Hospital General Universitario
Santa Lucía

2º CONGRESO
DE LA SOCIEDAD GALLEGA
DE NEFROLOGÍA

Ferrol
23 y 24 de Octubre de 2015

Sede AFUNDACIÓN

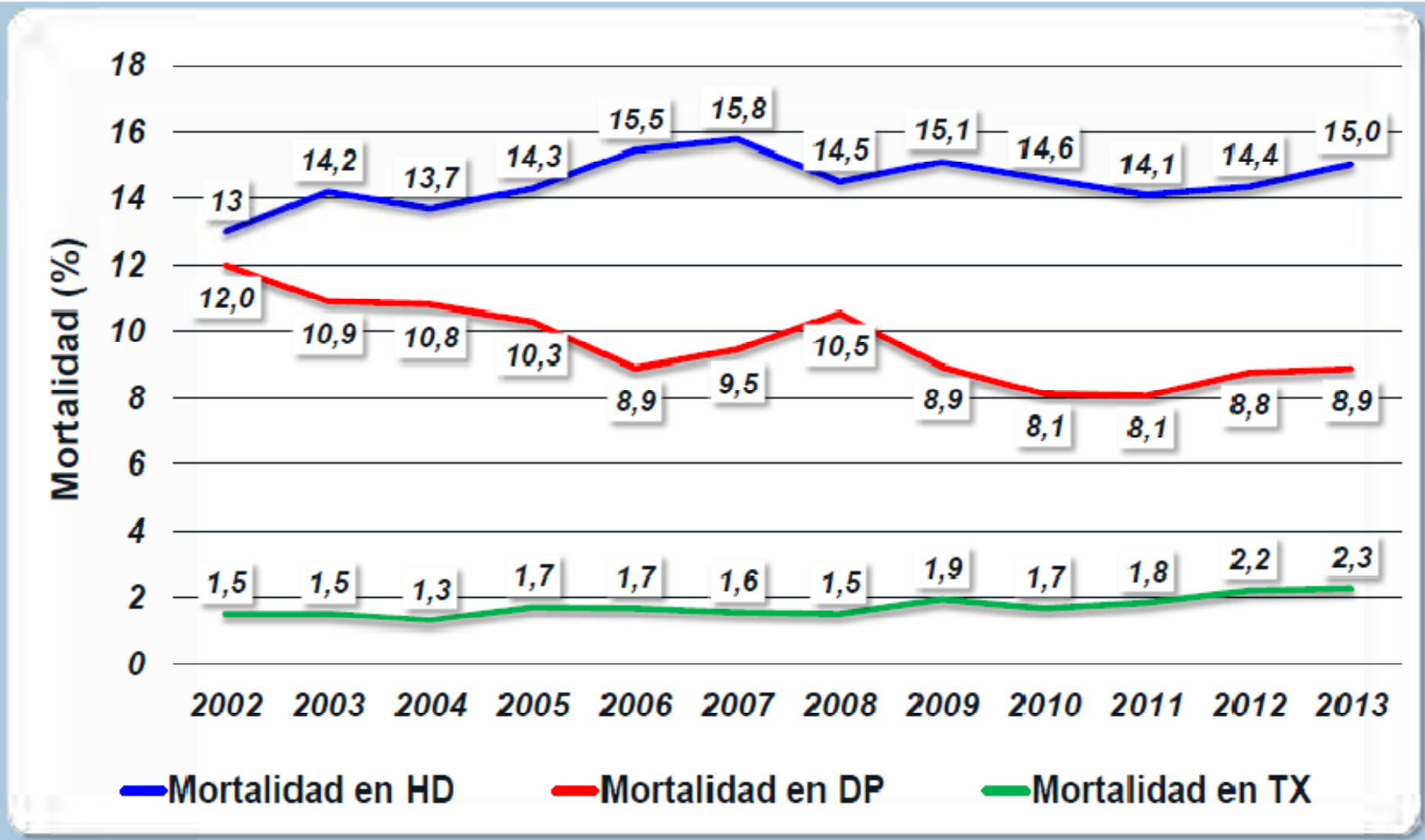
SGAN
sociedad gallega de nefrología

"Hemodiafiltracion on-line: luces y sombras"

M. Molina Núñez
Jefe de Servicio de Nefrología
Complejo Hospitalario Universitario
Cartagena

El Ferrol, 23 de octubre de 2015

Evolución de la Mortalidad



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CLINICAL RESEARCH www.jasn.org

High-Efficiency Postdilution Online Hemodiafiltration Reduces All-Cause Mortality in Hemodialysis Patients

Francisco Maduell,* Francesc Moreso,† Mercedes Pons,‡ Rosa Ramos,§ Josep Mora-Macià,‖ Jordi Carreras,¶ Jordi Soler,** Ferran Torres,††‡‡ Josep M. Campistol,* and Alberto Martinez-Castelao,§§ for the ESHOL Study Group

*Nephrology Department, Hospital Clinic, Barcelona, Spain; †Nephrology Department, Hospital Universitari Vall d'Hebron, Barcelona, Spain; ‡CETIRSA, Barcelona, Spain; §Hospital San Antonio Abad, Vilanova i la Geltru, Spain; ‖Fresenius Medical Care, Granollers, Spain; ¶Diaverum Baix Llobregat, L'Hospitalet, Llobregat, Spain; **Fresenius Medical Care, Reus, Spain; ††Biostatistics Unit, School of Medicine, Universitat Autònoma de Barcelona, Barcelona, Spain; ‡‡Biostatistics and Data Management Platform, IDIBAPS, Hospital Clinic, Barcelona, Spain; and §§Nephrology

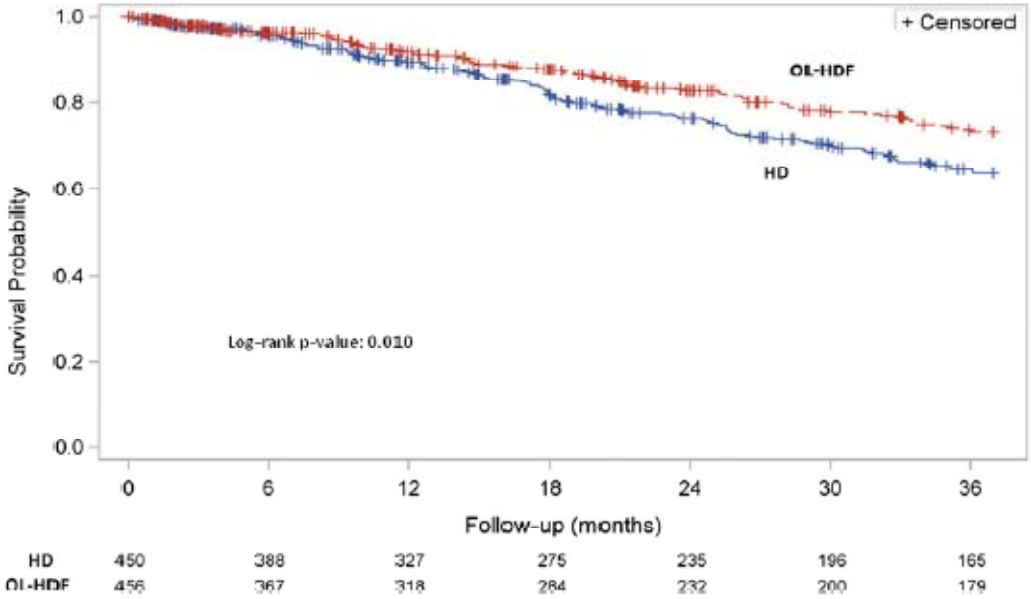

Figure 2. Kaplan–Meier curves for 36-month survival in the intention-to-treat population (P=0.01 by the log-rank test). HD, hemodialysis.

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Table 3. Primary outcome: Mortality

	Hemodialysis Group (*n*=450) (867.3 patient-years at risk)		OL-HDF Group (*n*=456) (863.1 patient-years at risk)		HR (95% CI)	P[a]
	Events	Events/100 Patient-Years	Events	Events/100 Patient-Years		
Death from any cause	122	14.1	85	9.8	0.70 (0.53 0.92)	0.01
Cardiovascular cause	55	6.3	37	4.3	0.67 (0.44 1.02)	0.06
Heart failure	10	1.2	7	0.8	0.69 (0.26 1.82)	0.46
Ischemic heart disease	15	1.7	14	1.6	0.93 (0.45 1.94)	0.86
Mesenteric thrombosis	6	0.7	5	0.6	0.84 (0.26 2.77)	0.78
Stroke	18	2.1	7	0.8	0.39 (0.16 0.93)	0.03
Dysrhythmia	5	0.6	3	0.3	0.59 (0.14 2.47)	0.46
Peripheral arteriopathy	1	0.0	1	0.0	0.97 (0.06 15.48)	0.98
Infection	22	2.5	10	1.2	0.45 (0.21 0.96)	0.03
Tumor	6	0.7	10	1.2	1.67 (0.61 4.59)	0.32
Sudden death	14	1.6	14	1.6	0.99 (0.47 2.08)	0.98
Cachexia	8	0.9	4	0.5	0.51 (0.15 1.70)	0.27
Death from other causes	17	2.0	10	1.2	0.59 (0.27 1.28)	0.18

Data are given as HR or NNT (95% CI). NNTs (95% CIs) for all-cause mortality at 1, 2, and 3 years were 9.75 (5.03–47.41), 7.67 (4.32–33.57) and 7.67 (4.51–31.83), respectively.
[a]P value by the log-rank test.

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Table 5. Outcome data: Hospitalizations and intradialysis symptoms

	Hemodialysis Group (*n*=450) (867.3 Patient-Years at Risk)		OL-HDF Group (*n*=456) (863.1 Patient-Years at Risk)		Rate Ratio (95% CI)	*P*[a]
	No. of Events	No. of Events/100 Patient-Years	No. of Events	No. of Events/100 Patient-Years		
All cause hospitalizations	412	47.5	317	36.7	0.78 (0.67 0.90)	0.001
Infections	73	8.4	72	8.3		
Vascular access	98	11.3	56	6.5		
Heart failure	28	3.2	15	1.7		
Ischemic heart disease	25	2.9	16	1.9		
Respiratory disease	26	3.0	28	3.2		
Gastrointestinal bleeding	10	1.2	4	0.5		
Other reasons	152	17.5	126	14.6		
Symptomatic hypotension episodes[b]	8133	937.7	5862	679.2	0.72 (0.68 0.77)	<0.001
Dysrythmia[b]	444	51.2	477	55.3	1.08 (0.86 1.35)	0.50
Thoracic pain[b]	327	37.7	318	36.8	0.98 (0.75 1.28)	0.87

Data are the number of hospitalizations (hospital admissions per 100 patient-years) and number of complicated dialysis sessions (number of symptoms per 100 patient-years).

[a]Penalized quasi-likelihood under restricted maximum likelihood models.

[b]Pooled data (data were collected 1 month per each 3-month period).

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TABLE 9 . Risk of all-cause mortality results by achieved convective volume, convective volume/BMI and convective volume/BSA

	HD	OL-HDF			p1	p2
		Tertile 1	Tertile 2	Tertile 3		
Convective Volume (L/session)		<23.1	23.1-25.4	>25.4		
n (%)	124 (26.4)	33 (22.9)	27 (18.2)	23 (16.0)	0,030	0,003
HR [95%CI]	Ref.	0.90 [0.61 to 1.31]	0.60 [0.39 to 0.9]	0.55 [0.34 to 0.84]	0,011	0,001
Convective Volume / BMI (L/Kg/m2)		<0.9	0.9-1.1	>1.1		
n (%)	124 (26.4)	25 (17.2)	32 (21.9)	26 (17.9)	0,046	0,027
HR [95%CI]	Ref.	0.62 [0.4 to 0.94]	0.74 [0.49 to 1.08]	0.66 [0.42 to 0.99]	0,043	0,020
Convective Volume / BSA (L/m2)		<13.2	13.2-14.8	>14.8		
n (%)	124 (26.4)	29 (20.0)	29 (19.9)	25 (17.2)	0,062	0,010
HR [95%CI]	Ref.	0.75 [0.49 to 1.11]	0.66 [0.43 to 0.98]	0.62 [0.39 to 0.93]	0,044	0,006

n (%): number of exitus (% of exitus from total of group subjects); BMI: Body Mass Index (Kg/m^2); BSA: Body Surface Area (m^2)
BMI: Body Mass Index (Kg/m2); BSA: Body Surface Area (m2)
p1: p-value for the statistical significance test (Fisher's exact test; log-rank test)
p2: p-value for the trend test (Cochran-Armitage Trend Test; log-rank test)

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Effect of Online Hemodiafiltration on All-Cause Mortality and Cardiovascular Outcomes

Muriel P.C. Grooteman,*† Marinus A. van den Dorpel,‡ Michiel L. Bots,§ E. Lars Penne,*‖ Neelke C. van der Weerd,* Albert H.A. Mazairac,‖ Claire H. den Hoedt,‡‖ Ingeborg van der Tweel,§ Renée Lévesque,¶ Menso J. Nubé,*† Piet M. ter Wee,*† and Peter J. Blankestijn,‖ for the CONTRAST Investigators

*Department of Nephrology, VU University Medical Center, Amsterdam, The Netherlands; †Institute for Cardiovascular Research, VU Medical Center, Amsterdam, The Netherlands; ‡Department of Internal Medicine, Maasstad Hospital, Rotterdam, The Netherlands; §Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht, The Netherlands; ¶Department of Nephrology, University Medical Center Utrecht, Utrecht, The Netherlands; and ‖Department of Nephrology, Centre Hospitalier de l'Université de Montréal, St. Luc Hospital, Montréal, Canada

ABSTRACT

Table 4. Risk of all-cause mortality and fatal and nonfatal cardiovascular events by achieved convection volume in liters per treatment

	Hemodialysis	Online Hemodiafiltration Convection Volume Tertiles			P for Trend
		<18.17 L	18.18–21.95 L	>21.95 L	
Total mortality					
crude	1.0	0.95 (0.66–1.38)	0.83 (0.57–1.22)	0.62 (0.41–0.93)	0.010
adjusted[a]	1.0	0.79 (0.53–1.14)	0.77 (0.51–1.14)	0.65 (0.42–0.99)	0.012
adjusted[b]	1.0	0.80 (0.52–1.24)	0.84 (0.54–1.29)	0.61 (0.38–0.98)	0.015
Fatal and nonfatal cardiovascular events					
crude	1.0	1.37 (0.94–1.98)	1.06 (0.72–1.56)	0.76 (0.50–1.16)	0.473
adjusted[a]	1.0	1.41 (0.92–2.11)	0.93 (0.62–1.40)	0.77 (0.48–1.21)	0.369
adjusted[b]	1.0	1.35 (0.86–2.11)	1.04 (0.66–1.62)	0.72 (0.44–1.19)	0.475

Results reported as HR and 95% confidence interval, from Cox proportional hazards models. Reference is treatment with low-flux hemodialysis.
[a]Adjusted for determinants of mortality, i.e., age, sex, previous vascular disease, diabetes, previous transplantation, spKt/V, baseline eGFR, baseline albumin, baseline creatinine, baseline hematocrit, and use of α- and β-blockers, calcium antagonists, and angiotensin converting inhibitors at baseline (82 missing, 206 deaths, 182 cardiovascular events).
[b]Adjusted for the above mentioned determinates as well as for center differences (82 missing, 206 deaths, 182 cardiovascular events).

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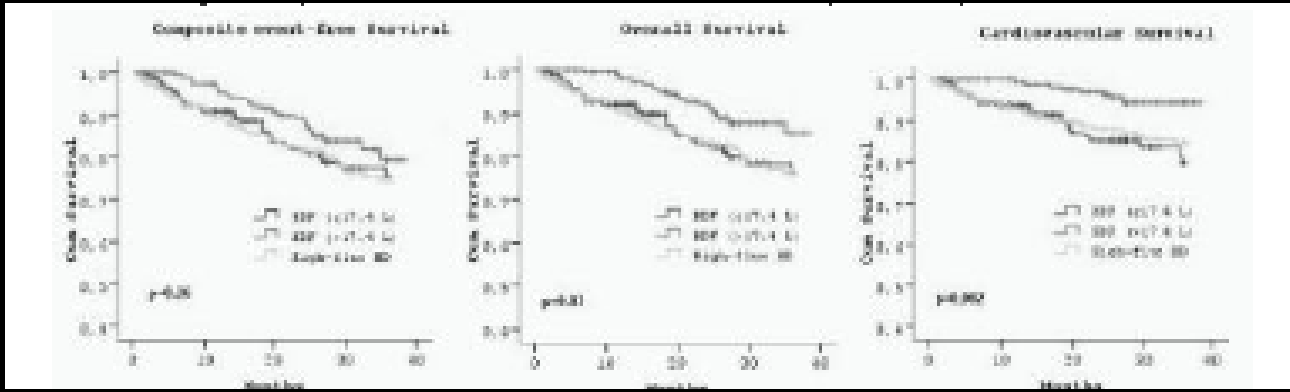
[LBCT2] COMPARISON OF POSTDILUTION ON-LINE HEMODIAFILTRATION AND HEMODIALYSIS (TURKISH HDF STUDY)

Ercan Ok,[1] Gulay Asci,[1] Ebru Sevinc Ok,[1] Fatih Kircelli,[1] Mumtaz Yilmaz,[1] Ender Hur,[1] Meltem Sezis Demirci,[1] Oner Ozdogan,[1] Cenk Demirci,[1] Ozen Onen Serbuz,[1] Soner Duman,[1] Mehmet Ozkahya,[1] Meral Kayikcioglu,[1] Hayriye Elbi,[1] Ali Basti,[1] Huseyin Toz[1]. [1]Nephrology, Ege University School of Medicine, Izmir, Bornova, Turkey



HDF con volumen de sustitución > 17,4 L en comparación a HD de alto flujo asociado a:

- 46% de reducción del riesgo general de mortalidad (RR=0,54, p=0,02)
- 71% de reducción del riesgo de mortalidad debida a CV (RR=0,29, p= 0,003)

HDF ↓ mortalidad dependiente del V

Estudio	**DOPPS** 2006	**Turco** 2012	**CONTRAST** 2012	**ESHOL** 2013
Diseño	HD vs HDF **R**	HF-HD vs HDF **P, R, C**	LF-HD vs HDF **P, R, C**	HF-HD vs HDF **P, R, C**
Nº pacientes	2165	782	714	906
Objetivo	**SUPERVIVENCIA**			
Duración	4 años	2 años (máx. 39 m)	3 años (0.4-6.6 años)	3 años
Resultados **Post hoc**	**↓† 35%** **si > 15 l**	**↓† 39%** **si > 20 l** **↓† si >17.4 l**	**↓† 46%** **si > 21.9 l**	**↓† 40%** **si > 23.1 l** **↓† 45% si >25 l**

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Blood Purification

Blood Purif 2013;35:55–62
DOI: 10.1159/000345175

Published online: January 22, 2013

Emerging Clinical Evidence on Online Hemodiafiltration: Does Volume of Ultrafiltration Matter?

Bernard Canaud[a, b] Sudhir K. Bowry[a]

[a] Medical Board EMEA LA, Fresenius Medical Care, Bad Homburg, Germany; [b] Montpellier University I, Medical School, Montpellier, France

Conclusion

Based on the findings of previous cohort studies and of the two recently reported randomized controlled trials (CONTRAST and Turkish OL-HDF), one can conclude that the volume of convection matters. It may represent a decisive component of the survival benefit for OL-HDF-treated patients. From a statistical viewpoint, the two recent interventional trials will be registered as negative studies not achieving their primary objective of reducing all-cause and cardiovascular mortality in dialysis patients. Again, from a methodological viewpoint, one should note that a targeted convective volume was achieved in a minority of patients (one third) and interestingly only these patients had significant survival benefits. From a purely clinical perspective, it would be unfortunate to deprive end-stage CKD patients from deriving advantages from a superior renal replacement therapy due simply to suboptimal care practices and methodological considerations [54, 55].

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Nephrol Dial Transplant (2013) 22: 542–550
doi: 10.1093/ndt/gfs530
Advance Access publication 22 January 2013

Online haemodiafiltration: definition, dose quantification and safety revisited

James E. Tattersall[1]
Richard A. Ward[2]on behalf of the EUDIAL group*

[1]Department of Renal Medicine, St James's University Hospital, Leeds, UK and
[2]Department of Medicine, University of Louisville, Louisville, KY, USA

HDF is a blood purification therapy combining diffusive and convective solute transport using a high-flux membrane characterized by an ultrafiltration coefficient greater than 20 mL/h/mm Hg/m^2 and a sieving coefficient (S) for β_2-microglobulin of greater than 0.6. Convective transport is achieved by an effective convection volume of at least 20% of the total blood volume processed. Appropriate fluid balance is maintained by external infusion of a sterile, non-pyrogenic solution into the patient's blood.

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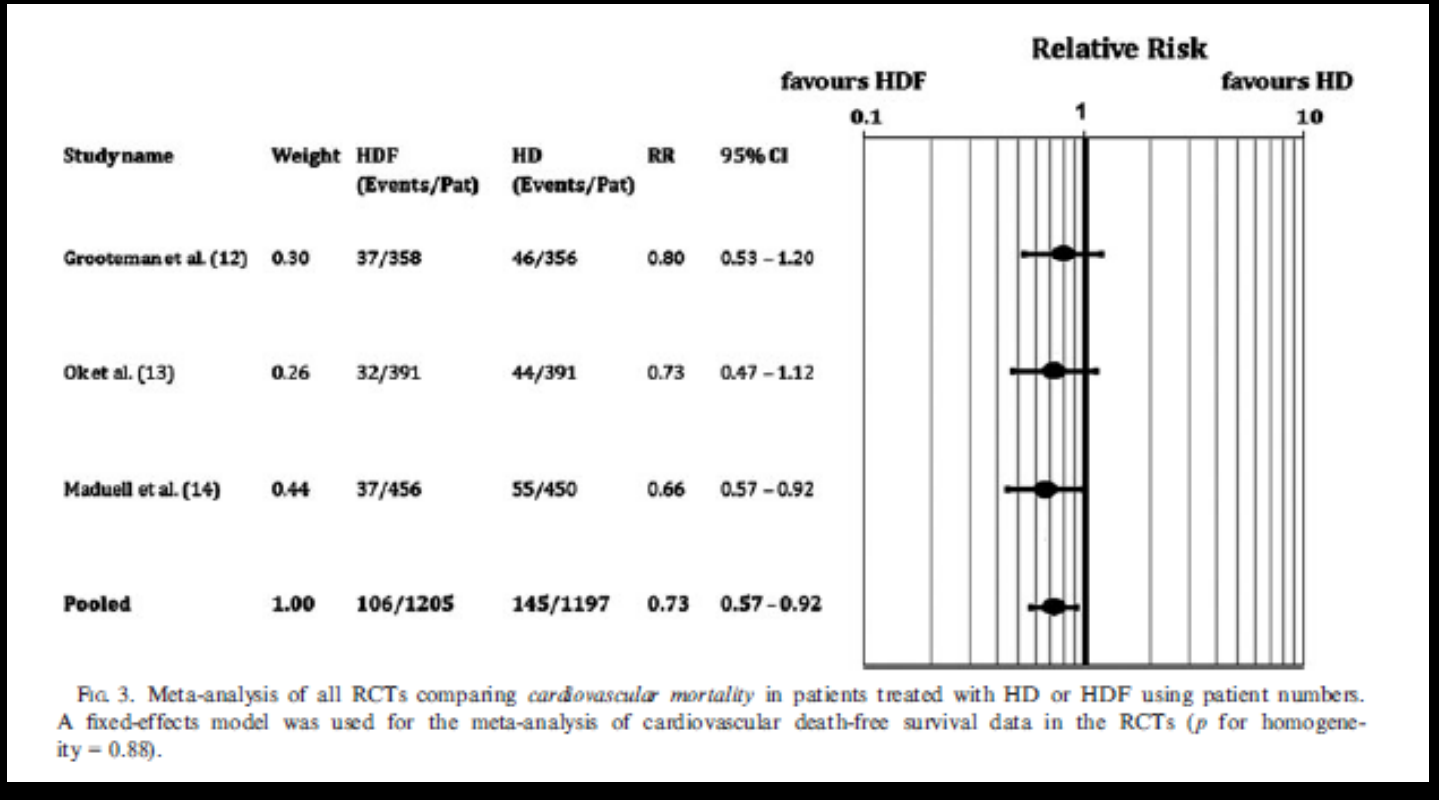
Seminars in Dialysis

PROGRESS IN DIALYSIS PRACTICE

Clinical Evidence on Hemodiafiltration: A Systematic Review and a Meta-analysis

Ira M. Mostovaya,* Peter J. Blankestijn,* Michiel L. Bots,† Adrian Covic,‡ Andrew Davenport,§ Muriel P.C. Grooteman,¶** Jörgen Hegbrant,†† Francesco Locatelli,‡‡ Raymond Vanholder,§§ Menso J. Nubé,¶** and on behalf of the EUDIAL[1] – an official



Study name	Weight	HDF (Events/Pat)	HD (Events/Pat)	RR	95% CI
Grooteman et al. (12)	0.30	37/358	46/356	0.80	0.53 – 1.20
Ok et al. (13)	0.26	32/391	44/391	0.73	0.47 – 1.12
Maduell et al. (14)	0.44	37/456	55/450	0.66	0.57 – 0.92
Pooled	**1.00**	**106/1205**	**145/1197**	**0.73**	**0.57 – 0.92**

FIG. 3. Meta-analysis of all RCTs comparing *cardiovascular mortality* in patients treated with HD or HDF using patient numbers. A fixed-effects model was used for the meta-analysis of cardiovascular death-free survival data in the RCTs (p for homogeneity = 0.88).

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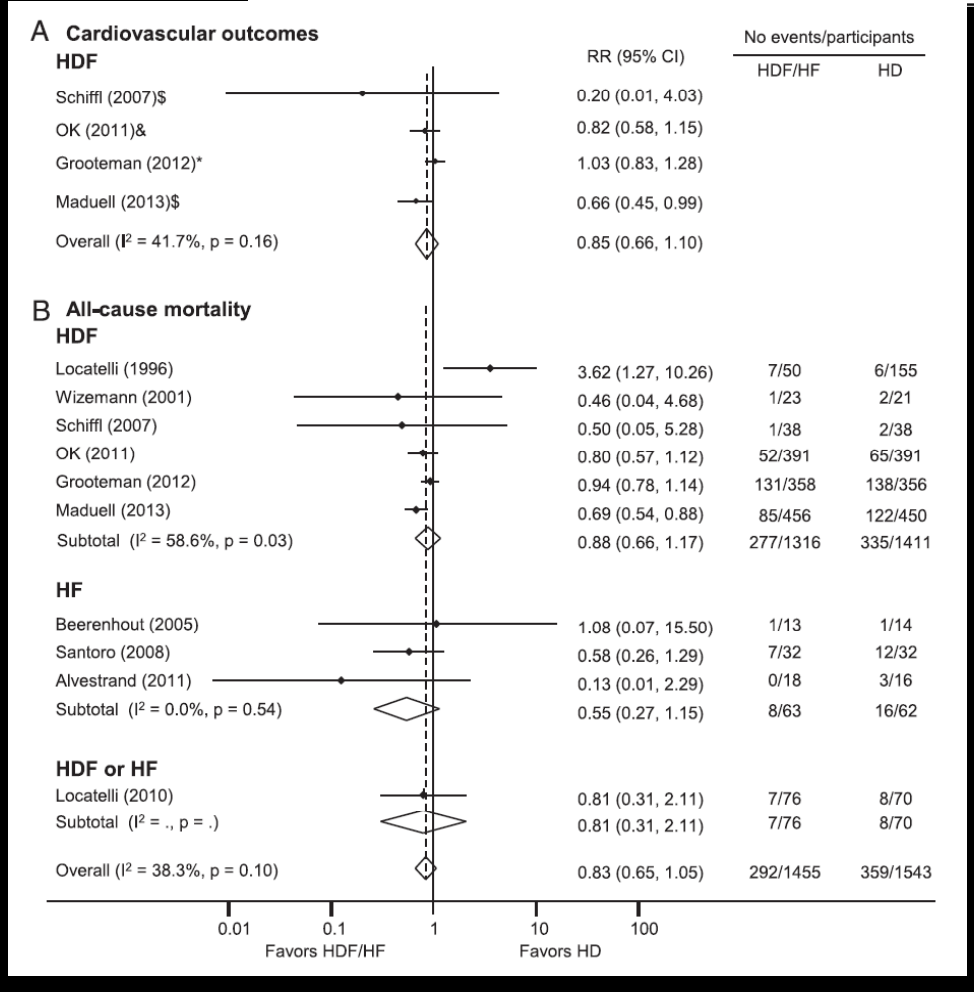
AJKD
Original Investigation

Effect of Hemodiafiltration or Hemofiltration Compared With Hemodialysis on Mortality and Cardiovascular Disease in Chronic Kidney Failure: A Systematic Review and Meta-analysis of Randomized Trials

Amanda Y. Wang, MBBS, FRACP,[1] Toshiharu Ninomiya, MD, PhD,[1] Anas Al-Kahwa, BSc(Med),[1,2] Vlado Perkovic, MBBS, PhD, FRACP,[1] Martin P. Gallagher, MBBS, PhD, FRACP,[1,2] Carmel Hawley, MBBS (Hons), M Med Sci, FRACP,[3] and Meg J. Jardine, MBBS, PhD, FRACP[1,2]



AJKD
Editorial

Understanding Discordant Meta-analyses of Convective Dialytic Therapies for Chronic Kidney Failure

Table 1. Summary of Findings From 4 Meta-analyses on the Efficacy of Convective Therapies for the Treatment of Chronic Kidney Failure

	Rabindranath et al[8] (2006)	Susantitaphong et al[12] (2013)	Wang et al[13] (2014)	Nistor et al[14] (2014)
Population	ESRD	ESRD	ESRD	ESRD
Methods				
Data sources	MEDLINE (1966-2006), EMBASE (1980-2006), Cochrane Central Register of Controlled Trials (2006), CINAHL (1872-2006).	MEDLINE (inception-December 2012), Cochrane Central Register of Controlled Trials, ClinicalTrials.gov, ASN scientific abstracts (2003-2012 meetings)	Cochrane Register of Controlled Trials (Central), MEDLINE (1946-February 2013), EMBASE (1980-February 2013).	MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials, ASN Database, CINAHL, Cochrane Renal Group's specialized register (through February 2013)
Intervention	Hemodiafiltration, hemofiltration, acetate-free biofiltration	Hemodiafiltration, hemofiltration, acetate-free biofiltration, high-flux/super high-flux HD	Hemodiafiltration, acetate-free biofiltration, hemofiltration	Hemodiafiltration, hemofiltration, acetate-free biofiltration
Comparator	Low-flux or high-flux HD	Low-flux HD	Low-flux or high-flux HD	Low-flux or high-flux HD
No. of RCTs (sample size) study design, and publication types	20 (657 patients): 8 crossover and 12 parallel-arm trials; 20 published articles	65 (12,182 patients): 29 crossover and 36 parallel-arm trials; 64 published articles and 1 published abstract	16 (3,220 patients): 2 crossover and 14 parallel-arm trials; 16 published articles	35 (4,039 patients): 17 crossover and 18 parallel-arm trials; 25 published articles and 10 published abstracts
Analytical approach	Random-effects models	Random-effects models	Random-effects models	Random effects models
Results				
All-cause mortality	RR, 1.68 (95% CI, 0.23 to 12.13); I^2 index, 61%	RR, 0.88 (95% CI, 0.76 to 1.02); I^2 index, 18%	RR, 0.83 (95% CI, 0.65 to 1.05); I^2 index, 59%	RR, 0.87 (95% CI, 0.70 to 1.07); I^2 index, 34%
Cardiovascular mortality	NR	RR, 0.84 (95% CI, 0.71 to 0.98); I^2, 0%	RR, 0.85 (95% CI, 0.66 to 1.10); I^2 index, 42%	RR, 0.75 (95% CI, 0.58 to 0.97); I^2 index, 0%
Therapy-related hypotension	MD,[a] −5.4 (95% CI, −23.7 to 12.9); I^2, 0%	RR, 0.55 (95% CI, 0.35 to 0.87); I^2 index, 99%	RR, 0.49 (95% CI, 0.30 to 0.81); I^2 index, 78%	RR, 0.72 (95% CI, 0.66 to 0.80)
β_2-Microglobulin clearance (mL/min)	MD, 23.0 (95% CI, 20.2 to 25.8); I^2 index, 0%	MD, 64.8 (95% CI, 46.8 to 82.8); I^2 index, 99%	NR	NR
Pre-treatment β_2-Microglobulin level (mg/L)	MD, −12.2 (95% CI, −26.1 to 1.7); I^2 index, 91%	MD, −9.9 (95% CI, −12.4 to −7.5); I^2 index, 88%	[b]MD, −5.9 (95% CI, −10.3 to −1.6); I^2 index, 96%	MD, −5.6 (95% CI, −9.1 to −2.0); I^2 index, 94%

Note: The I^2 index is a measure of statistical heterogeneity across study results; I^2 index ≥ 75% indicates medium to high heterogeneity.

Abbreviations: ASN, American Society of Nephrology; CI, confidence interval; CINAHL, Cumulative Index to Nursing and Allied Health Literature; ESRD, end-stage renal disease; HD, hemodialysis; MD, mean difference; NR, not reported; RCT, randomized controlled trial; RR, relative risk.

[a]Percentage of treatment sessions associated with hypotension.

[b]Post-treatment.

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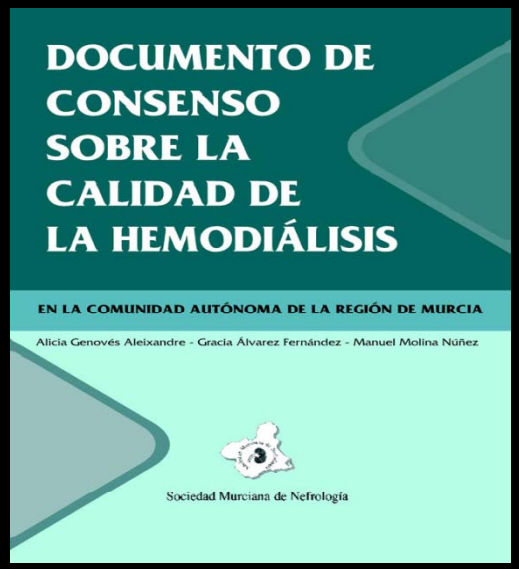
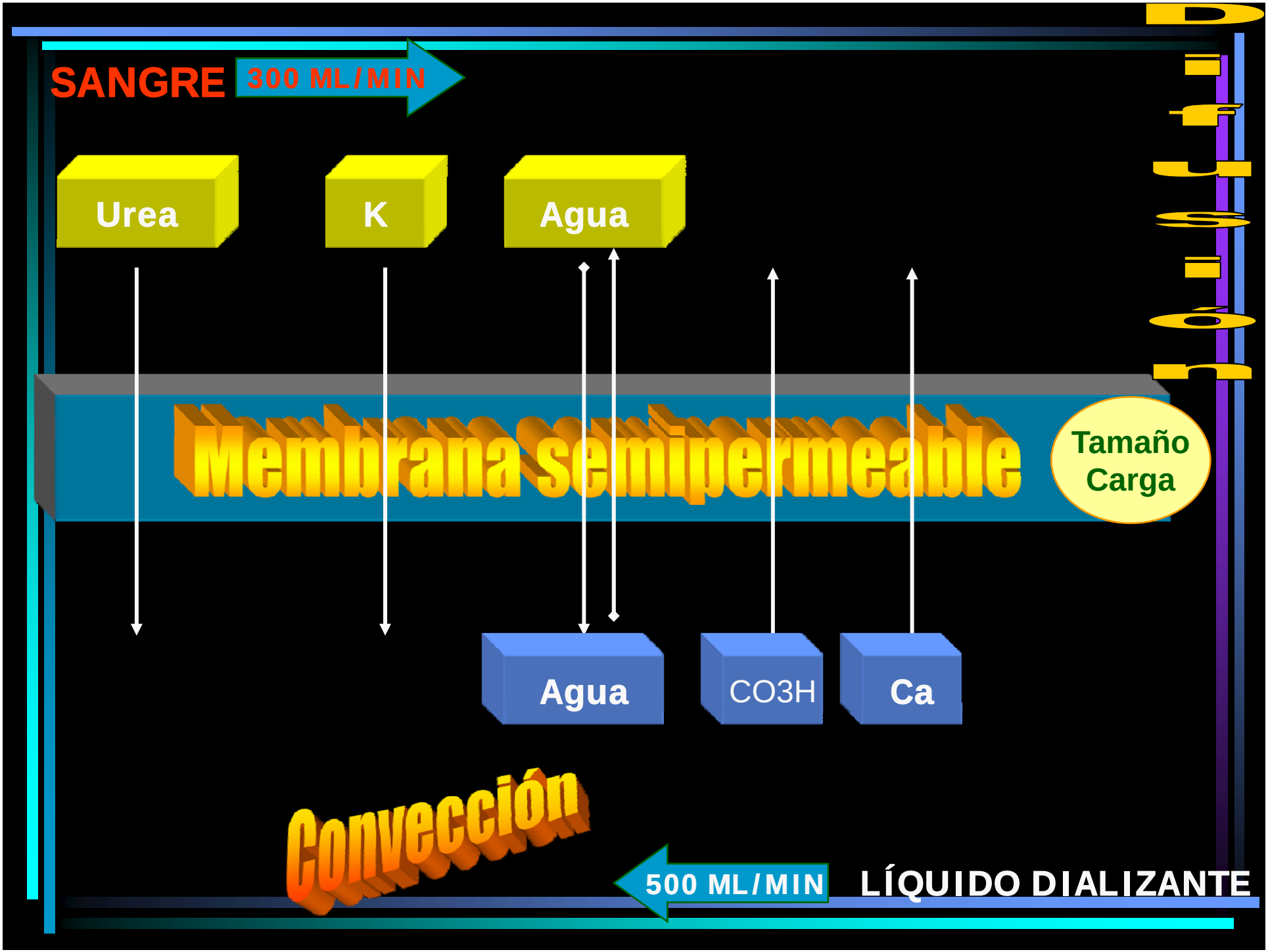


HEMODIÁLISIS CONVENCIONAL Y TÉCNICAS ESPECIALES

Comentario editorial

Los estudios mencionados por los autores implican una reducción de la mortalidad con el trasporte convectivo elevado (> 20 litros), siendo la HDF en línea la técnica más cómoda y barata para alcanzarlo. Así, dadas las circunstancias especiales de nuestra Comunidad, podría considerarse como técnica de elección en los pacientes en los que no se opte por aumentar la frecuencia, y siempre y cuando los requisitos técnicos sean los adecuados.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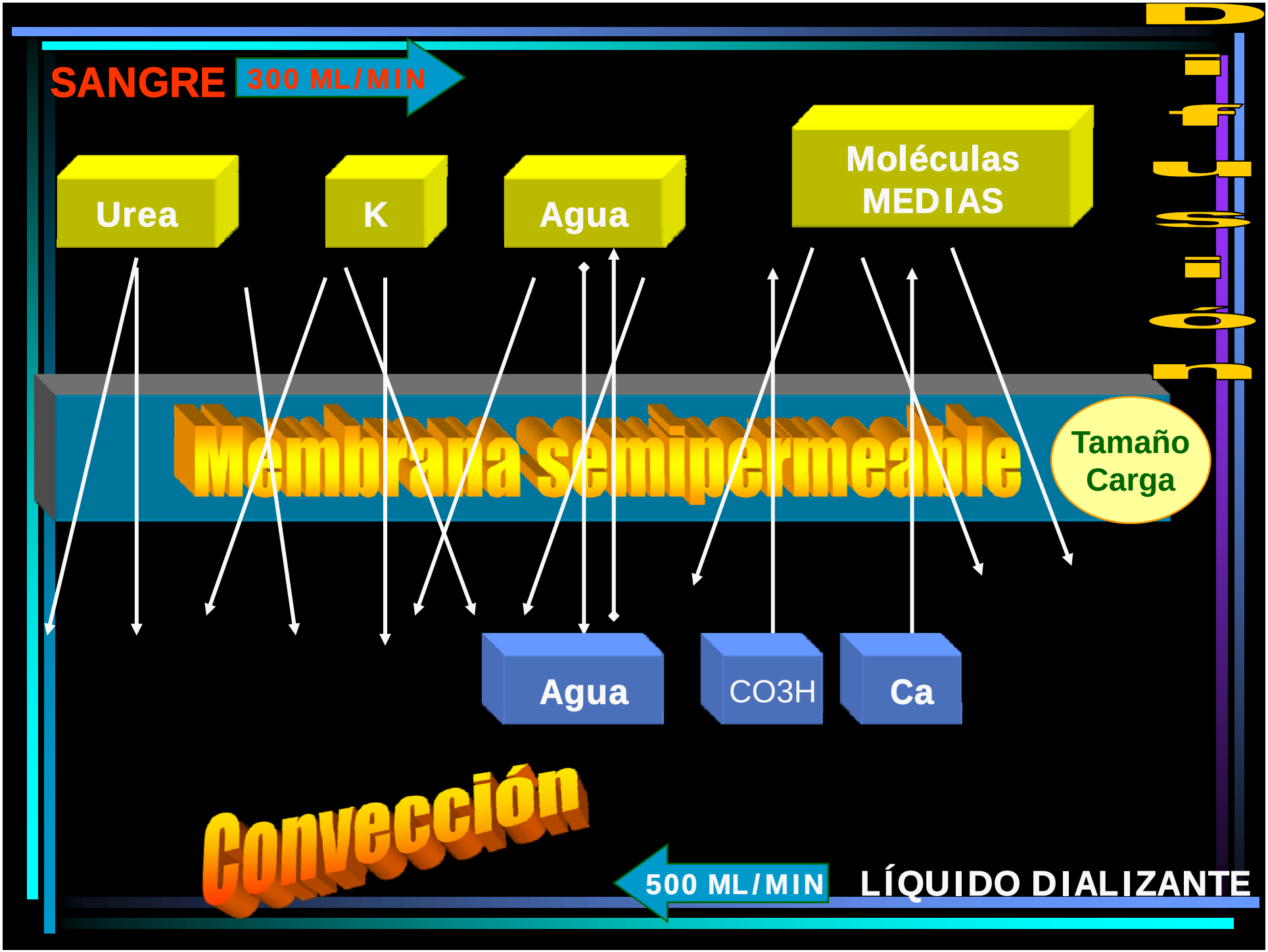
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Moléculas MEDIAS
Membrana semipermeable
Tamaño
Carga
Agua
CO3H
Ca
Convección
500 ML/MIN
LÍQUIDO DIALIZANTE
Difusión

Hospital General Universitario
Santa Lucía

http://www.kidney-international.org original article

Mortality risk for patients receiving hemodiafiltration versus hemodialysis: European results from the DOPPS

B Canaud[1], JL Bragg-Gresham[2], MR Marshall[3], S Desmeules[4], BW Gillespie[5], T Depner[6], P Klassen[7] and FK Port[2]

[1]Department of Nephrology, Lapeyronie University Hospital, Montpellier, France; [2]DOPPS, URREA, Ann Arbor, Michigan, USA; [3]Department of Renal Medicine, Middlemore Hospital, Otahuhu, Auckland, New Zealand; [4]Department of Néphrologie, CHUQ-Hôtel Dieu de Québec, Québec, Canada; [5]Department of Biostatistics, University of Michigan, Ann Arbor, Michigan, USA; [6]Department of Medicine, University of California, Davis, Sacramento, California, USA and [7]Department of Clinical Research, Amgen, Inc., Thousand Oaks, California, USA

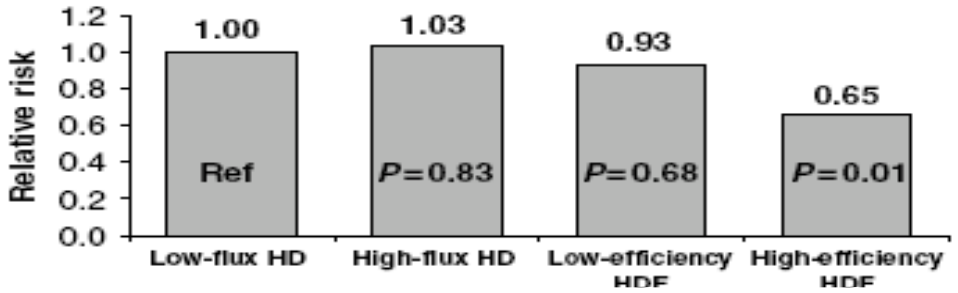

Figure 1 | Relative risk of mortality by dialysis type. (Adjusted for age, sex, time on dialysis, 14 summary comorbid conditions, weight, catheter use, hemoglobin, albumin, normalized protein catabolic rate, cholesterol, triglycerides, Kt/V, erythropoietin, MCS, and PCS.)

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Mortality risk for patients receiving hemodiafiltration versus hemodialysis

Kidney International (2006) **70,** 1524. doi:10.1038/sj.ki.5001759

T Jirka[1], S Cesare[2], A Di Benedetto[2], M Perera Chang[3], P Ponce[4], N Richards[5], C Tetta[3] and L Vaslaky[6]

We evaluated HDF data prospectively collected in EuCliD[2] from 56 clinics in Czech Republic, Hungary, Italy, and UK, all belonging to an International dialysis provider network. To reduce bias related to different dialysis doses, only patients on three times a week schedule achieving an $eKt/V \geqslant 1.20$ were considered. Out of 2564 prevalent patients, 394 were treated

HDF resulted in a significant 42.7% reduction in mortality risk (odds ratio: 0.573; 95% confidence interval: 0.377–0.873). After adjustment for age, gender, co-morbidities, and time on renal replacement therapy, mortality risk reduction was 35.3% (odds ratio: 0.647; 95% confidence interval: 0.419–0.991) and remained significant. In conclusion, our data confirm the results of Canaud *et al.*[1] However, epidemiological evaluations have limitations. The potential survival benefit of HDF must be tested by controlled clinical trials.

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In its search for ways to improve dialysis patient outcomes, the nephrology community has suggested that convective-based therapies represent promising modalities.[15] In this context, HDF is appealing. By combining ultrafiltration (convective clearances for removing larger solutes) with diffusion (for removal of small solutes), HDF offers an effective dialysis modality expanding spectrum of uremic toxins to middle-sized and large molecular weight solutes.[16,17] In addition, the ultrapure dialysis fluid and sterile substitution fluid used for infusion during HDF, combined with high-flux synthetic membranes, results in optimized biocompatibility of the extracorporeal circuit.

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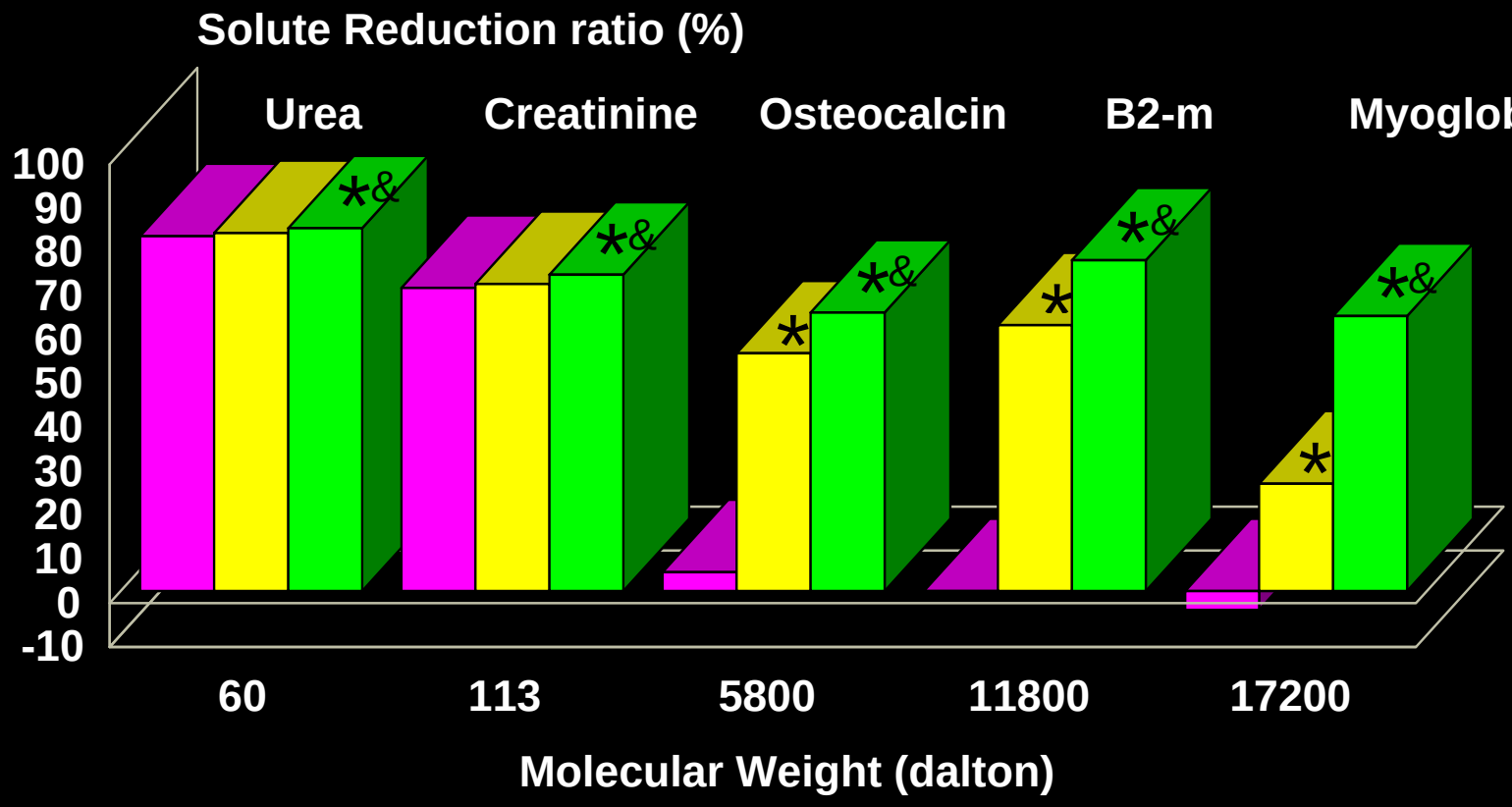
Osteocalcin and Myoglobin Removal in On-Line Hemodiafiltration Versus Low- and High-Flux Hemodialysis

Francisco Maduell, MD, Victor Navarro, MD, Mª Carmen Cruz, MD, Eduardo Torregrosa, MD, Daniel Garcia, PharmD, Victoria Simon, PharmD, and Jose Antonio Ferrero, PharmD

American Journal of Kidney Diseases, Vol 40, No 3 (September), 2002: pp 582-589



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Nephrol Dial Transplant (2009) 24: 571–577
doi: 10.1093/ndt/gfn521
Advance Access publication 17 September 2008

Original Article

NDT
Nephrology Dialysis Transplantation

Serum β_2-microglobulin level is a significant predictor of mortality in maintenance haemodialysis patients

Senji Okuno[1], Eiji Ishimura[2], Kaori Kohno[1], Yoko Fujino-Katoh[1], Yoshifumi Maeno[1], Tomoyuki Yamakawa[1], Masaaki Inaba[2] and Yoshiki Nishizawa[2]

[1]Kidney Center, Shirasagi Hospital and [2]Osaka City University Graduate School of Medicine, Osaka, Japan

Conclusion. These results demonstrate that the serum β_2-M level is a significant predictor of mortality in haemodialysis patients, independent of haemodialysis duration, diabetes, malnutrition and chronic inflammation, suggesting the clinical importance of lowering serum β_2-M in these patients.

Association between Serum β_2-Microglobulin Level and Infectious Mortality in Hemodialysis Patients

Alfred K. Cheung,*† Tom Greene,† John K. Leypoldt,†‡ Guofen Yan,§ Michael Allon,‖ James Delmez,¶ Andrew S. Levey,** Nathan W. Levin,†† Michael V. Rocco,‡‡ Gerald Schulman,§§ and Garabed Eknoyan‖‖ for HEMO Study Group

Clin J Am Soc Nephrol 3: 69–77, 2008. doi: 10.2215/CJN.02340607

Conclusions: These results generally support the notion that middle molecules are associated with systemic toxicity and that their accumulation predisposes dialysis patients to infectious deaths, independent of the duration of maintenance dialysis.

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CLINICAL RESEARCH www.jasn.org

High-Efficiency Postdilution Online Hemodiafiltration Reduces All-Cause Mortality in Hemodialysis Patients

Francisco Maduell,* Francesc Moreso,† Mercedes Pons,‡ Rosa Ramos,§ Josep Mora-Macià,‖ Jordi Carreras,¶ Jordi Soler,** Ferran Torres,††‡‡ Josep M. Campistol,* and Alberto Martinez-Castelao,§§ for the ESHOL Study Group

*Nephrology Department, Hospital Clínic, Barcelona, Spain; †Nephrology Department, Hospital Universitari Vall d'Hebron, Barcelona, Spain; ‡CETIRSA, Barcelona, Spain; §Hospital San Antonio Abad, Vilanova i la Geltru, Spain; ‖Fresenius Medical Care, Granollers, Spain; ¶Diaverum Baix Llobregat, L'Hospitalet, Llobregat, Spain; **Fresenius Medical Care, Reus, Spain; ††Biostatistics Unit, School of Medicine, Universitat Autònoma de Barcelona, Barcelona, Spain; ‡‡Biostatistics and Data Management Platform, IDIBAPS, Hospital Clínic, Barcelona, Spain; and §§Nephrology Department, Hospital Universitari Bellvitge, L'Hospitalet, Bellvitge, Spain

Clearance of middle-to-large molecules depends on the type of dialysis membrane and the amount of convection volume and may be increased with OL-HDF treatment. However, the observed increase of β_2-microglobulin serum levels in both groups during this study was an unexpected finding. Previous data[27] showed that there is a positive correlation between infusion volume and the β_2-microglobulin reduction ratio but this does not mean that predialysis levels were reduced, because β_2-microglobulin has a low distribution volume.[28] Moreover, several studies have shown that predialysis β_2-microglobulin levels were reduced after patients were switched from high-flux hemodialysis to OL-HDF.[7,29] Unfortunately, residual renal function, one of the major determinants of β2-microglobulin serum levels, was not monitored during the study period. These results suggest that the benefit of OL-HDF to patient survival partly depends on clearance of molecules other than β_2-microglobulin. OL-HDF can remove other middle-sized molecules or protein-bound uremic toxins more efficiently than hemodialysis, which may influence endothelial function, inflammatory status, or vascular calcification, providing cardioprotective effects and/or improving the immunologic system.

Hemodialysis	24.8 (23.6, 26.1)	24.4 (23.0, 25.8)	24.1 (22.6, 25.6)	29.0 (27.3, 30.7)	31.0 (29.1, 33.0)	30.6 (28.5, 32.7)	29.8 (27.4, 32.2)	<0.001‖
OL-HDF	23.9 (22.7, 25.0)	24.2 (22.7, 25.7)	25.8 (24.2, 27.5)	25.9 (24.1, 27.7)	29.6 (27.5, 31.6)	30.2 (28.0, 32.4)	29.2 (26.8, 31.7)	<0.001‖
Time × time	—	0.69	0.13	0.01	0.30	0.76	0.73	<0.001‖

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Blood Purification

Original Paper

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Mathematical Modeling of Different Molecule Removal on On-Line Haemodiafiltration: Influence of Dialysis Duration and Infusion Flow

Francisco Maduell[a] Juan Sanchez[b] Marta Net[b] Miquel Gomez[a]
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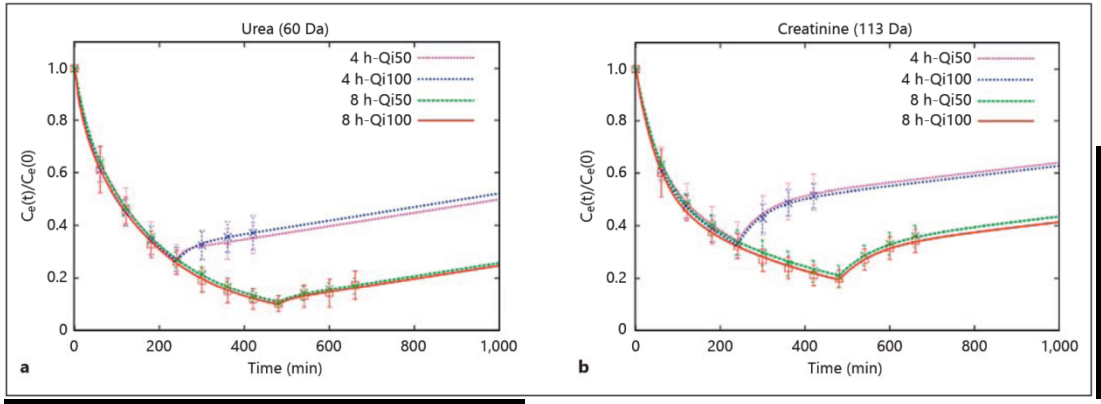
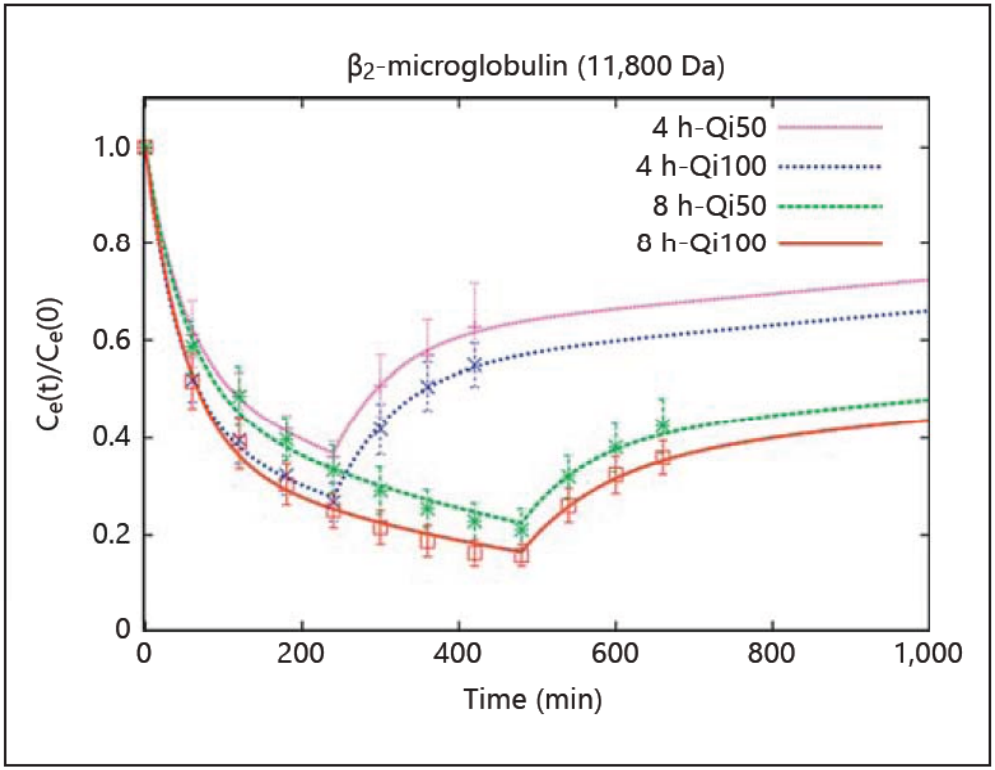
Josep M. Campistol[a]





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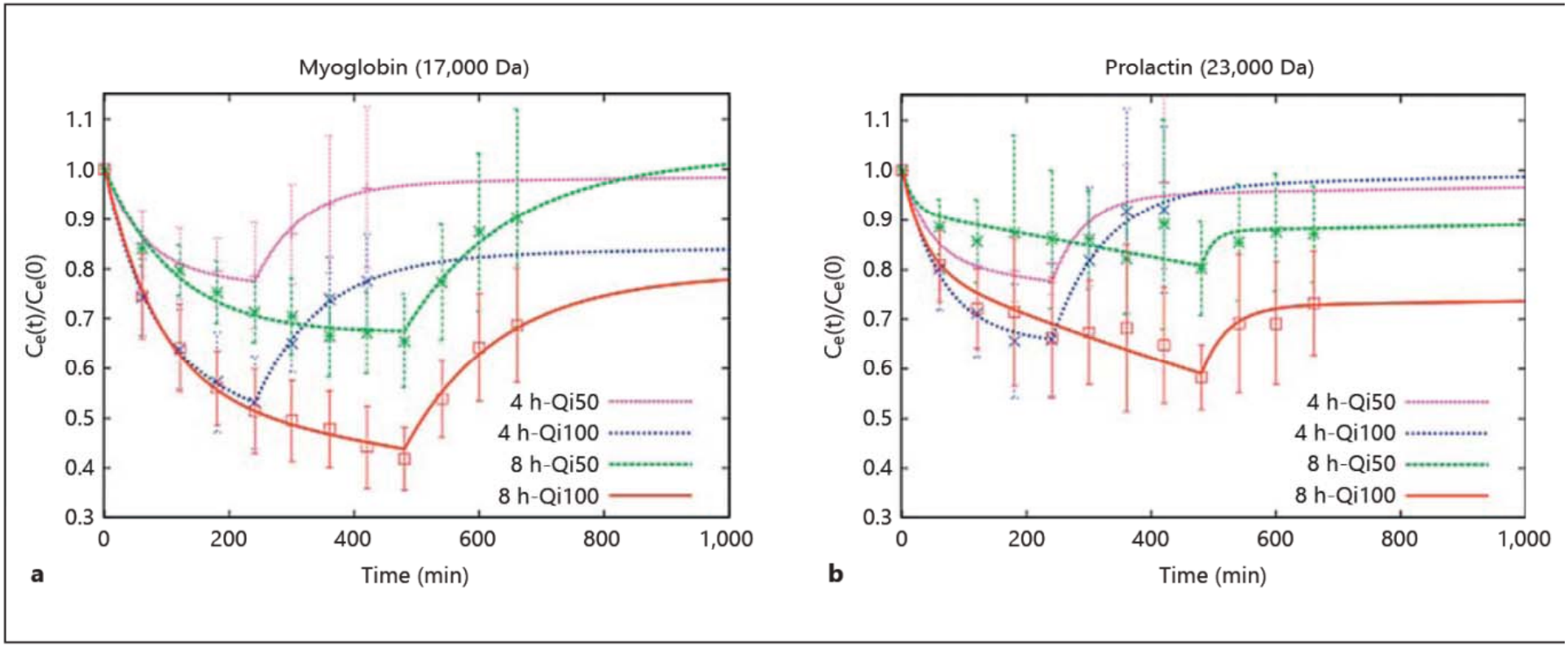

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CLINICAL RESEARCH www.jasn.org

Effect of Membrane Permeability on Survival of Hemodialysis Patients

Francesco Locatelli,* Alejandro Martin-Malo,† Thierry Hannedouche,‡ Alfredo Loureiro,§ Menelaos Papadimitriou,‖ Volker Wizemann,¶ Stefan H. Jacobson,** Stanislaw Czekalski,†† Claudio Ronco,‡‡ and Raymond Vanholder,§§
for the Membrane Permeability Outcome (MPO) Study Group

J Am Soc Nephrol 20: 645–654, 2009. doi: 10.1681/ASN.2008060590

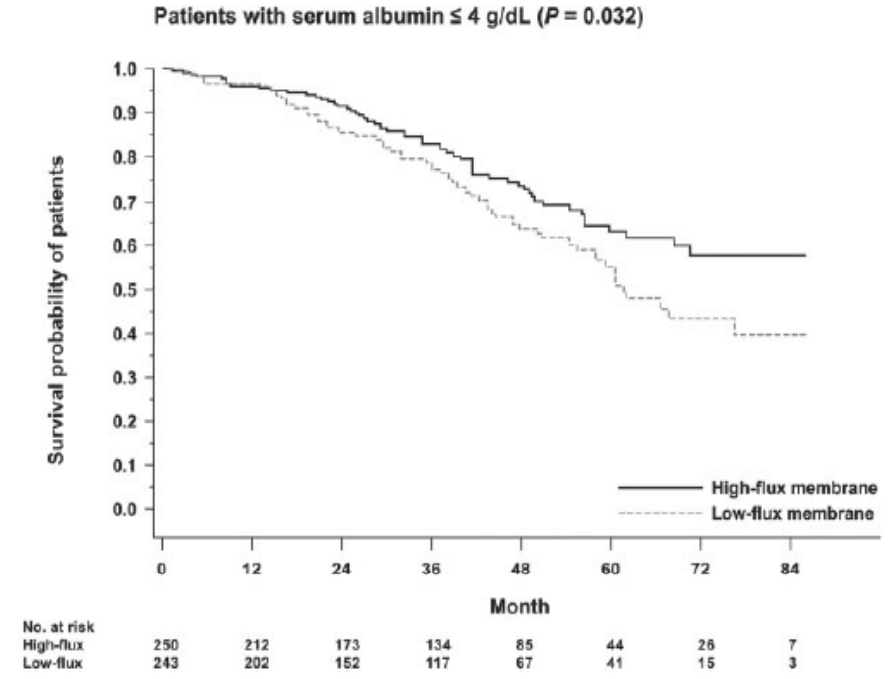

Figure 3. Kaplan-Meier survival curves for the population of patients with serum albumin ≤4 g/dl (Log-rank test $P = 0.032$).

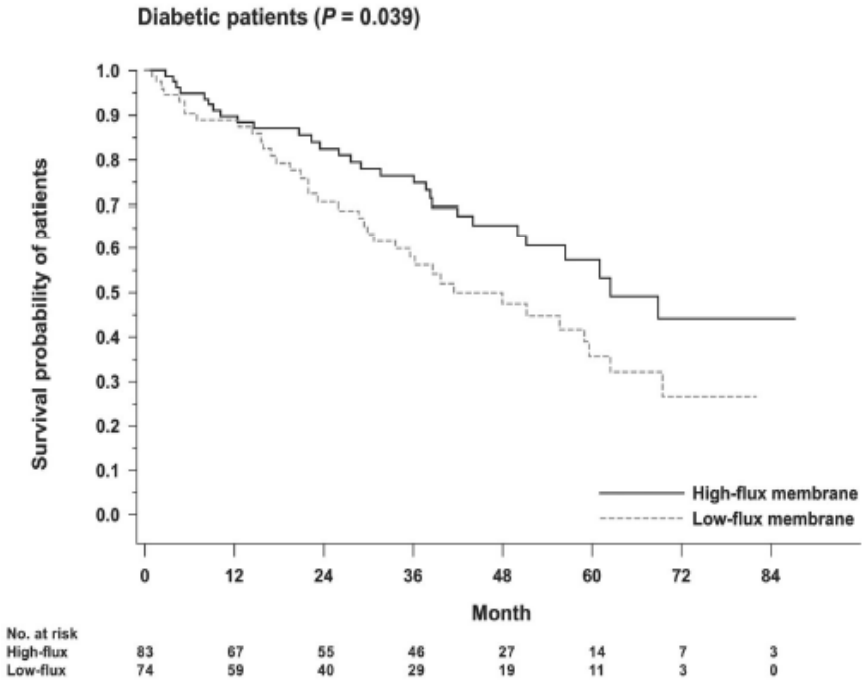

Figure 4. Kaplan-Meier survival curves for the subpopulation of patients with diabetes (Log-rank test $P = 0.039$).

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original article

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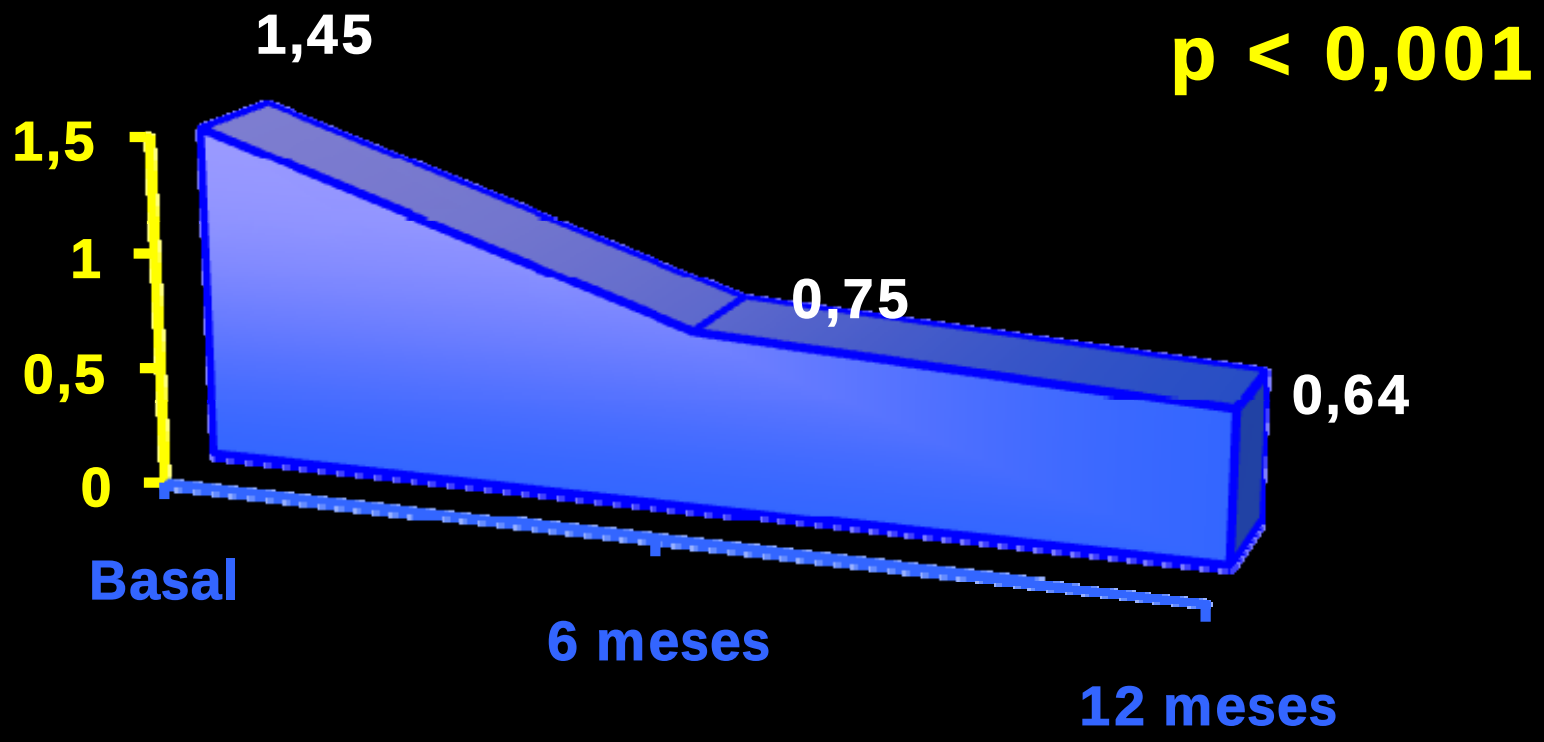
Liquido dializante ultra-puro

PCR, mg/dl **n=94**



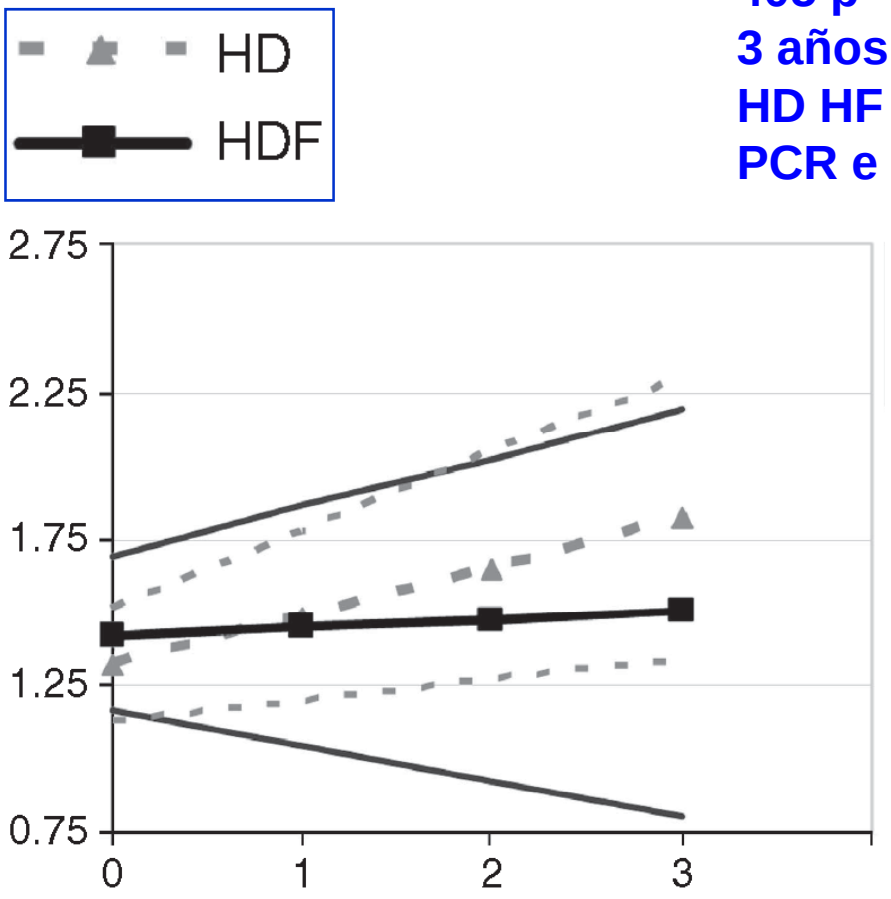
Molina M y cols. Nefrología 2007; 27(2):196-201.

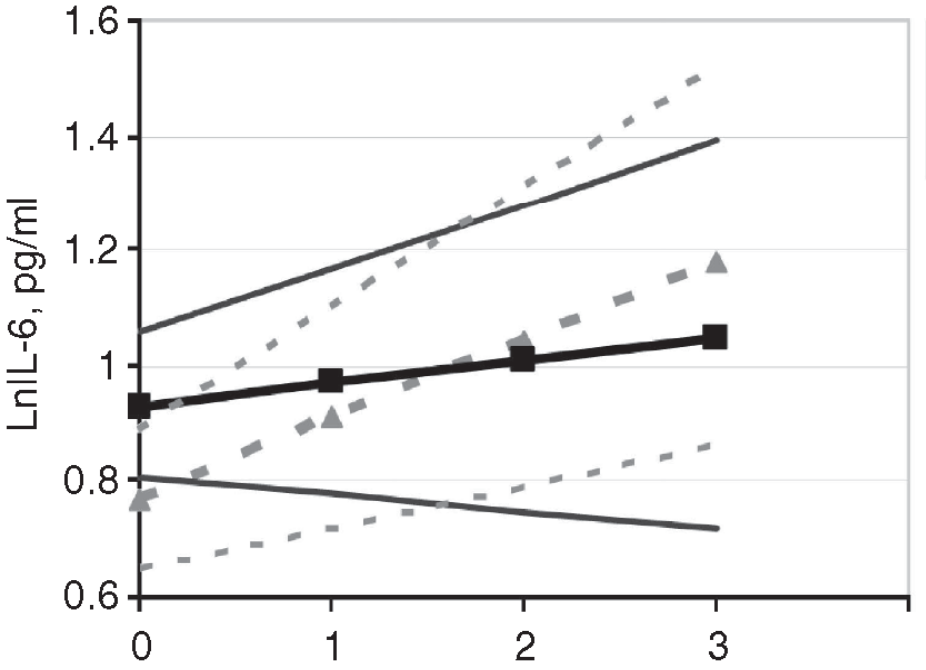
Kidney International (2014) **86,** 423–432

Online hemodiafiltration reduces systemic inflammation compared to low-flux hemodialysis

Claire H. den Hoedt[1,2], Michiel L. Bots[3], Muriel P.C. Grooteman[4,5], Neelke C. van der Weerd[6], Albert H.A. Mazairac[2], E. Lars Penne[4], Renée Levesque[7], Piet M. ter Wee[4,5], Menso J. Nubé[4,5], Peter J. Blankestijn[2] and Marinus A. van den Dorpel[1], for the CONTRAST Investigators[8]

405 p
3 años
HD HF vs HDF OL
PCR e IL6





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Citrate versus Acetate-Based Dialysate in On-Line Haemodiafiltration. A Prospective Cross-Over Study

Manuel Molina Nuñez Rosa de Alarcón Susana Roca Gracia Álvarez
María Soledad Ros Cristina Jimeno Laura Bucalo Isabel Villegas
María Ángeles García

Department of Nephrology, University Hospital Santa Lucia, Cartagena, Murcia, Spain

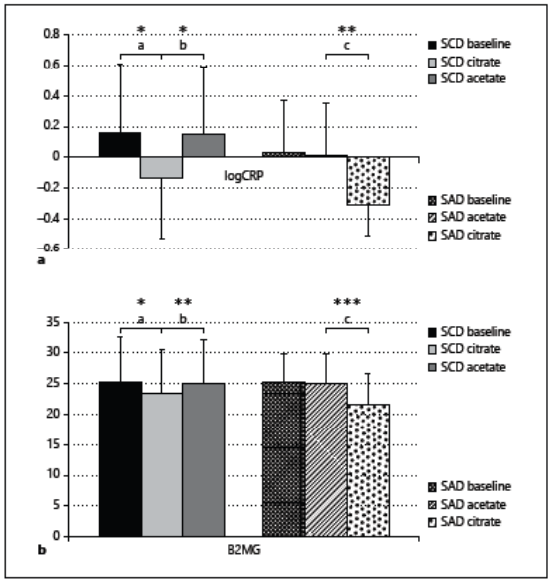

Fig. 3. **a** logPCR levels (mg/dl) according start up group. * $p < 0.001$; ** $p = 0.002$; a: SCD baseline versus SCD citrate; b: SCD citrate versus SCD acetate; c: SAD acetate versus SAD citrate. **b** B2MG levels (ng/ml) according start up group. * $p = 0.003$; ** $p = 0.028$; *** $p < 0.001$; a: SCD baseline versus SCD citrate; b: SCD citrate versus SCD acetate; c: SAD acetate versus SAD citrate. SCD = Citrate dialysate start up group; SAD = acetate dialysate start up group.

Table 4. Inflammatory parameters

Parameters	Baseline	CD	AD	p value
logCRP, mg/dl	0.098±0.41	−0.216±0.29	0.086±0.39	<0.001*
B2MG, ng/ml	25.3±6.03	22.51±6.20	25.02±6.05	<0.001*

* ANOVA.

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Blood Purification

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Published online: February 25, 2013

Cost-Effectiveness Analysis of On-Line Hemodiafiltration in Japan

Tomoyuki Takura[a] Hideki Kawanishi[b] Jun Minakuchi[c] Yoshio Nagake[d] Susumu Takahashi[e]

[a]Osaka University Graduate School of Medicine, Osaka; [b]Tsuchiya General Hospital, Hiroshima, [c]Kawashima Hospital, Tokushima, [d]Nagake Clinic, Okayama, [e]International Kidney Evaluation Association, Tokyo, Japan

Conclusion

Increased healthcare costs without socioeconomic effects and value may disrupt the medical system and prevent progress of medical technology. Development of therapy for renal failure requires the value of dialysis (value of medicine) to be examined not only on economic costs, but with matching of public funding (medical fees) to the value of the therapy. Advances in high-performance medical technology such as HDF coupled with discussion of the clinical and economic balance are needed to support developments in the dialysis field.

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¿A quién?

- NO ABSOLUTO: Flujo sanguíneo
- NO RELATIVO: No alcanzamos volumen convectivo
- SI EN EL RESTO. Priorizar:
  - Paciente joven con poca posibilidad de trasplante o largo tiempo en LETx
  - Comorbilidades específicas

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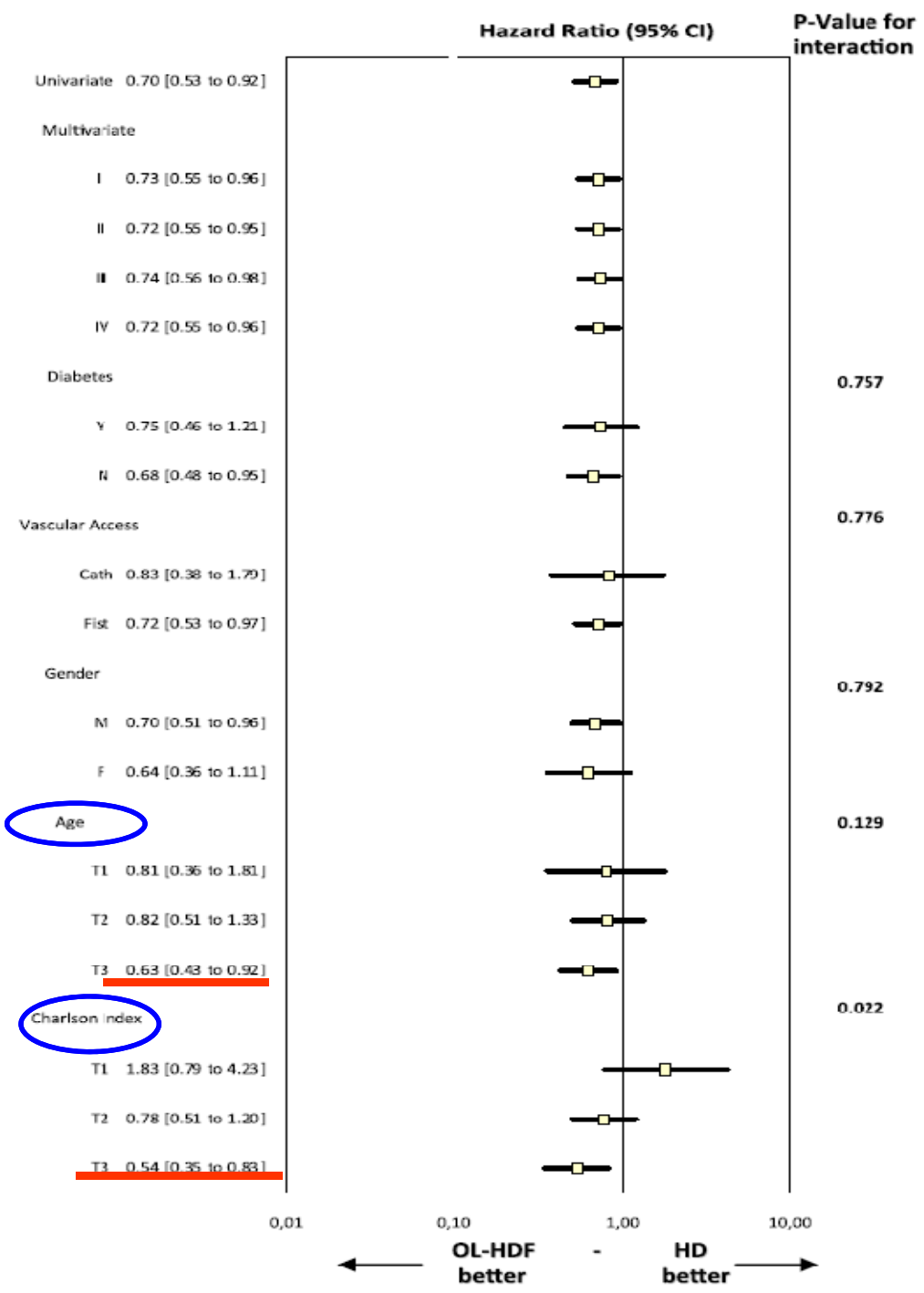

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Datos de mortalidad:

- En los últimos 8 años la mortalidad anual en HD en las áreas 2 y 8 de la CARM siempre ha sido inferior al 10%. En 2012, 8,74%. En 2013, 7,7%
- Datos del Registro de Enfermos Renales de la CARM. En 2012 y 2013 mortalidad en HD < 10%
- Desde 2004 en Cartagena y paulatinamente en los demás centros de CARM uso de HDFOL
- Mas de 600 pacientes fueron tratados con HDFOL en 2012 y 2013 en la CCAA de Murcia
- Estos datos incitan a la reflexión ….

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