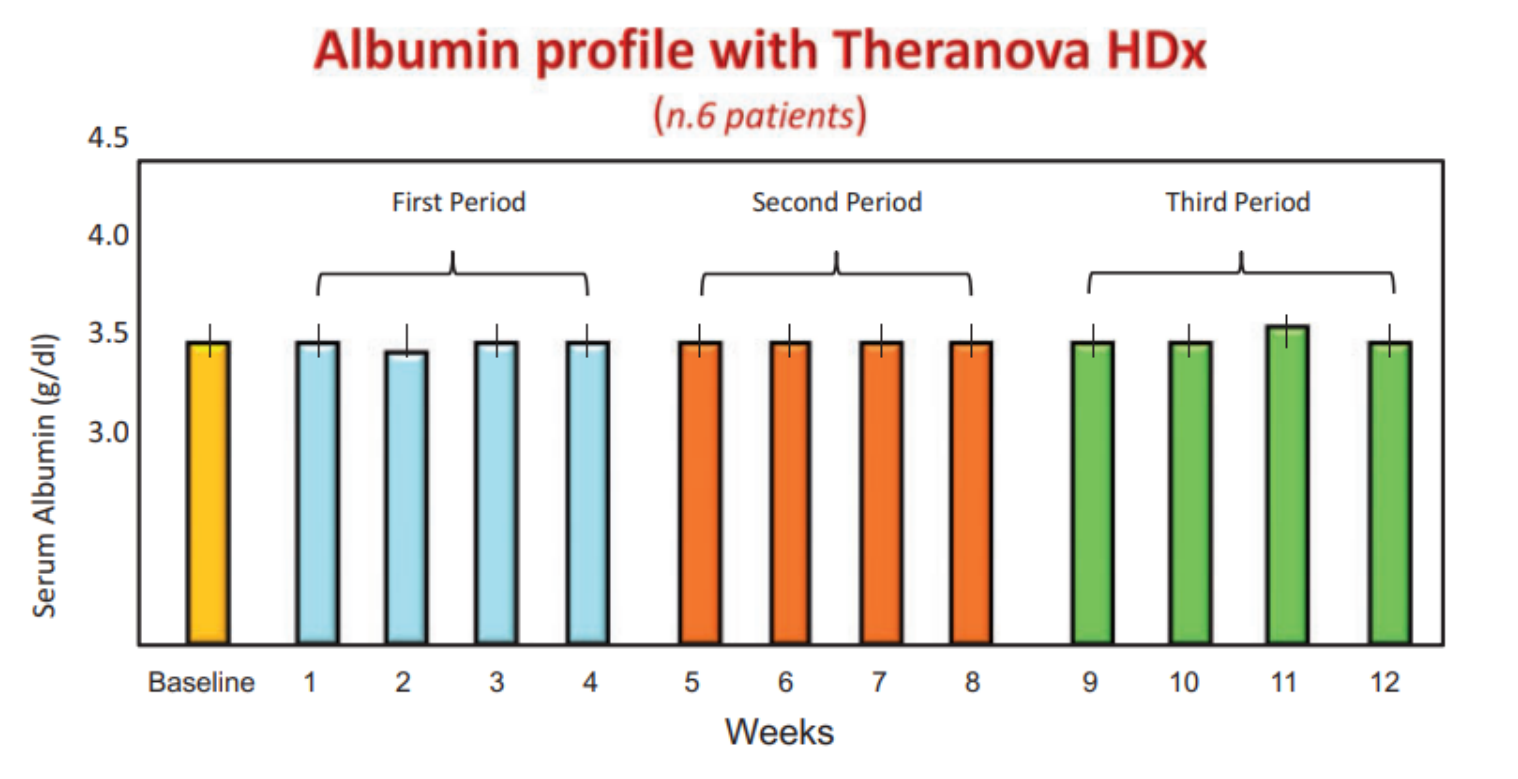




HFHD

LFHD

Albumin concentrations in six patients treated for 6 months with Theranova filters and HDx



Nephrol Dial Transplant (2018) 33: iii41–iii47

Blood Purification

Research Article

Blood Purif 2021;50:110–118
DOI: 10.1159/000508803

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Impact of Medium Cut-Off Dialyzers on Patient-Reported Outcomes: COREXH Registry

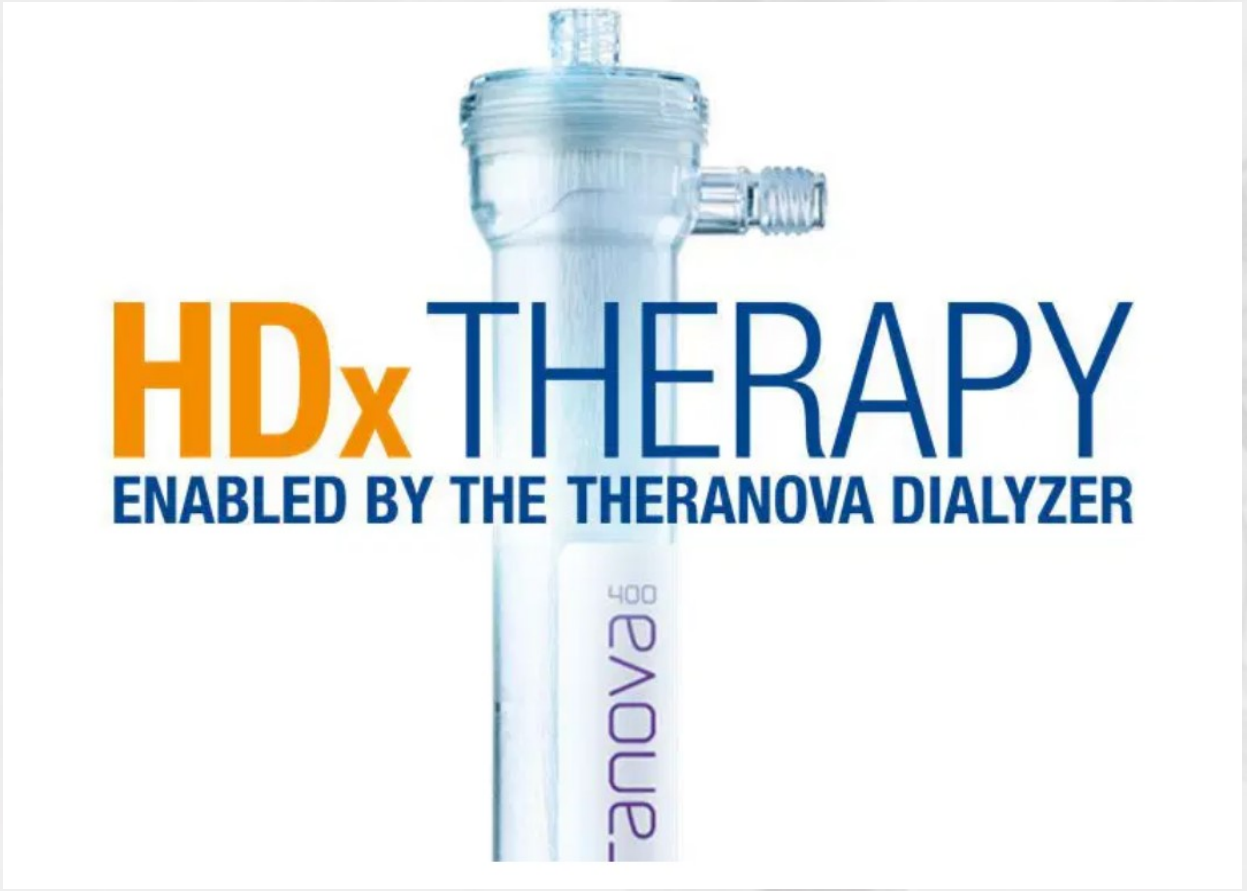
Juan Carlos Alarcon[a] Alfonso Bunch[a] Freddy Ardila[b] Eduardo Zuñiga[b]
Jasmin I. Vesga[b] Angela Rivera[c] Ricardo Sánchez[d] Rafael Mauricio Sanabria[a]
on behalf of the Colombian Registry of Expanded Hemodialysis Investigators

a prospective, multicenter, observational cohort study
992 patients from 12 renal clinics in Colombia
Withdrew from study, n 354 (35.7%)
switched from high-flux HD to MCO therapy
observed for 12 months.

Table 2. Dialysis and laboratory parameters at baseline and 12 months of follow-up

	Baseline, n = 992	12 months, n = 638
Dialysis parameters		
Vascular access, % (n)		
AV fistula	83.06 (824)	83.54 (533)
Catheter	14.52 (144)	13.95 (89)
Graft	2.42 (24)	2.51 (16)
Treatments/week, % (n)		
3	99.19 (984)	99.06 (632)
4	0.71 (7)	0.94 (6)
5	0.10 (1)	–
Duration of a dialysis session, mean (SD), h	4.01 (0.11)	4.01 (0.11)
Dialysate flow, mean (SD), mL/min	486.99 (52.21)	481.50 (54.56)
Blood flow, mean (SD), mL/min	352.05 (51.31)	355.43 (49.97)
Dialyzer type, % (n)		
Dicea 110 G (1.1 m^2)	0.20 (2)	–
Xenium XPH-210 (2.1 m^2)	0.40 (4)	–
Polyflux 140H (1.4 m^2)	2.22 (22)	–
Revaclear 300 (1.6 m^2)	78.02 (774)	–
Revaclear 400 (1.8 m^2)	19.15 (190)	–
Theranova 400 (1.7 m^2)	–	91.22 (582)
Theranova 500 (2.0 m^2)	–	8.78 (56)
Clinical laboratory parameters		
Albumin, mean (SD), g/dL	4.04 (0.33)	3.98 (0.34)
Hemoglobin, mean (SD), g/dL	11.89 (1.72)	11.87 (1.66)
Phosphorous, mean (SD), mg/dL	4.60 (1.38)	4.54 (1.32)
PTHi, median (IQR), pg/mL	327.80 (165.30, 625.30)	309.50 (173.00, 562.00)
hsCRP, mean (SD), mg/L	1.11 (2.83)	2.36 (15.68)
spKt/V_{urea}, mean (SD)	1.62 (0.34)	1.71 (0.36)

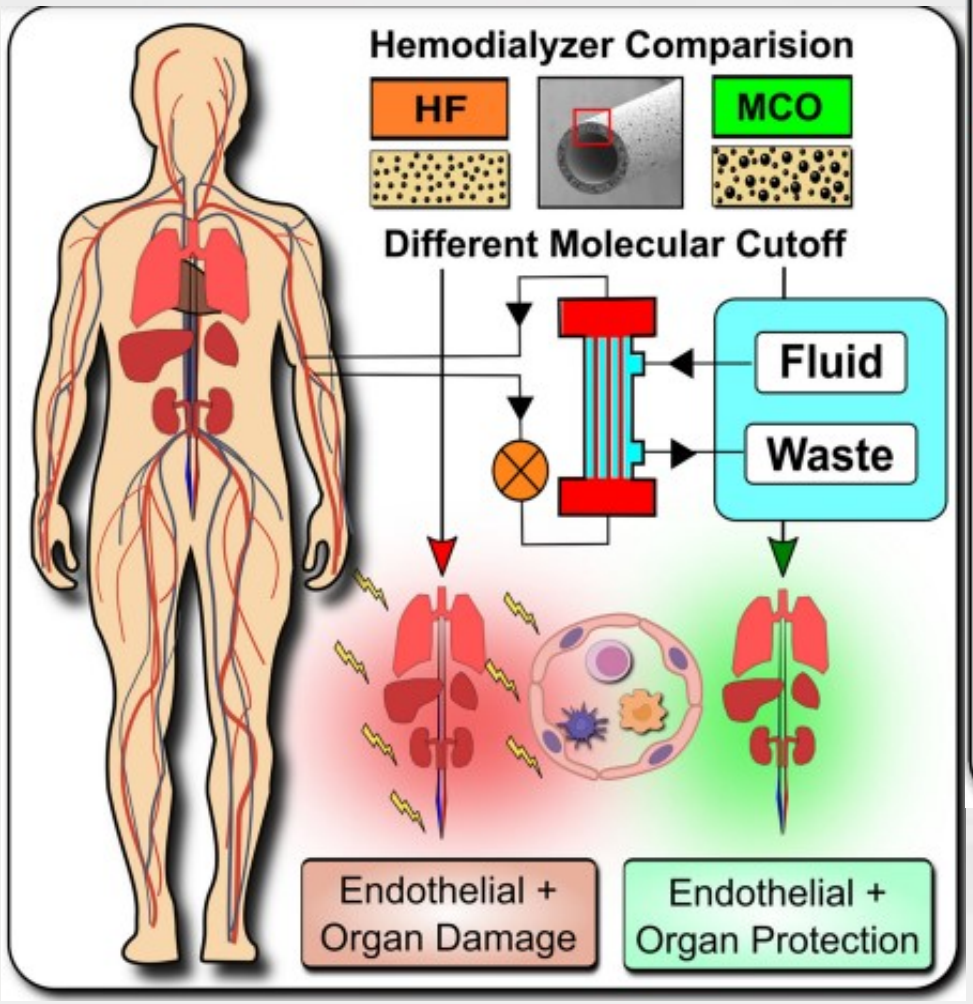
AV, arteriovenous; hsCRP, high-sensitivity C-reactive protein; IQR, interquartile range; PTHi, parathyroid hormone; SD, standard deviation; spKt/V_{urea}, standardized Kt/V_{urea}.

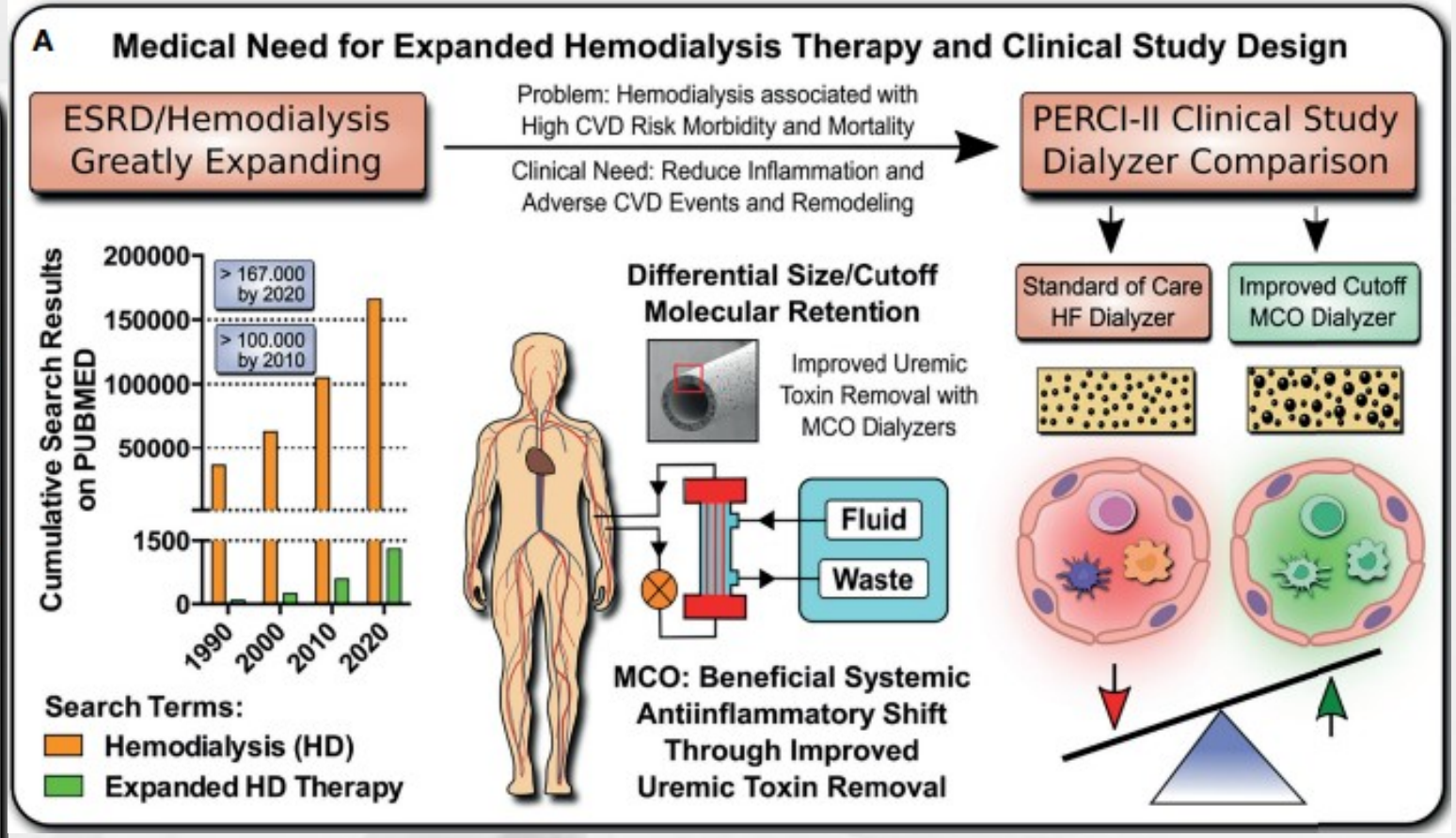

HDx THERAPY
ENABLED BY THE THERANOVA DIALYZER
400

frontiers in Immunology

Expanded Hemodialysis Therapy Ameliorates Uremia-Induced systemic Micro-inflammation and Endothelial Dysfunction by Modulating VEGF, TNFa and AP1-Signaling

ORIGINAL RESEARCH
published: 11 November 2021
doi: 10.3389/fimmu.2021.774052





PERCI-II study n=48 hemodialysis patients underwent crossover randomized multi-center comparison MCO 400, Gambro) dialyzers vs standard of care HF HD (PERCI-II-MCO; ClinicalTrials.gov: NCT02084381)

MCO-HD normalizes endothelial VEGF production and maladaptive angiogenesis upon uremic serum exposure in vitro.

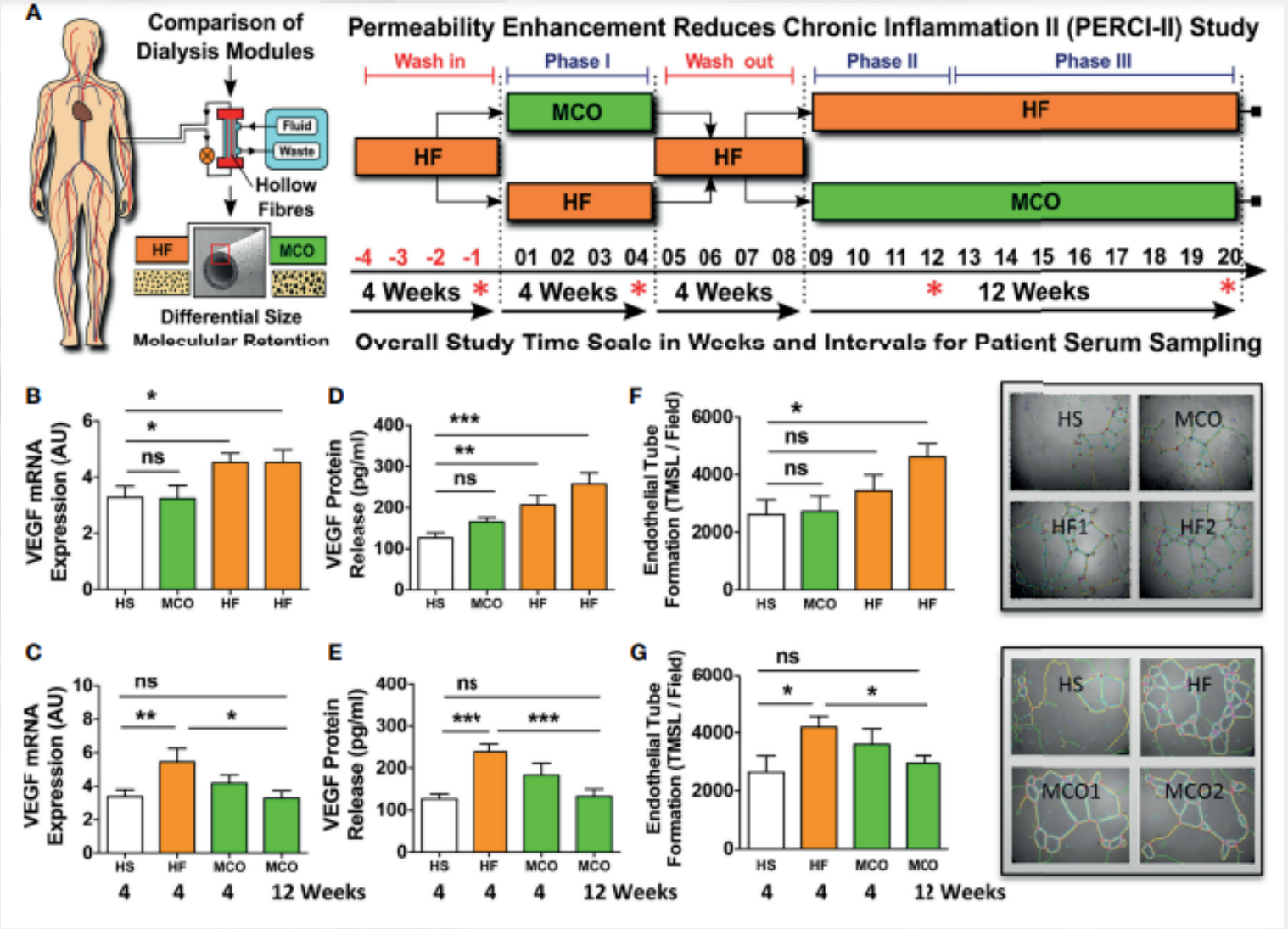
(A) Schematics of patient serum collection for analysis of endothelial VEGF expression and angiogenesis/endothelial tube formation after stimulation of ECs with respective sera.
The top row shows regimen A (HF, MCO, HF, HF) and the bottom row shows regimen B (HF, HF, MCO, MCO). The sera/time points used for analysis in the second part of the figure are indicated with red stars: end of washin, end of phase 1, 2, 3;

(B, C) Endothelial VEGF mRNA expression (AU; arbitrary units, 3-hour stimulation; n=23-25),

(D, E) VEGF protein release (pg/ml) upon 24-hour stimulation with either 10% HF-HD or 10% MCO-HD serum (n=23-25),

(F, G) Endothelial tube formation (TMSL/field; n=23-25) upon stimulated with either 10% HF-HD or 10% MCO-HD serum for 16 hours, as compared to healthy serum (HS) controls.

*ANOVA, Mean ± SEM, with *P < 0.05, **P < 0.01, and ***P < 0.001. ns, not significant.*



frontiers in Immunology

Dialyzer Classification and Mortality in Hemodialysis Patients: A 3-Years Nationwide Cohort Study

ORIGINAL RESEARCH
published: 11 November 2021
doi: 10.3389/fimmu.2021.774052

JPN nationwide registry data
242 467 Patients
Follow-up 3 years
PFP: All cause mortality
Reference Type IV dialyzers

JSDT Guidelines: dialyzers are defined by β2MG clearance rates

Type I	<10	low-flux dialyzers
Type II	10-30	high-flux dialyzers,
Type III	30-50	
Type IV	50-70	protein-leaking dialyzers
Type V	>70	

Clinical Kidney Journal

Super high-flux membrane dialyzers reduce mortality in patients on hemodialysis: a 3-year nationwide cohort study

In Japan, dialyzers are classified according to their β2-microglobulin clearance: type I dialyzers are classified as low-flux, type II and III as high-flux, and type IV and V as super high-flux dialyzers

Aim

To assess the association of each dialyzer type with 3-year all-cause mortality

Methods

Nationwide prospective cohort study
Dialysis Therapy Renal Data Registry
2008–2011

Low-flux
(< 10 mL/min clearance)

High-flux
(10–30 and 30–50 mL/min clearance)

Super high-flux
(50–70 and ≥ 70 mL/min clearance)

Results

242 467 patients

53 172 (21.9%)

	Low-flux	High-flux	Super high-flux
	Type I 1.3%	Type II 1.0% Type III 4.2%	Type IV 81.2% Type V 12.3%
Unadjusted HR	2.43		
		Type II HR 1.74	Type IV (reference)
		Type III HR 1.21	Type V HR 0.65

Adjusted HR for (1) basic factors; (2) basic factors + dialysis-related factors; (3) basic factors + dialysis-related factors + nutrition- and inflammation-related factors; type I maintained a higher HR and type V a lower HR

Conclusion: Hemodialysis using super high-flux dialyzers might reduce mortality. Randomized controlled trials are warranted to clarify whether these type V dialyzers can improve prognosis.

Abe M., et al
Clinical Kidney Journal (2021)
@CKJsocial

frontiers in Immunology

Dialyzer Classification and Mortality in Hemodialysis Patients: A 3-Years Nationwide Cohort Study

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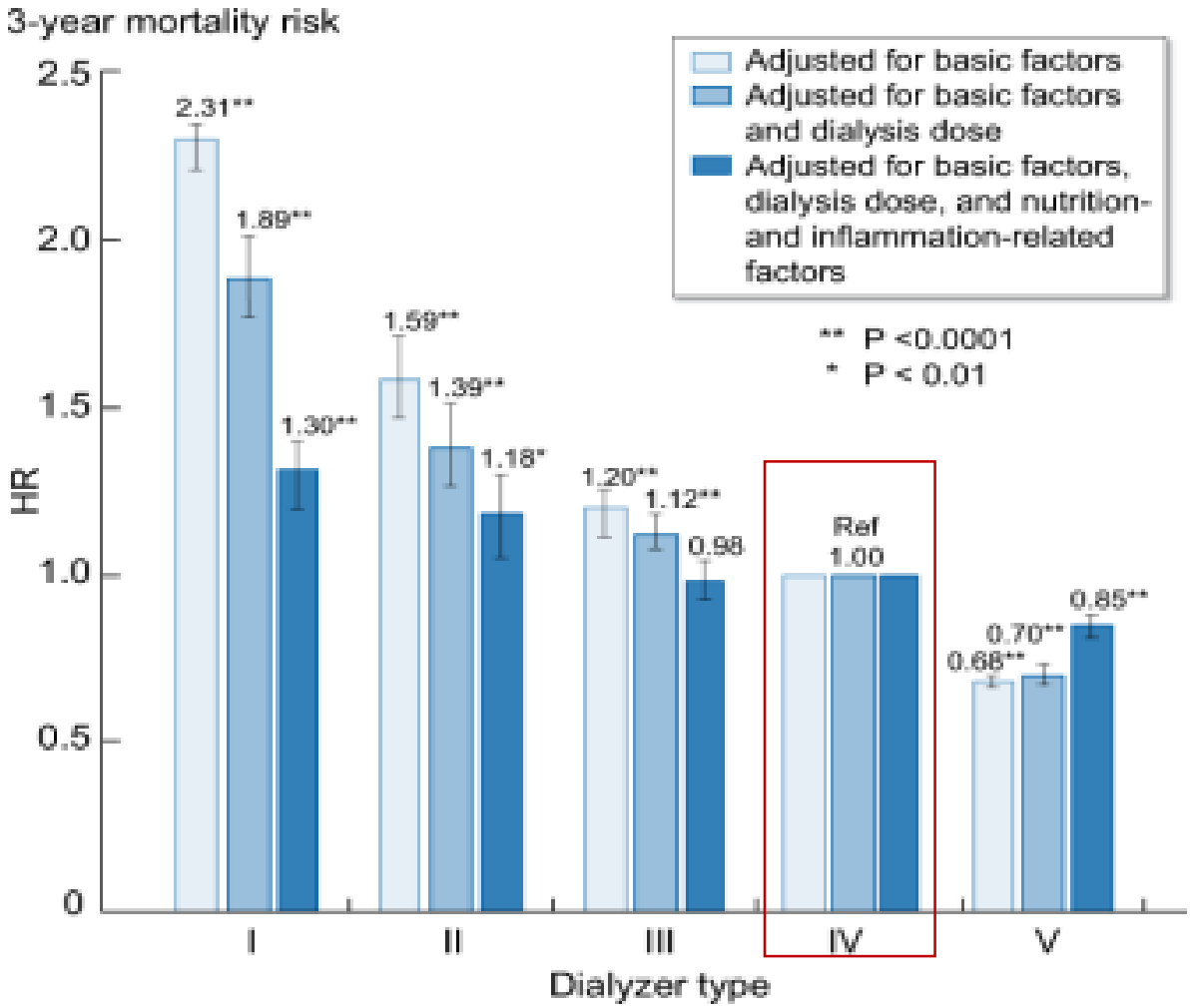

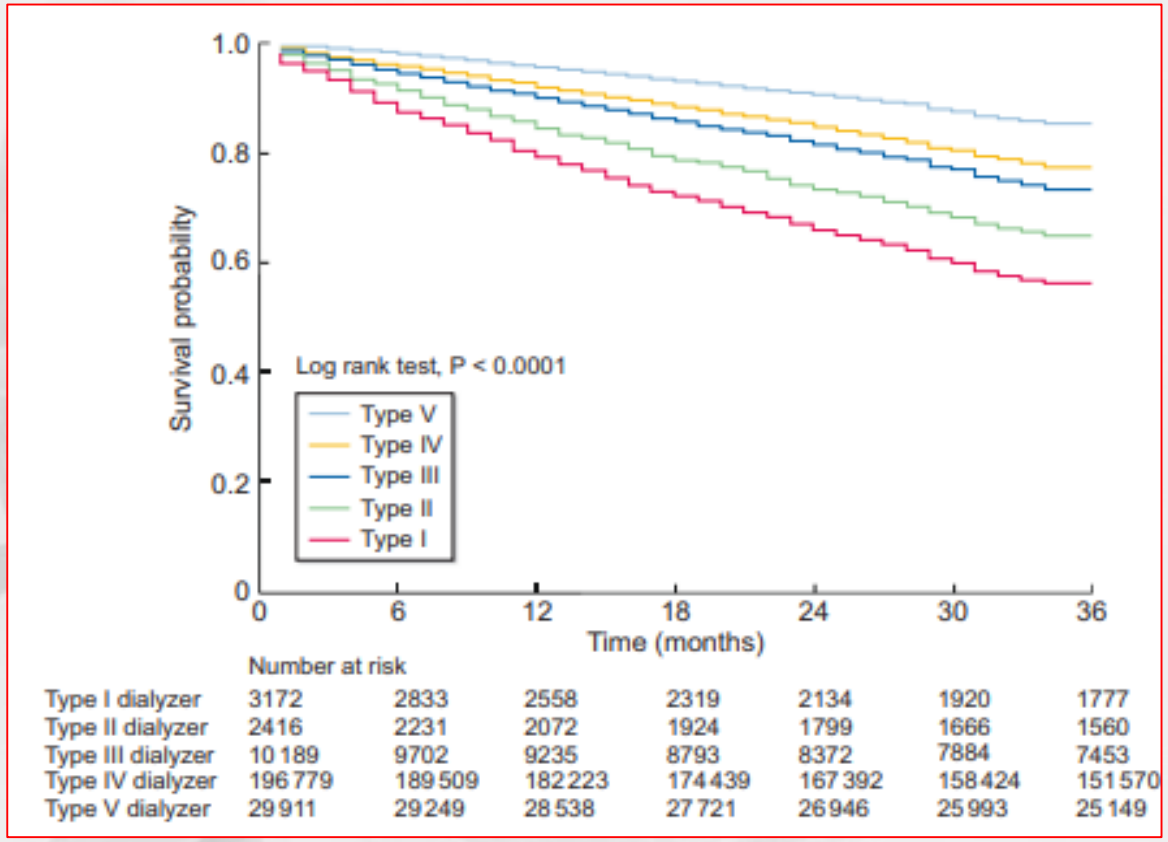

Number at risk

Type I dialyzer	3172	2833	2558	2319	2134	1920	1777
Type II dialyzer	2416	2231	2072	1924	1799	1666	1560
Type III dialyzer	10 189	9702	9235	8793	8372	7884	7453
Type IV dialyzer	196 779	189 509	182 223	174 439	167 392	158 424	151 570
Type V dialyzer	29 911	29 249	28 538	27 721	26 946	25 993	25 149

	Type I	<10	low-flux dialyzers
	Type II	10-30	high-flux dialyzers,
	Type III	30-50	
	Type IV	50-70	protein-leaking dialyzers
	Type V	>70	

frontiers in Immunology

Dialyzer Classification and Mortality in Hemodialysis Patients: A 3-Years Nationwide Cohort Study

ORIGINAL RESEARCH
published: 11 November 2021
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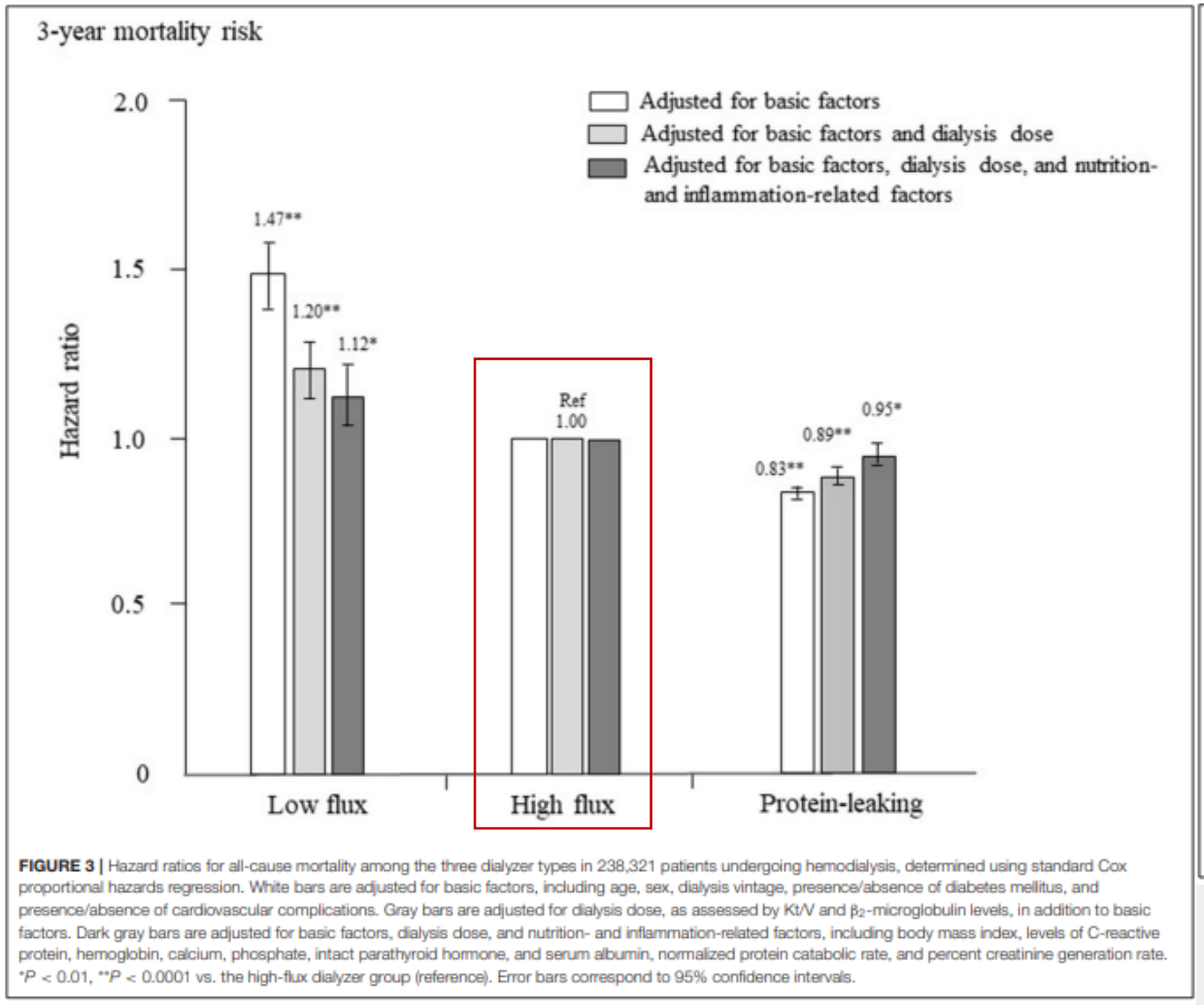

FIGURE 3 | Hazard ratios for all-cause mortality among the three dialyzer types in 238,321 patients undergoing hemodialysis, determined using standard Cox proportional hazards regression. White bars are adjusted for basic factors, including age, sex, dialysis vintage, presence/absence of diabetes mellitus, and presence/absence of cardiovascular complications. Gray bars are adjusted for dialysis dose, as assessed by Kt/V and β_2-microglobulin levels, in addition to basic factors. Dark gray bars are adjusted for basic factors, dialysis dose, and nutrition- and inflammation-related factors, including body mass index, levels of C-reactive protein, hemoglobin, calcium, phosphate, intact parathyroid hormone, and serum albumin, normalized protein catabolic rate, and percent creatinine generation rate. *$P < 0.01$, **$P < 0.0001$ vs. the high-flux dialyzer group (reference). Error bars correspond to 95% confidence intervals.

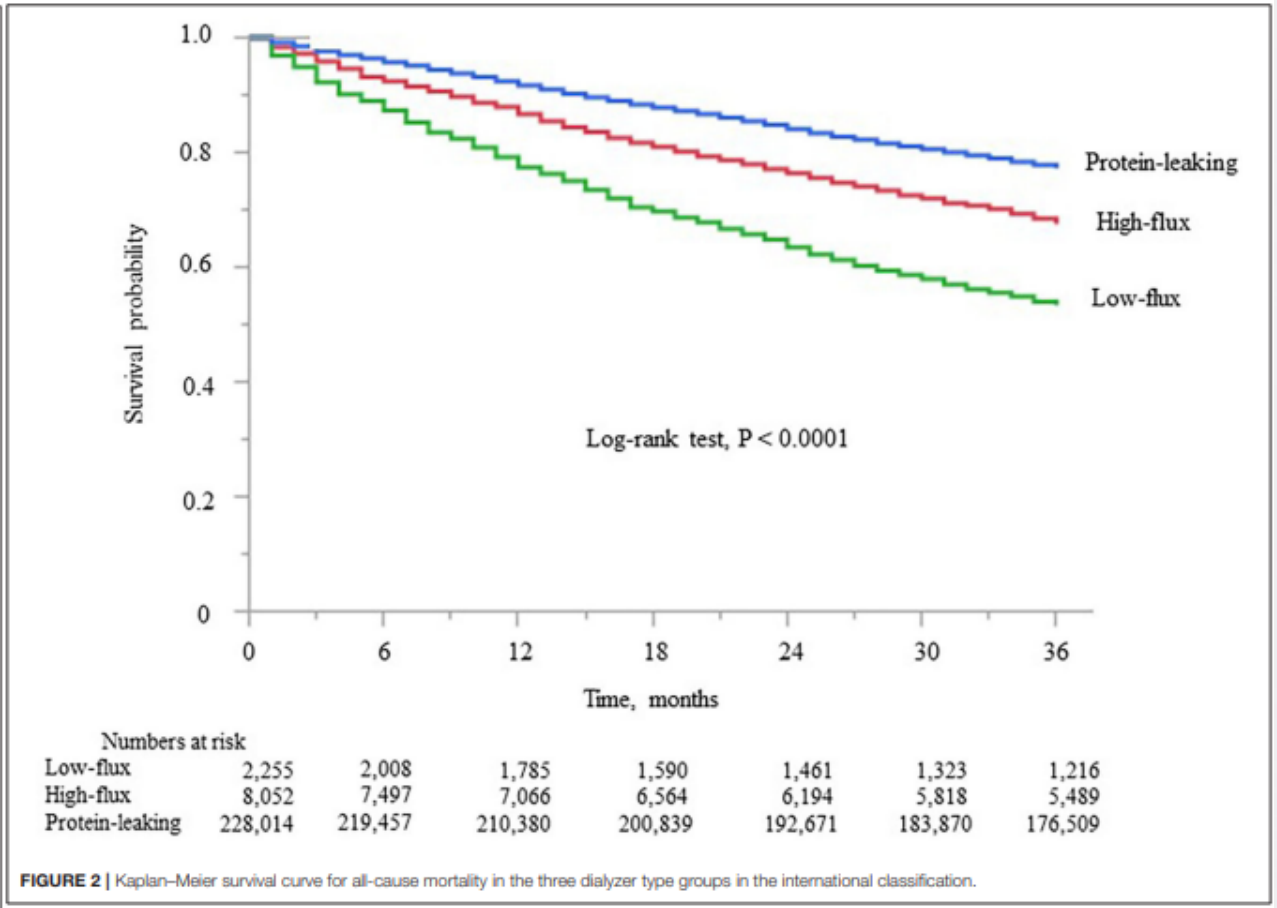

FIGURE 2 | Kaplan–Meier survival curve for all-cause mortality in the three dialyzer type groups in the international classification.

Type I	<10	low-flux dialyzers
Type II	10-30	high-flux dialyzers,
Type III	30-50	
Type IV	50-70	protein-leaking dialyzers
Type V	>70	

Waiting for prospective randomized trial on mortality and MACE

AGDUC

COMEDIMS 22/12/2022

Evaluation THERANOVA 400-5000

AGDUC- Site Montélimar

Faiçal JARRAYA

Indication THERANOVA: « Crampes en séance, asthénie, dénutrition »

Identification du prescripteur :
Dr. JARRAYA Faiçal
N° ADELI : N° RPPS :

Coordonnées du prescripteur :
MONTELIMAR HD CENTRE EDUC
QUARTIER BEAUSSERET
26200 MONTELILMAR
Tél. 0481828100 Fax.
Email :

Désignation du lieu de traitement : MONTELIMAR HD CENTRE AIGUE
N° FINESS du lieu de traitement : 04 81 82 81 00
260001631

Identification du patient :
Nom et prénom d'usage
Née
Sexe
Date de naissance (75 ans)
N° Sécurité sociale 248012622000752
N° MEDIAL
Poids sec : 41,8 kg
Taille : 1,56 m

Mme V

Modalités de dialyse

*
* **Dialyse :** A partir du 07/03/2022, à MTL HD Centre, 3 x / semaine.
* **Poids de base :** (22/03/2023) 41,8 Kg, Taille : 1,56 m
* **Durée des séances :** 3h30
* **Ponction :**
* **Ligne(s) :**
* **Antisepsie :** Gluc. Chlorhex. 0.5% 125ml x20
* **Dialyseur :**
* **Rinçage :** Flex NaCl 0,9% emol 1000ml x12 (Qté : 1)
* **Restitution :** Flex glucose 5 % 0.5L (x20) (Qté : 1)
* **Débit réinjection :** Automatique.
* **Anticoagulation :** Dose initiale : 1,00 Fraxiparine 0,4ml/3800UI (x10) - (Rajout Fraxi 0.2ml à mi séance, les jours de fer IV.)
* **Débit sang, volume de traitement, U.F. :** Débit sang - Artère : 300 ml/min, U.F. libre, débit UF maxi. : 700 ml/heure
* **Bain :** Concentré : K+ : 2 mmol/L - Ca^{2+} : 1,5 mmol/L - Glucose : 1 g/L - Mg^{2+} : 0,5 mmol/L - Tampon : Citrate

Na : 138 mmol/l
Bicarbonate : 34 mmol/l
Température : 36,5 °C
Débit dialysat : 500 ml/min

RLS improved

Allergies et intolérances

Allergies : V07AY AUTRES PRODUITS AUXILIAIRES NON THERAPEUTIQUES (Classe ATC) - Allergie à l'acétate, réversible à l'utilisation du bain citrate.
Intolérances médicamenteuses : SEVELAMER CARBONATE (Substance active) - intolérance digestive

Abord Dialyse

12/09/2017 FAV native Autologue radiale gauche

Médecin responsable du patient et prescripteur : Docteur JARRAYA Faiçal

H DF/postD – PEPA 1,8m²

Identification du prescripteur :
Dr. JARRAYA Faiçal
N° ADELI : N° RPPS :

Coordonnées du prescripteur :
MONTELIMAR HD CENTRE EDUC
QUARTIER BEAUSSERET
26200 MONTELILMAR
Tél. 0481828100 Fax.
Email :

Désignation du lieu de traitement : MONTELIMAR HD CENTRE AIGUE
N° FINESS du lieu de traitement : 04 81 82 81 00
260001631

Identification du patient :
Nom et prénom d'usage
Née
Sexe
Date de naissance (75 ans)
N° Sécurité sociale 248012622000752
N° MEDIAL 057009
Poids sec : 41,8 kg
Taille : 1,56 m

Mme V

Modalités de dialyse

*
* **Dialyse :** A partir du 02/07/2022, à MTL HD Centre, 3 x / semaine.
* **Poids de base :** (22/03/2023) 41,8 Kg, Taille : 1,56 m
* **Durée des séances :** 3h30
* **Ponction :** Cath.MEDIKITNEO 15G 25mm sec. Cath.MEDIKITNEO 15G 25mm sec.
* **Ligne(s) :**
* **Antisepsie :** BACTISEPTIC 2% ORANGE 250ml
* **Dialyseur**
* **Anticoagulation :** Dose initiale : 1,00 Fraxiparine 0,4ml/3800UI (x10) - (Rajout Fraxi 0.2ml à mi séance, les jours de fer IV.)
* **Débit sang, volume de traitement, U.F. :** Débit sang - Artère : 300 ml/min, U.F. libre, débit UF maxi. : 700 ml/heure
* **Bain :** Concentré : K+ : 2 mmol/L - Ca^{2+} : 1,5 mmol/L - Glucose : 1 g/L - Mg^{2+} : 0,5 mmol/L - Tampon : Citrate

Na : 138 mmol/l
Bicarbonate : 34 mmol/l
Température : 36,5 °C
Débit dialysat : 500 ml/min
* **Particularités :** INTOLERANCE à l'ACETATE

Anorhexia improved
RLS improved

Allergies et intolérances

Allergies : V07AY AUTRES PRODUITS AUXILIAIRES NON THERAPEUTIQUES (Classe ATC) - Allergie à l'acétate, réversible à l'utilisation du bain citrate.
Intolérances médicamenteuses : SEVELAMER CARBONATE (Substance active) - intolérance digestive

Abord Dialyse

12/09/2017 FAV native Autologue radiale gauche

Médecin responsable du patient et prescripteur : Docteur JARRAYA Faiçal

H D – THERANOVA 400

Indication THERANOVA: « Crampes en séance, asthénie, dénutrition »

Identification du prescripteur :
Dr. JARRAYA Faiçal
N° ADELI : N° RPPS :

Coordonnées du prescripteur :
MONTELIMAR HD CENTRE EDUC
QUARTIER BEAUSSERET
26200 MONTELILMAR
Tél. 0481828100 Fax.
Email :

Désignation du lieu de traitement : MONTELIMAR HD UDM
N° FINESS du lieu de traitement : 260001631

Identification du patient :
Nom et prénom d'usage
Née
Sexe Féminin
Date de naissance (73 ans)
N° Sécurité sociale 249070719100826
N° MEDIAL 062218
Poids sec : 48,8 kg
Taille : 1,56 m

Mme N

Modalités de dialyse

[redacted]
* **Dialyse :** A partir du 28/06/2022, à MTL HD udm, 3 x / semaine.
* **Poids de base :** (03/05/2023) 48,8 Kg, Taille : 1,56 m
* **Durée des séances :** 4h00
* **Ponction :** Aig 25mm A16G 1614 secu (x50). Aig 25mm V16G 1616 secu (x50).
* **Ligne(s) :** Prolongateur.
* **Antisepsie :** BACTISEPTIC 2% ORANGE 250ml
* **Dialyseur :** [redacted] (x30)
* **Rinçage :** Flex NaCl 0,9% emol 1000ml x12 (Qté : 1)
* **Anticoagulation :** Dose initiale : 1,00 Fraxiparine 0,4ml/3800UI (x10)
* **Débit sang, volume de traitement, U.F. :** Débit sang - Artère : 300 ml/min, U.F. libre, débit UF maxi. : 500 ml/heure
* **Bain :** Concentré : K+ : 2 mmol/L - Ca^{2+} : 1,5 mmol/L - Glucose : 1 g/L - Mg^{2+} : 0,5 mmol/L - Tampon : Citrate
Na : 138 mmol/l
Bicarbonate : 35 mmol/l
Température : 37 °C
Débit dialysat : 500 ml/min

Cramps, fatigue, denutrition

Abord Dialyse
18/01/2018 FAV native radiale gauche

Médecin responsable du patient et prescripteur : Docteur JARRAYA Faiçal

H DF/postD – PSF 1,8m²

Identification du prescripteur :
Dr. JARRAYA Faiçal
N° ADELI : N° RPPS :

Coordonnées du prescripteur :
MONTELIMAR HD CENTRE EDUC
QUARTIER BEAUSSERET
26200 MONTELILMAR
Tél. 0481828100 Fax.
Email :

Désignation du lieu de traitement : MONTELIMAR HD UDM
N° FINESS du lieu de traitement : 260001631

Identification du patient :
Nom et prénom d'usage
Née
Sexe Féminin
Date de naissance (73 ans)
N° Sécurité sociale 249070719100826
N° MEDIAL 062218
Poids sec : 48,8 kg
Taille : 1,56 m

Mme N

Modalités de dialyse

* [redacted]
* **Dialyse :** A partir du 28/06/2022, à MTL HD udm, 3 x / semaine.
* **Poids de base :** (03/05/2023) 48,8 Kg, Taille : 1,56 m
* **Durée des séances :** 4h00
* **Ponction :** Aig 25mm A16G 1614 secu (x50). Aig 25mm V16G 1616 secu (x50).
* **Ligne(s) :** Prolongateur.
* **Antisepsie :** BACTISEPTIC 2% ORANGE 250ml
* **Dialyseur** [redacted]
* **Rinçage :** Flex NaCl 0,9% emol 1000ml x12 (Qté : 1)
* **Anticoagulation :** Dose initiale : 1,00 Fraxiparine 0,4ml/3800UI (x10)
* **Débit sang, volume de traitement, U.F. :** Débit sang - Artère : 300 ml/min, U.F. libre, débit UF maxi. : 500 ml/heure
* **Bain :** Concentré : K+ : 2 mmol/L - Ca^{2+} : 1,5 mmol/L - Glucose : 1 g/L - Mg^{2+} : 0,5 mmol/L - Tampon : Citrate
Na : 138 mmol/l
Bicarbonate : 35 mmol/l
Température : 37 °C
Débit dialysat : 500 ml/min

All improved

Abord Dialyse
18/01/2018 FAV native radiale gauche

Médecin responsable du patient et prescripteur : Docteur JARRAYA Faiçal

H D – THERANOVA 400

Indication THERANOVA: « Crampes en séance, asthénie, dénutrition »

Identification du prescripteur :
Dr. SARRET Damien
N° ADELI : N° RPPS :
10004991880

Coordonnées du prescripteur :
MONTELIMAR HD UDM
AGDUC
CS 70102
26203 MONTELIMAR
Tél. Fax.
Email [redacted]

Désignation du lieu de traitement : MONTELIMAR HD UDM
N° FINESS du lieu de traitement : 260001631

Identification du patient :
Mr S

Nom et prénom d'usage	
Né	
Sexe	Masculin
Date de naissance	21/11/1947 (75 ans)
N° Sécurité sociale	147112636205181
N° MEDIAL	076567
Poids sec :	74,6 kg
Taille :	1,71 m

Modalités de dialyse

* **Hémodialyse conventionnelle Biponcture**
* **Dialyse :** A partir du 06/08/2021, à MTL HD udm, 3 x / semaine.
* **Poids de base :** [redacted] : 1,71 m
* **Durée des séances :** 3h30
* **Ponction :** Aig JMS A16G 1609 secu (x50). Aig JMS V16G 1610 secu (x50).
* **Ligne(s) :** Prolongateur.
* **Antisepsie :** Gluc. Chlorhex. 0.5% 125ml x20
* **Dialyseur :** Dialyseur TORAY BK-2.1F (X12)
* **Restitution :** Flex NaCl 0,9% emol 1000ml x12 (Qté : 1)
* **Anticoagulation :** Dose initiale : 1,00 Fraxiparine 0,2ml/1900UI (x10) + 1,00 Fraxiparine 0,3ml/2850UI (x10)
* **Débit sang, volume de traitement, U.F. :** Débit sang - Artère : 300 ml/min, U.F. libre
* **Bain :** Concentré : K+ : 2 mmol/L - Ca^{2+} : 1,5 mmol/L - Glucose : 1 g/L - Mg^{2+} : 0,5 mmol/L - Tampon : Citrate
Na : 140 mmol/l
Bicarbonate : 35 mmol/l
Température : 36,5 °C
Débit dialysat : 500 ml/min

Anorexia,
Post dialysis Fatigue
Post Dialysis Recovery Time

Allergies et intolérances

Allergies : AUCUNE ALLERGIE CONNUE
Intolérances médicamenteuses : SEVELAMER CARBONATE (Substance active) - Intolérance digestive, ballonnement, diarrhée

Médecin responsable du patient : Docteur JARRAYA Faiçal

H DF/postD – DIA 2.1m², PEPA 1,8m², HD - PMMA 2,1m²

Identification du prescripteur :
Dr. JARRAYA Faiçal
N° ADELI : N° RPPS :
10107552027

Coordonnées du prescripteur :
MONTELIMAR HD CENTRE EDUC
QUARTIER BEAUSSERET
26200 MONTELILMAR
Tél. 0481828100 Fax.
Email :

Désignation du lieu de traitement : MONTELIMAR HD UDM
N° FINESS du lieu de traitement : 260001631

Identification du patient :
Mr S

Nom et prénom d'usage	
Né	
Sexe	Masculin
Date de naissance	21/11/1947 (75 ans)
N° Sécurité sociale	147112636205181
N° MEDIAL	076567
Poids sec :	74,6 kg
Taille :	1,71 m

Modalités de dialyse

* **Hémodialyse conventionnelle Biponcture**
* **Dialyse :** A partir du 02/07/2022, à MTL HD udm, 3 x / semaine.
* **Poids de base :** (27/01/2023) 74,6 Kg, Taille : 1,71 m
* **Durée des séances :** 3h30
* **Ponction :** Aig JMS A16G 1609 secu (x50). Aig JMS V16G 1610 secu (x50).
* **Ligne(s) :** Prolongateur.
* **Antisepsie :** BACTISEPTIC 2% ORANGE 250ml
* **Dialyseur :** Dialyseur THERANOVA 500 (x24)
* **Restitution :** Flex NaCl 0,9% emol 1000ml x12 (Qté : 1)
* **Anticoagulation :** Dose initiale : 1,00 Fraxiparine 0,2ml/1900UI (x10) + 1,00 Fraxiparine 0,3ml/2850UI (x10)
* **Débit sang, volume de traitement, U.F. :** Débit sang - Artère : 300 ml/min, U.F. libre
* **Bain :** Concentré : K+ : 2 mmol/L - Ca^{2+} : 1,5 mmol/L - Glucose : 1 g/L - Mg^{2+} : 0,5 mmol/L - Tampon : Citrate
Na : 140 mmol/l
Bicarbonate : 35 mmol/l
Température : 36,5 °C
Débit dialysat : 500 ml/min

Recovery
But Fistula Thrombosis

Allergies et intolérances

Allergies : AUCUNE ALLERGIE CONNUE
Intolérances médicamenteuses : SEVELAMER CARBONATE (Substance active) - Intolérance digestive, ballonnement, diarrhée

Médecin responsable du patient et prescripteur : Docteur JARRAYA Faiçal

H D – THERANOVA 400
02/07/2022 – 04/01/2023

Indication THERANOVA: « Crampes en séance, asthénie, dénutrition »

Identification du prescripteur :
Dr. JARRAYA Faiçal
N° ADELI : N° RPPS :

Coordonnées du prescripteur :
MONTELIMAR HD CENTRE EDUC
QUARTIER BEAUSSERET
26200 MONTELILMAR
Tél. 0481828100 Fax.
Email :

Désignation du lieu de traitement : MONTELIMAR HD UDM
N° FINESS du lieu de traitement : 260001631

Identification du patient :
Nom et prénom d'usage Mr J
Né
Sexe Masculin
Date de naissance (84 ans)
N° Sécurité sociale 139026938305190
N° MEDIAL 052313
Poids sec : 70,5 kg
Taille : 1,72 m

Modalités de dialyse

[redacted]
* **Dialyse :** A partir du 20/09/2022, à MTL HD udm, 3 x / semaine.
* **Poids de base :** (27/03/2023) 70,5 Kg, Taille : 1,72 m
* **Durée des séances :** 4h00
* **Ponction :** Aig JMS V15G tub 50 1518 (x40). Aig JMS A15G tub 50 1519 (x40).
* **Ligne(s) :**
* **Antisepsie :** BACTISEPTIC 2% ORANGE 250ml
* **Dialyseur** [redacted])
* **Rinçage :** Flex NaCl 0,9% emol 1000ml x12 (Qté : 1)
* **Débit réinjection :** Automatique.
* **Anticoagulation :** Dose initiale : 1,00 Fraxiparine 0,4ml/3800UI (x10)
* **Débit sang, volume de traitement, U.F. :** Débit sang - Artère : 350 ml/min, débit UF maxi. : 800 ml/heure
* **Bain :** Concentré : K+ : 2 mmol/L - Ca^{2+} : 1,5 mmol/L - Glucose : 1 g/L - Mg^{2+} : 0,5 mmol/L - Tampon : Citrate
Na : 140 mmol/l
Bicarbonate : 35 mmol/l
Température : 36,5 °C
Débit dialysat : 500 ml/min

Ichting,
related Cutaneous injury

Allergies et intolérances

Allergies : AUCUNE ALLERGIE CONNUE
Intolérances médicamenteuses : AUCUNE INTOLERANCE CONNUE

Abord Dialyse

14/02/2017 FAV native radiale droite

Médecin responsable du patient et prescripteur : Docteur JARRAYA Faiçal

H DF/postD – DIA 2.1m², PEPA 1,8m², HD - PMMA 2,1m²

Identification du prescripteur :
Dr. JARRAYA Faiçal
N° ADELI : N° RPPS :

Coordonnées du prescripteur :
MONTELIMAR HD CENTRE EDUC
QUARTIER BEAUSSERET
26200 MONTELILMAR
Tél. 0481828100 Fax.
Email :

Désignation du lieu de traitement : MONTELIMAR HD UDM
N° FINESS du lieu de traitement : 260001631

Identification du patient :
Nom et prénom d'usage Mr J
Né
Sexe
Date de naissance (84 ans)
N° Sécurité sociale 139026938305190
N° MEDIAL 052313
Poids sec : 70,5 kg
Taille : 1,72 m

Modalités de dialyse

[redacted]
* **Dialyse :** A partir du 04/10/2022, à MTL HD udm, 3 x / semaine.
* **Poids de base :** (27/03/2023) 70,5 Kg, Taille : 1,72 m
* **Durée des séances :** 4h00
* **Ponction :** Aig JMS V15G tub 50 1518 (x40). Aig JMS A15G tub 50 1519 (x40).
* **Ligne(s) :**
* **Antisepsie :** BACTISEPTIC 2% ORANGE 250ml
* **Dialyseur** [redacted]
* **Anticoagulation :** Dose initiale : 1,00 Fraxiparine 0,4ml/3800UI (x10)
* **Débit sang, volume de traitement, U.F. :** Débit sang - Artère : 350 ml/min, débit UF maxi. : 800 ml/heure
* **Bain :** Concentré : K+ : 2 mmol/L - Ca^{2+} : 1,5 mmol/L - Glucose : 1 g/L - Mg^{2+} : 0,5 mmol/L - Tampon : Citrate
Na : 140 mmol/l
Bicarbonate : 35 mmol/l
Température : 36,5 °C
Débit dialysat : 500 ml/min

recovery

Allergies et intolérances

Allergies : AUCUNE ALLERGIE CONNUE
Intolérances médicamenteuses : AUCUNE INTOLERANCE CONNUE

Abord Dialyse

14/02/2017 FAV native radiale droite

Médecin responsable du patient et prescripteur : Docteur JARRAYA Faiçal

H D – THERANOVA 400
04/10/2022 – 04/01/2023

HDx THERAPY
ENABLED BY THE THERANOVA DIALYZER

Take Home Messages

Classification des membranes selon le Kuf et le K_0A

Propriétés	Bas flux	Haut flux	SuperFlux	
			MCO	HCO
K_{uf} (ml/h/mmHg)	**<20**	>40	>70	>100
K_0A urée (ml/min/m²)	500	>1000	>1000	>1000

- Perméabilité diffusive Jd = $f\ d\pi r^2 / e$
- Perméabilité hydraulique Kuf = $f\ d\pi r^4 / e$
- Perméabilité convective Jc = Qf x CT x conc. art.

$d\pi r^2$ = porosité = densité x surface des pores e = épaisseur de la membrane
Qf = débit convectif CT = coefficient de tamisage

TH 02/2022

HDx –MCO membranes

Innovation on membrane engineering (PESF-PVP) homogeneous diameter, MW close RO to CO

HDx = Hemodialysis (not Hemodiafiltration)

Middle weight uremic toxins removal: HDx > HF-HD, seems HDx = HDF

Safety excellent on Albumin leaking

Retrospective cohort study: Better survival

Need for prospective blinded randomized trial on mortality and MACE

When recommended (personal proposition)

-If HDF is not possible (Home Hemodialysis/NxStage, Autodialysis unit, convective volume<23L)

-Special indication: Rest Less Syndrome, Anorexia, Unexplained ichting, post dialysis fatigue,¨High post dialysis recovery time, neurological cramps

Theranova (Baxter)
Phylther SD (Medtronic)
Elisio HX (Nipro)

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INTERNATIONAL SOCIETY OF NEPHROLOGY

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editorial

Nephrology in Africa: forgotten no more

Kidney International (2020) 98, 804–806; https://doi.org/10.1016/j.kint.2020.07.016

KEYWORDS: acute kidney injury; Africa; chronic kidney disease; nephrology

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Take Note

Welcome Message from AFRAN President Mohamed Hany Hafez

Dear colleagues, Professors and consultants :

On behalf of AFRAN executive committee, I am privileged and honored to…

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African Nephrology & Transplantation Summit 2023

View the Lectures

Take Note

New AFRAN membership offers and benefits

Given the common missions, the leadership of The European Society for Organ Transplantation (ESOT) and the African Association of Nephrology agree that a formal relationship would create synergy, avoid…

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Editorial note: Welcome to the year 2022 and Volume 25

—Alain G Assounga

The Editorial Board and Editors of the African Journal of Nephrology wish all authors, reviewers and readers a very happy and blessed New Year. Like the last two years, we start this year in a wave of the COVID-19 pandemic. Hopefully, the future…

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Prof Rashad Barsoum

It's with great sorrow AFRAN announces the great loss of Prof Rashad Barsoum, one of the founders of the Egyptian,African and Arab societies of nephrology and transplantation…

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Take Note

8th Maghrebian Congress of Nephrology
8ème Congrès Maghrébin de Néphrologie
Nouakchott, January 19-21, 2023

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African Associations Celebrating

KIDNEY HEALTH

World Kidney

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Sfax, Arab Cultural Capital 2016