Därför använder vi i Linköping mycket HDF

Anders Fernström

Verksamhetschef, överläkare, docent

Njurmedicinska kliniken (inkl. Endokrinmedicinska enheten)

Brandtal?

Försvarstal?

Ingetdera!
… eller kanske lite av varje!

Därför använder vi i Linköping mycket HDF

Nephrol Dial Transplant (2000) 15 [Suppl 1]: 60–67

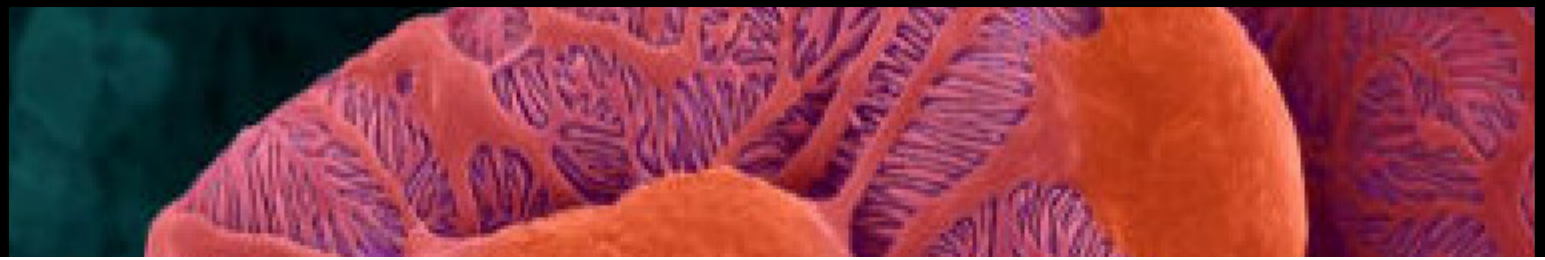
Nephrology Dialysis Transplantation

On-line haemodiafiltration. Safety and efficacy in long-term clinical practice

B. Canaud[1], J. Y. Bosc[1], H. Leray-Moragues[1], F. Stec[2], A. Argiles[2], M. Leblanc[3] and C. Mion[2]

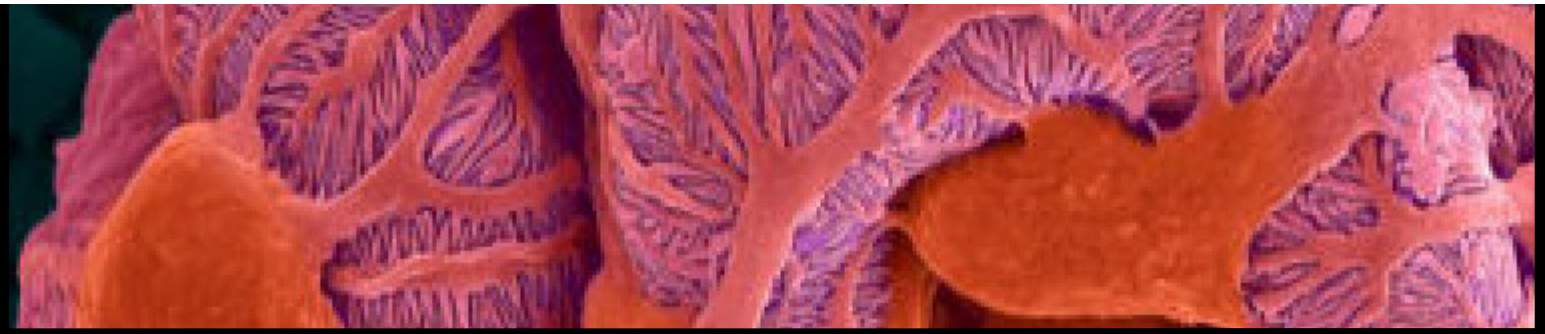
In conclusion, on-line HDF offers a safe and highly efficient RRT modality for ESRD patients which has been routinely performed for more than 10 years in our institution. It is now time to define good medical practice in this field to facilitate on-line HDF implementation in standard dialysis facilities.

n = 242



”Tekniker med högvolymhemodiafiltration innebär ett nytt steg i riktning mot hur reningen av blodet fungerar i en naturlig njure.”

Francisco Maduell, Hemodialysis International, 2005

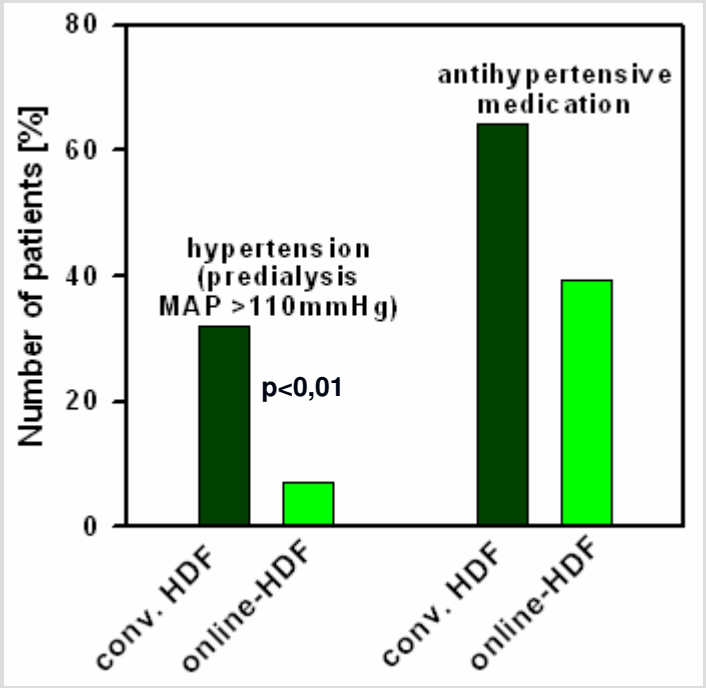


Peter Mathieson 2009

Vad kan man uppnå med online-HDF? (några exempel)

- Bättre hemodynamisk stabilitet/ blodtryckskontroll
- Minskad inflammation/oxidativ stress → mindre endoteldysfunktion
- Minskad risk för karpaltunnelsyndrom

Blodtryckskontroll

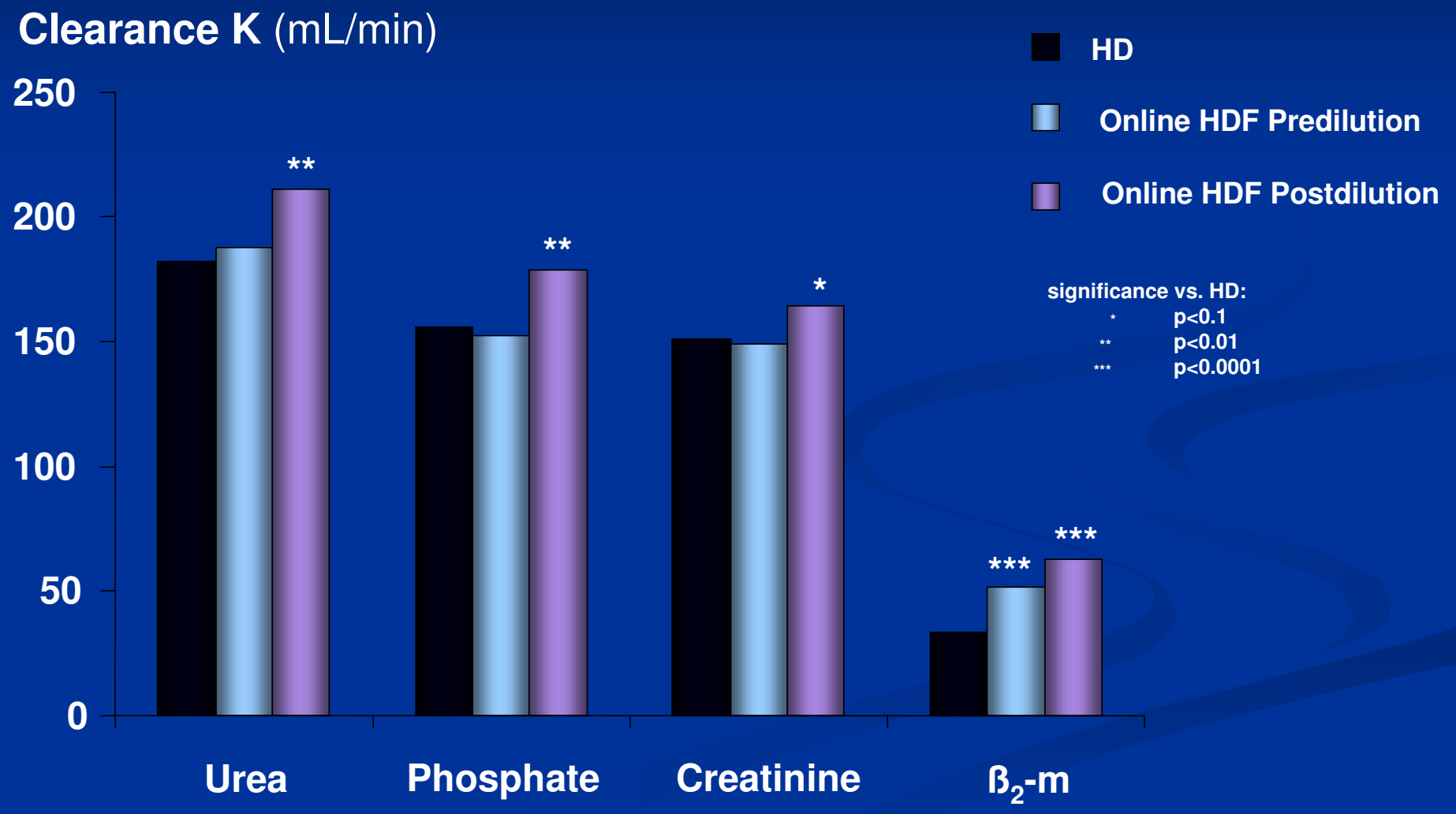


Maduell F et al. Nephrol Dial Transplant (1999) 14: 1202-1207 (n = 37, follow-up 1 år)

Fresenius Medical Care

Konventionell HDF = Substitutionsvolym 4L±2L
Online-HDF = Substitutionsvolym 22,5L±4,3L, samma högpermeabla filter-samma dialystid

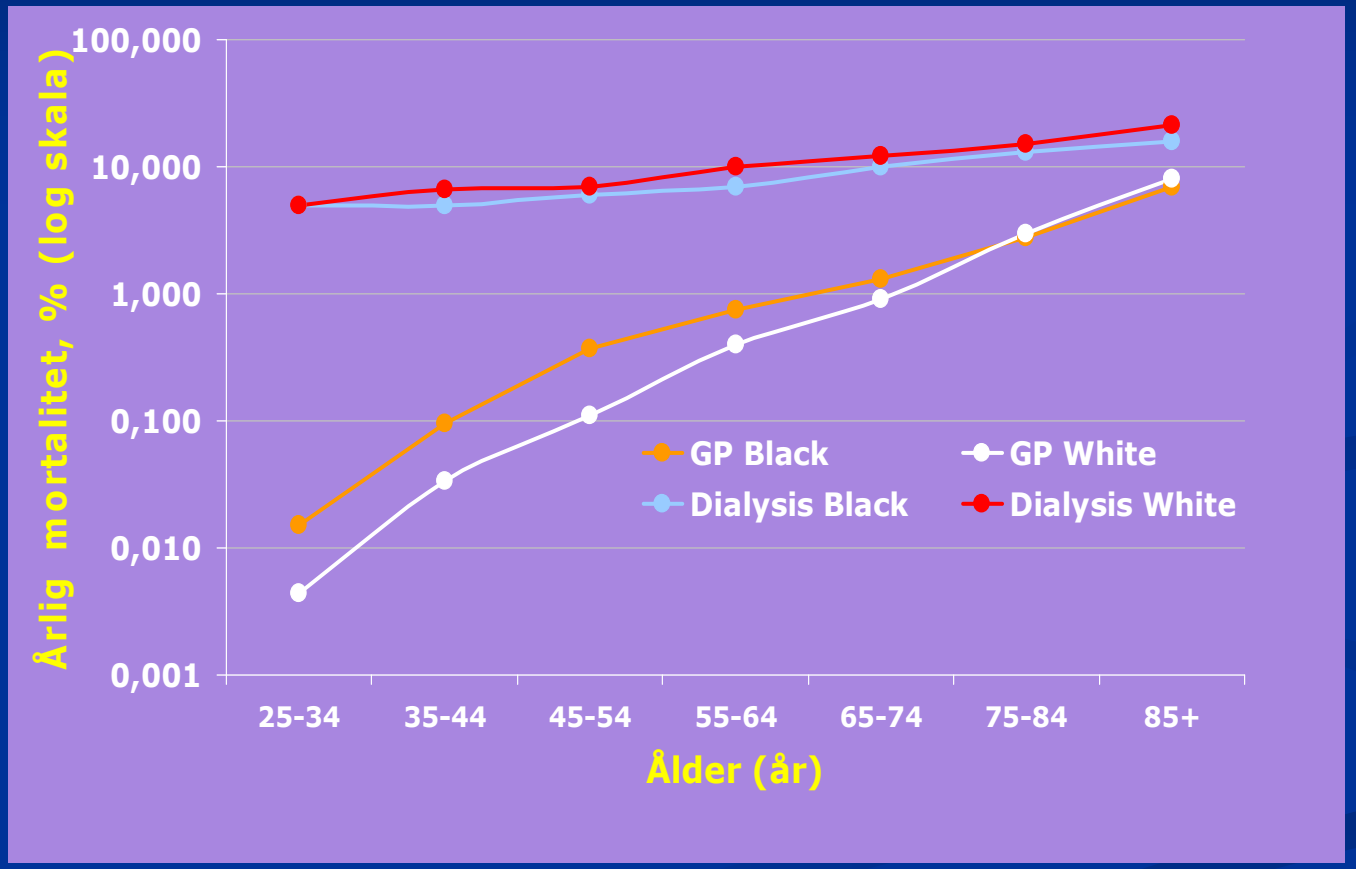
Higher Clearances with postdilution Online-HDF



Ahrenholz et al. Int J Artif Organs (1997) 20: 81-90

Fresenius Medical Care

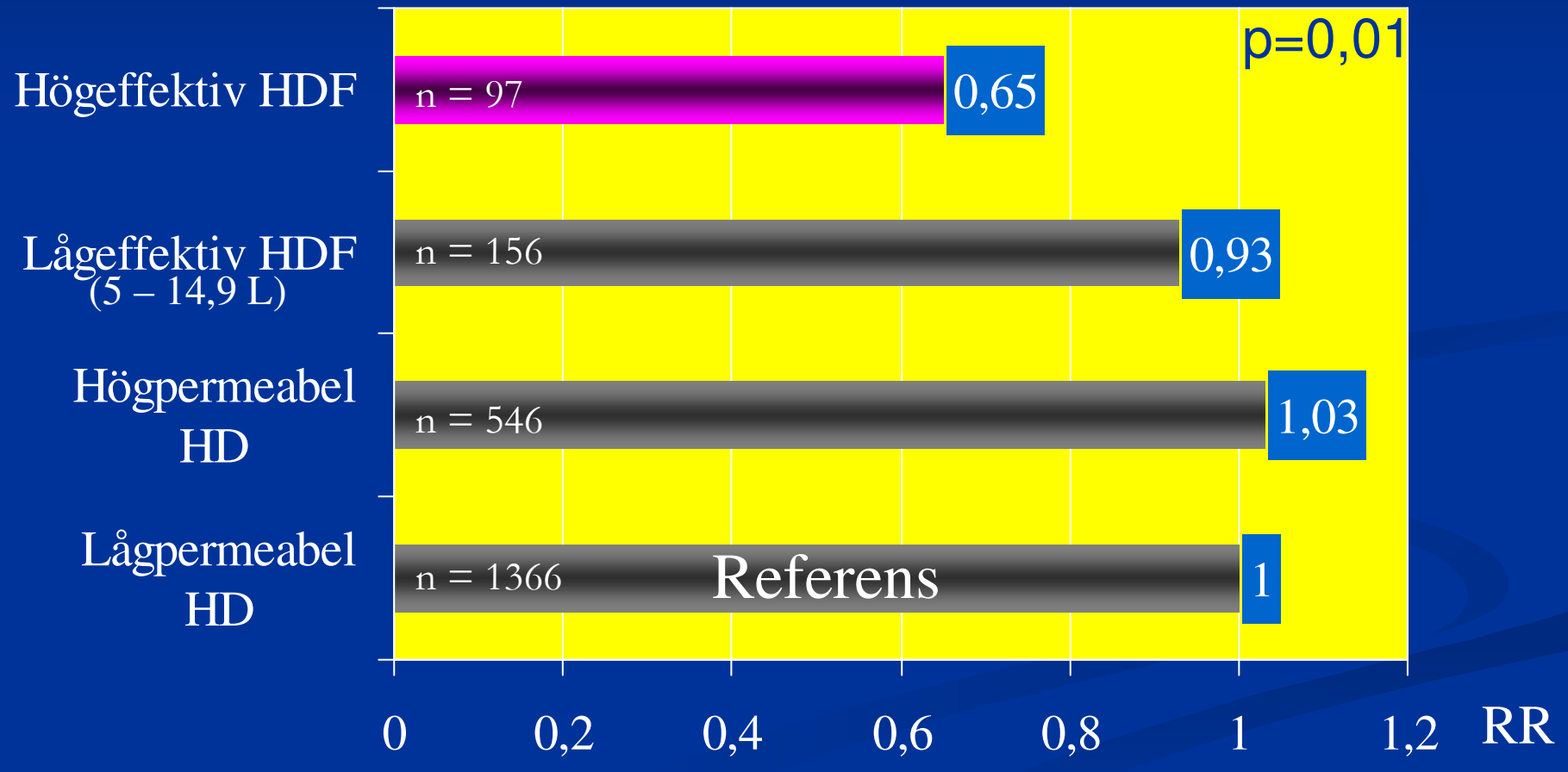
Årlig mortalitet hos dialyspatienter jämfört med en ålders- och könsmatchad normalpopulation



Sarnak MJ, Levey AS. Semin Dial. 1999;12:69-76.

Lägst mortalitet vid högeffektiv HDF (15 – 24,9 L/HDF)

Resultatet justerat för ålder, kön, komorbiditet och tid i dialys



Prospektiv observationsstudie

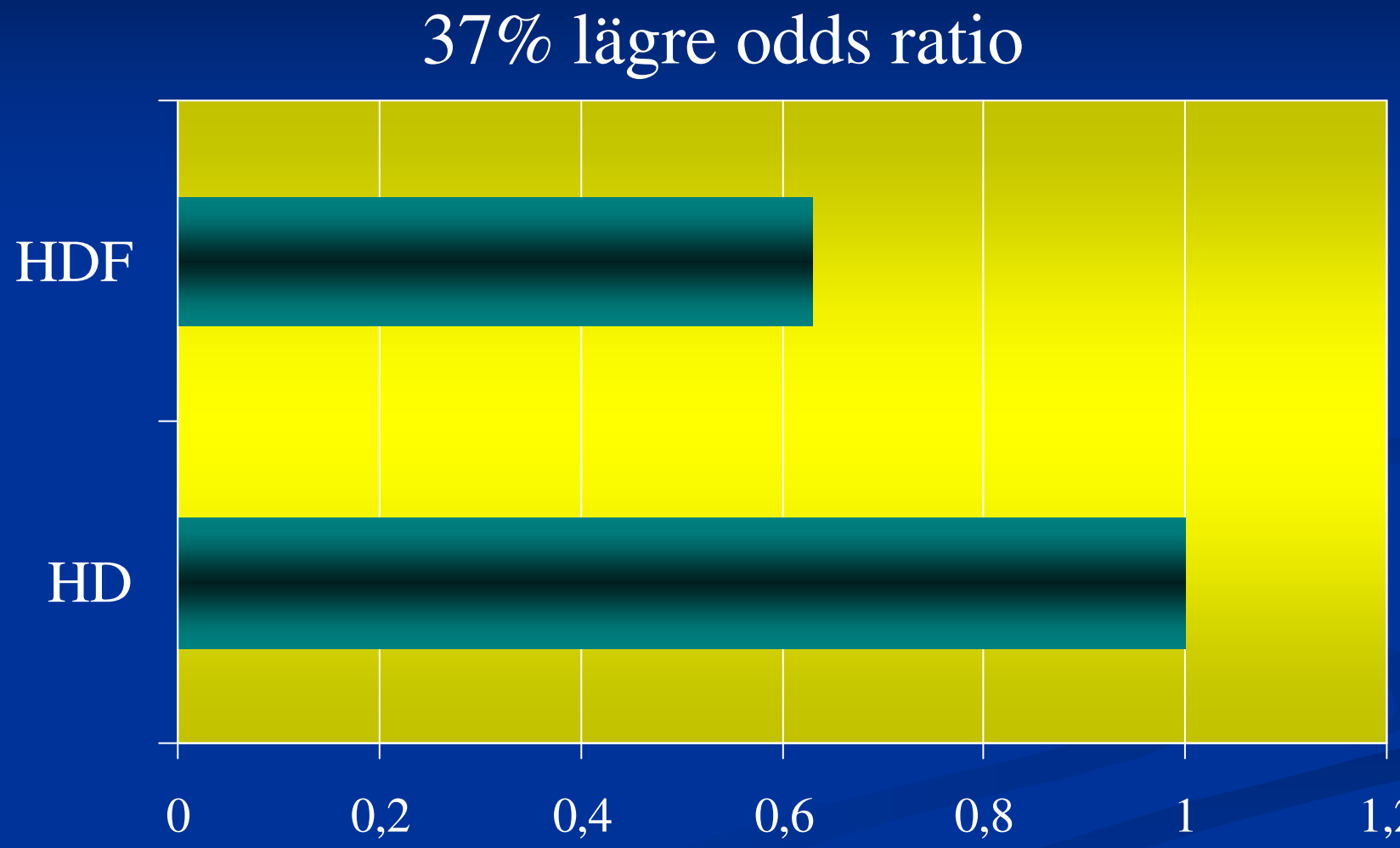
Canaud B et al, Kidney Int 2006; 69: 2087-93 (DOPPS-Europa, 2165 patienter)

Resultat av HDF i Fresenius databas i Europa

Jirka T et al, Kidney Int 2006; 70(8): 1524

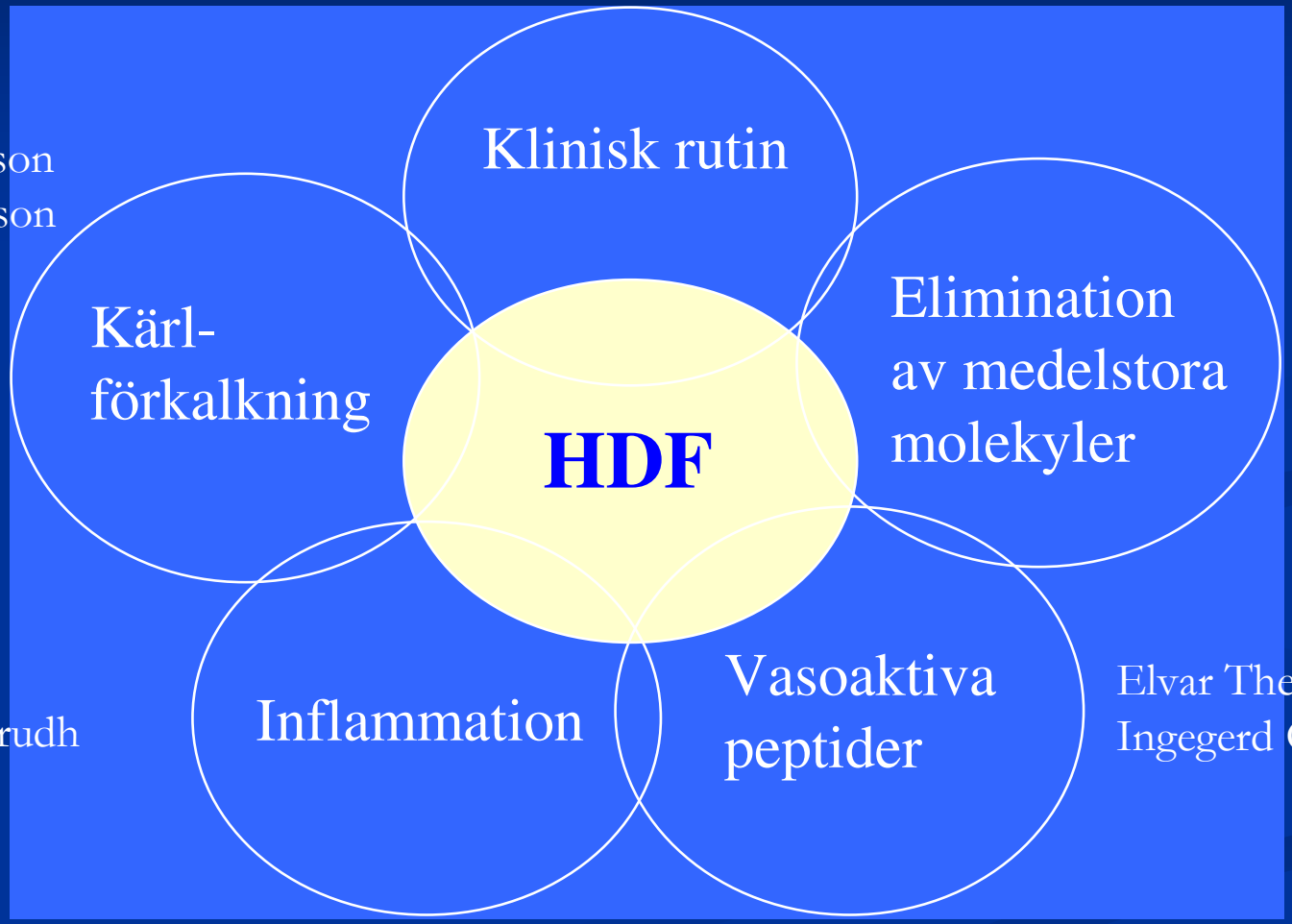
- 3828 pat med HD eller online HDF från 67 kliniker
- Observationstid drygt 4 år, retrospektiv analys
- Fördelning
  - 12 % online HDF
  - 87 % högpermeabel HD
  - 1 % lågpermeabel HD
- Alla pat hade polysulfonmembran
- Resultatet justerat för ålder, kön, komorbiditet och tid i dialys

Online HDF – lägre mortalitetsrisk



Jirka T et al, Kidney Int 2006; 70(8): 1524

Egna erfarenheter?



Tobias Larsson
Per Magnusson

Jan Ernerudh

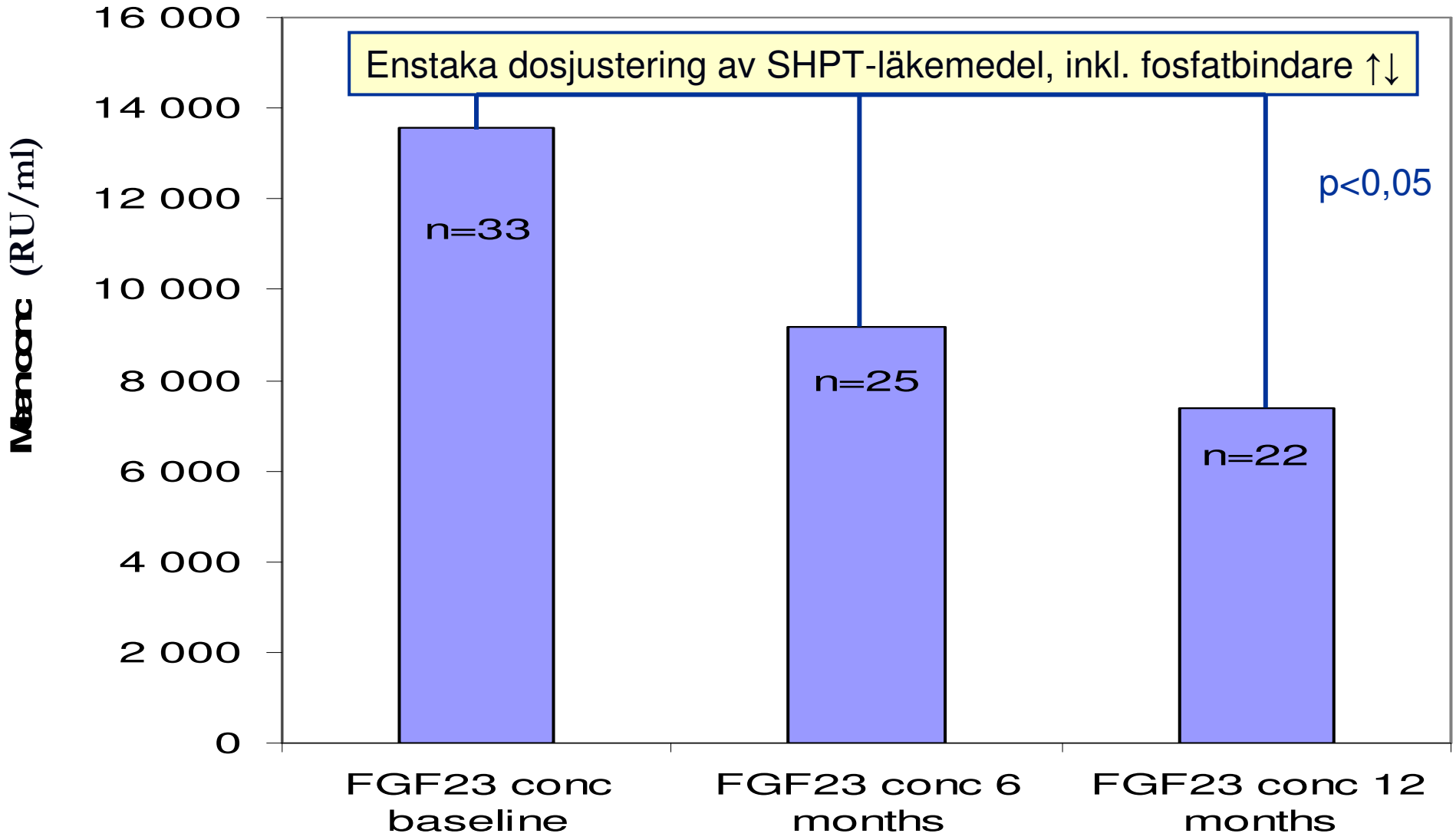
Elvar Theodorsson
Ingegerd Odar-Cederlöf

Från traditionell hemodialys (HD) till hemodiafiltration (HDF).
F. Uhlin, A. Fernström, *Incitament* 2: s 135 – 139, 2010.

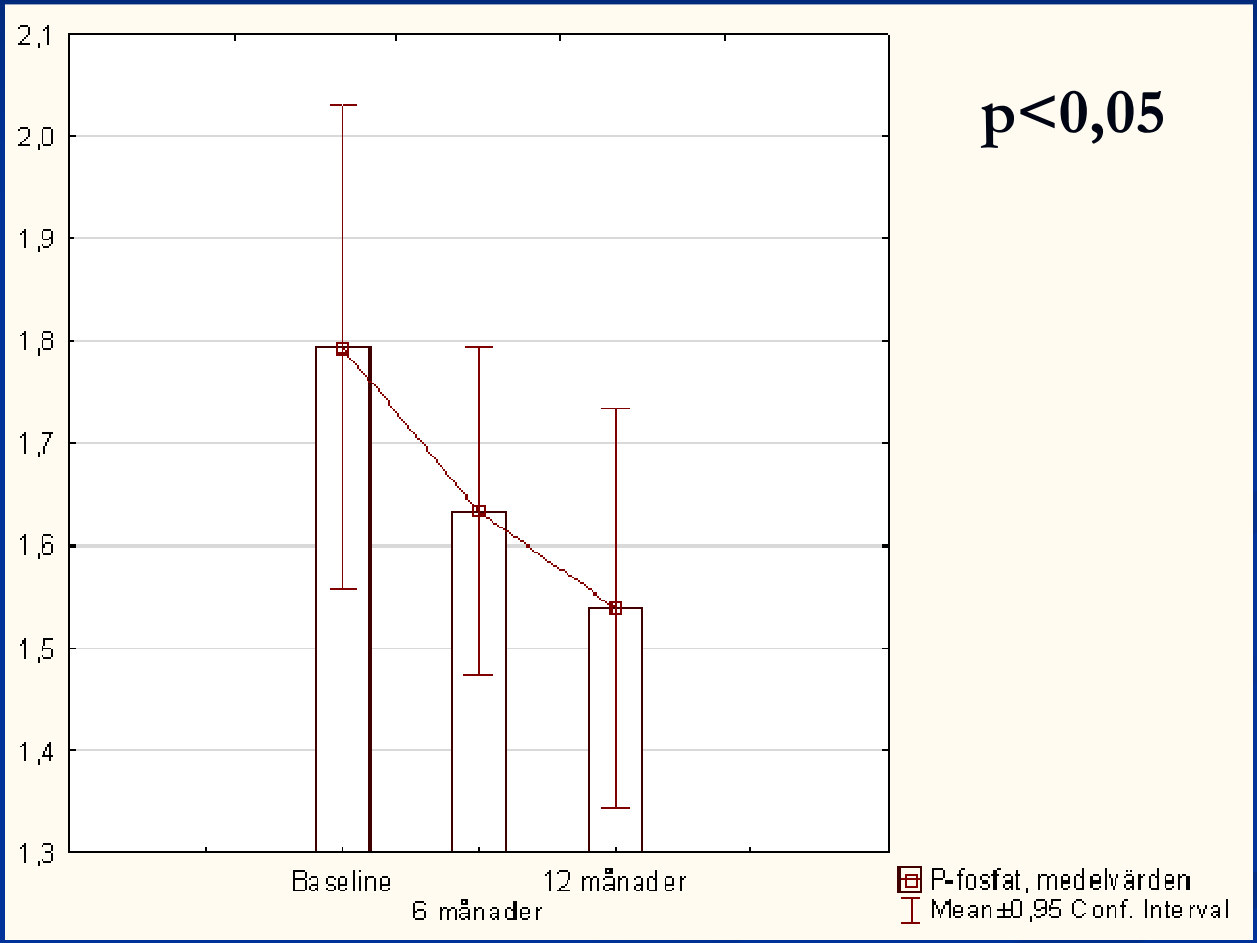
Före dialys

P<0,05

FGF23



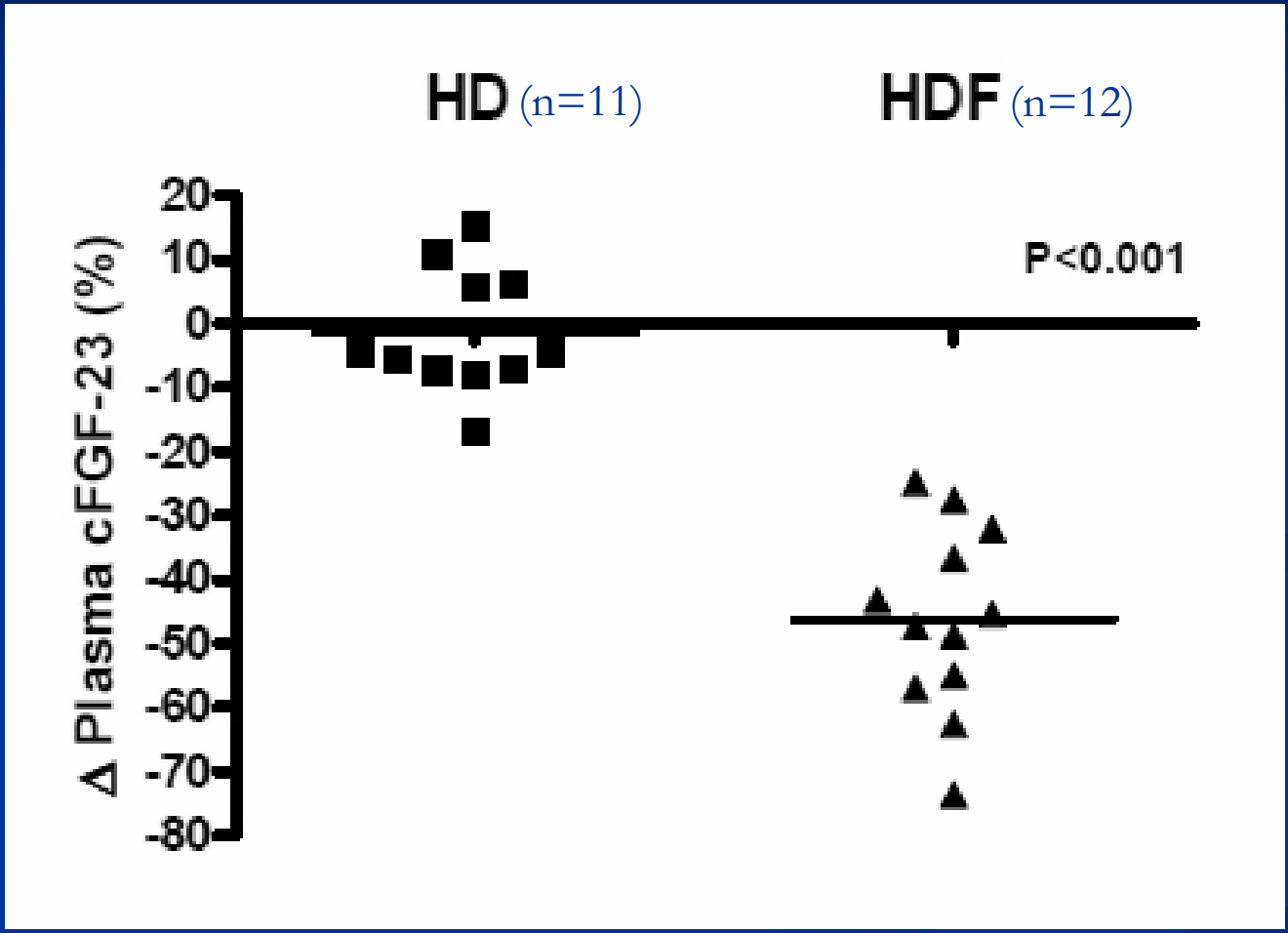
P-fosfat



p<0,05

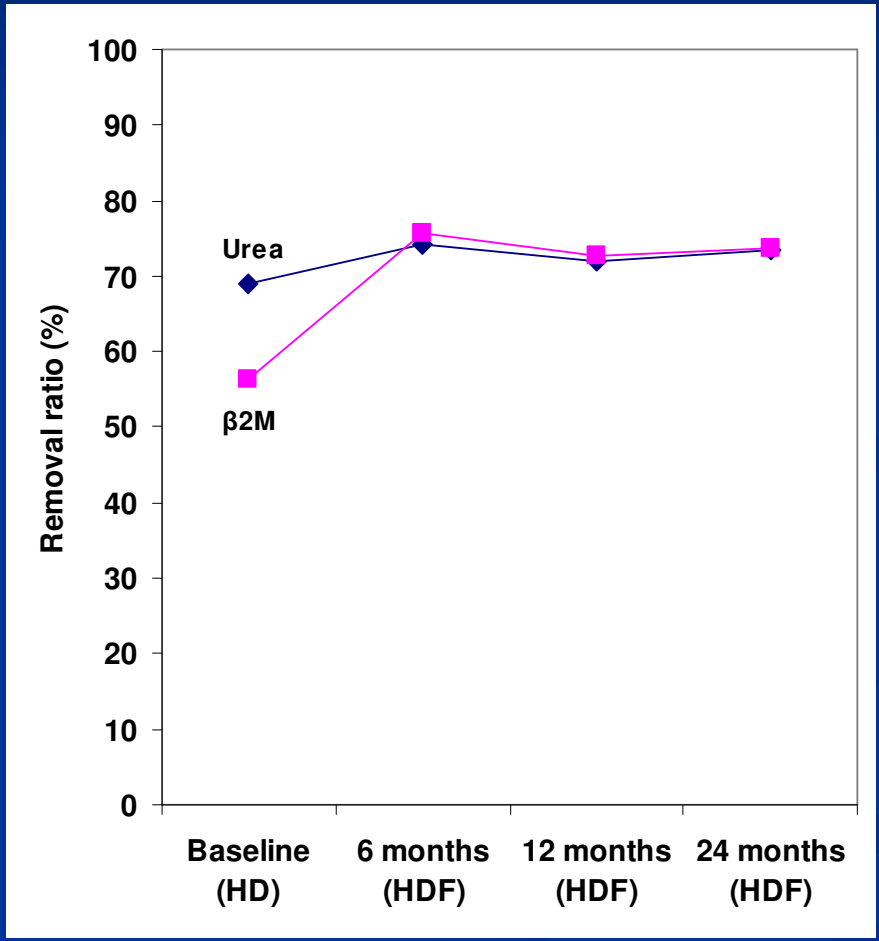
Enstaka dosjustering av SHPT-läkemedel, inkl. fosfatbindare ↑↓

FGF23-elimination vid HDF

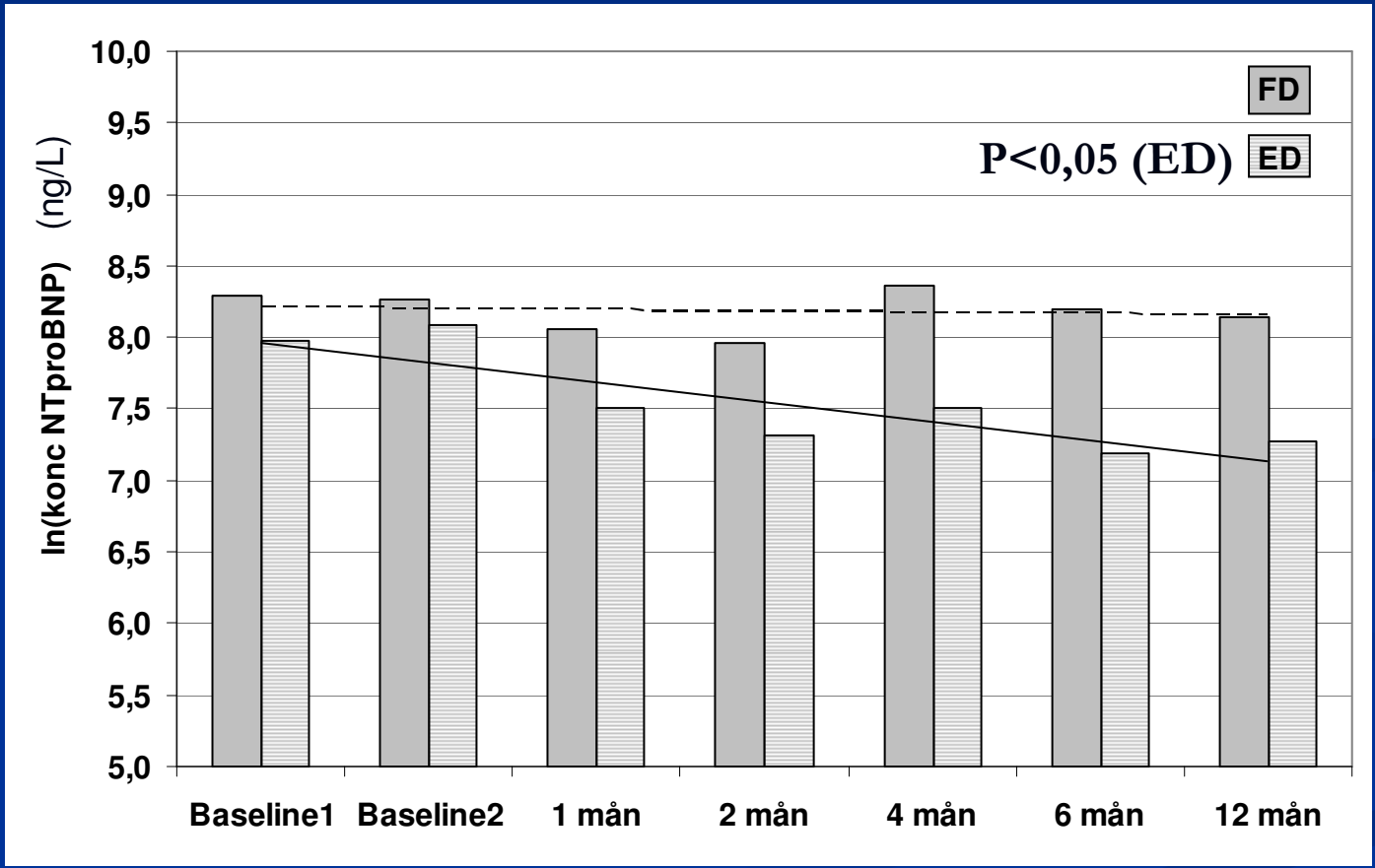


ABSTRACT WCN 2011:
[SA351] FIBROBLAST GROWTH FACTOR 23 IS EFFECTIVELY REMOVED BY ONLINE HEMODIAFILTRATION, BUT NOT BY LOW-FLUX HEMODIALYSIS
Claire den Hoedt et al.

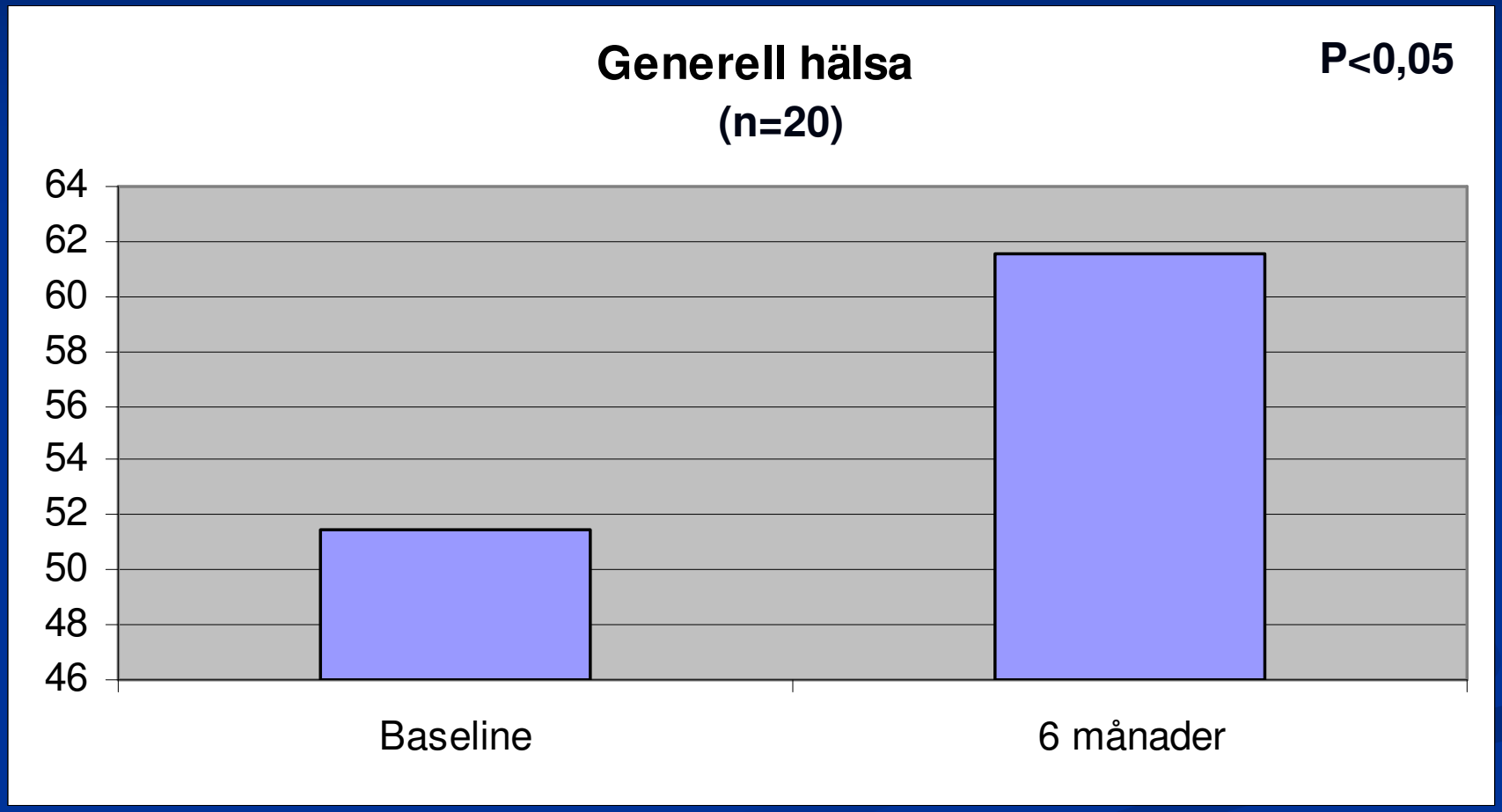
ß2 Mikroglobulin



NT-proBNP


10,0
9,5
9,0
8,5
8,0
7,5
7,0
6,5
6,0
5,5
5,0
ln(konc NTproBNP) (ng/L)
FD
P<0,05 (ED)
ED
Baseline1
Baseline2
1 mån
2 mån
4 mån
6 mån
12 mån

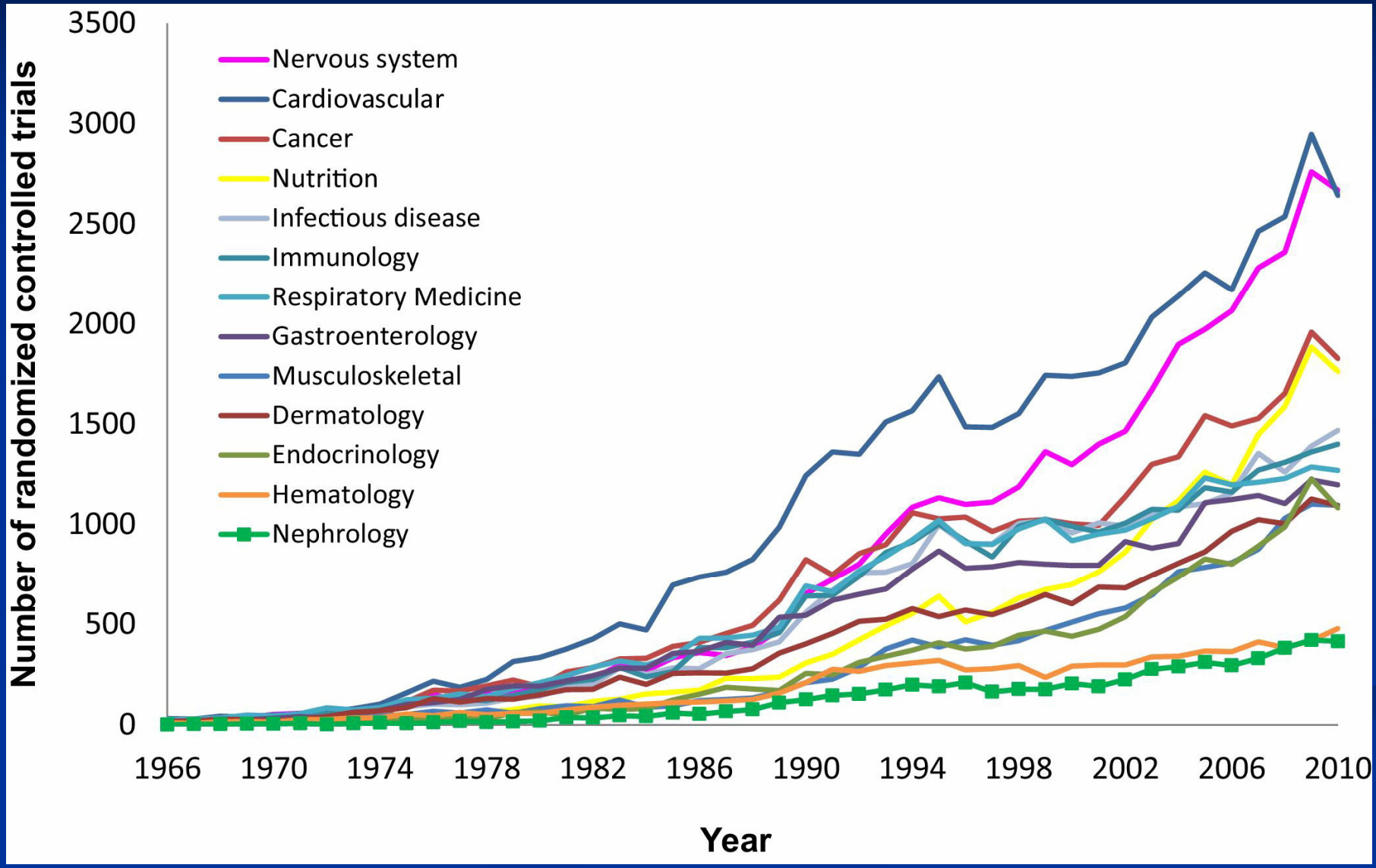
KDQOL-SF : Självskattad generell hälsa ökade signifikant med HDF



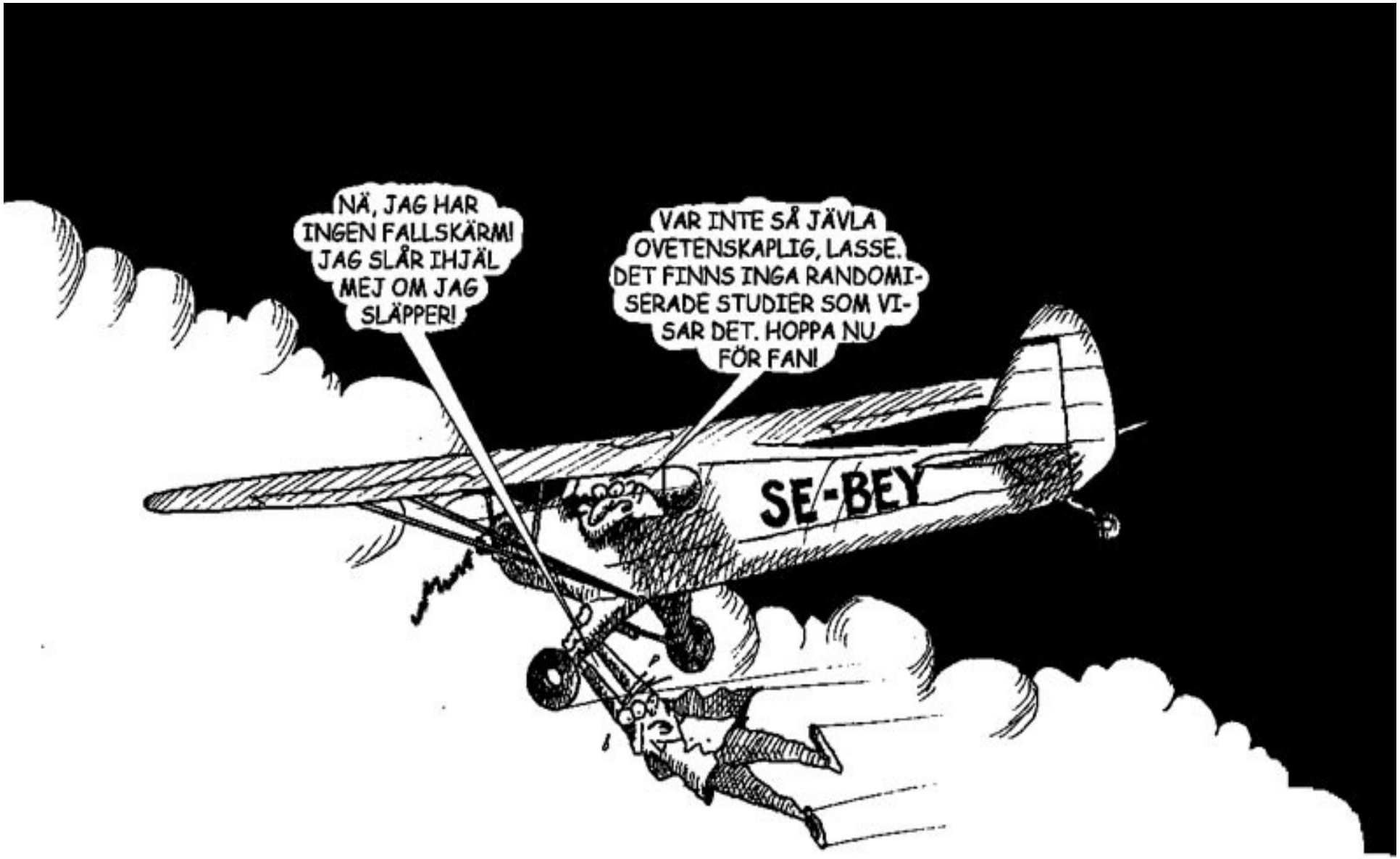
KDQOL-SF = Kidney Disease Quality of Life – Short Form

Karolin Jonsson, Magisteruppsats 2009

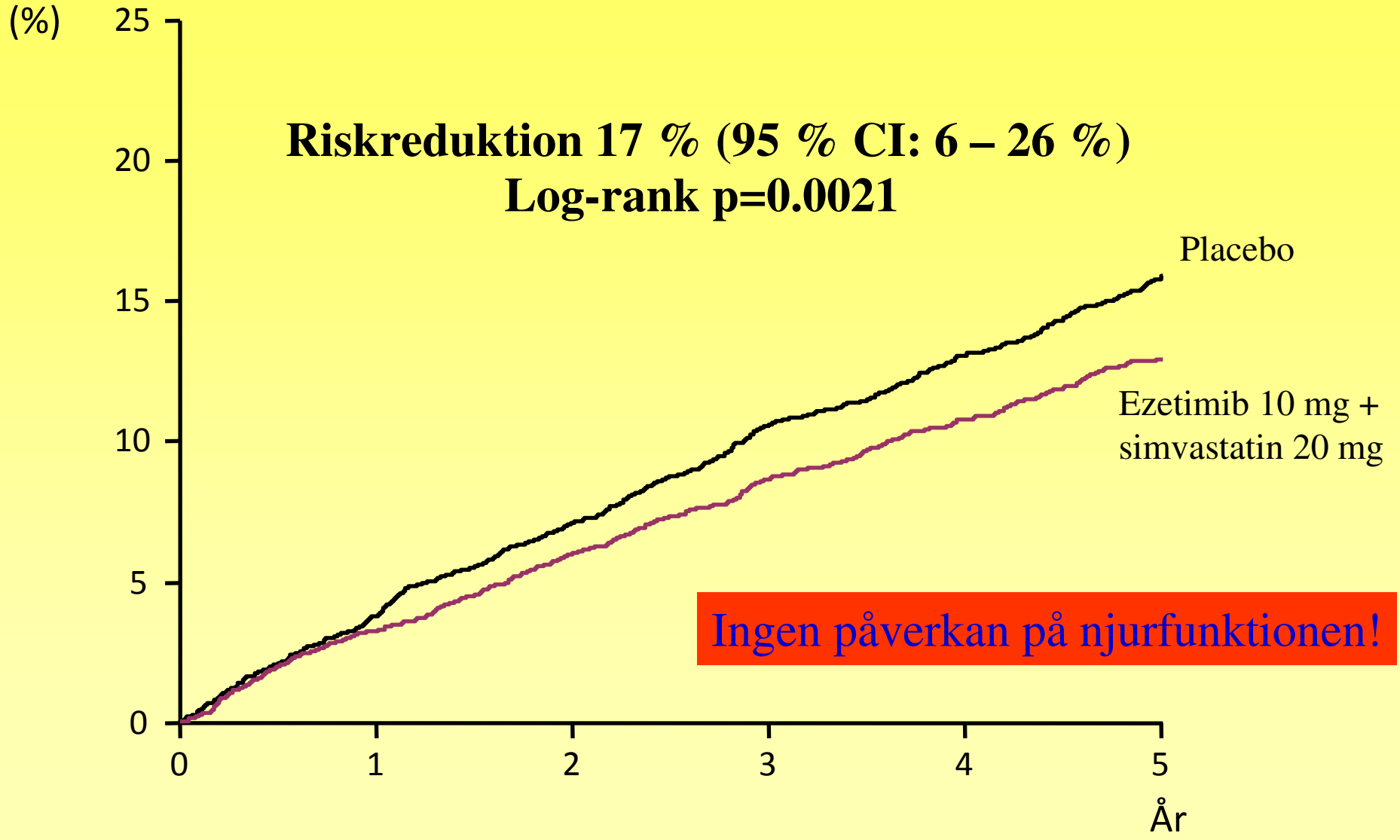
Number of randomized controlled trials published in nephrology and 12 other specialties of internal medicine from 1966-2010



Palmer SC et al. Am J Kid Dis 2011;58(3):335-337


NÄ, JAG HAR INGEN FALLSKÄRM! JAG SLÅR IHJÄL MEJ OM JAG SLÄPPER!
VAR INTE SÅ JÄVLA OVETENSKAPLIG, LASSE. DET FINNS INGA RANDOMISERADE STUDIER SOM VISAR DET. HOPPA NU FÖR FAN!
SE-BEY

SHARP: Större atherosklerotiska händelser

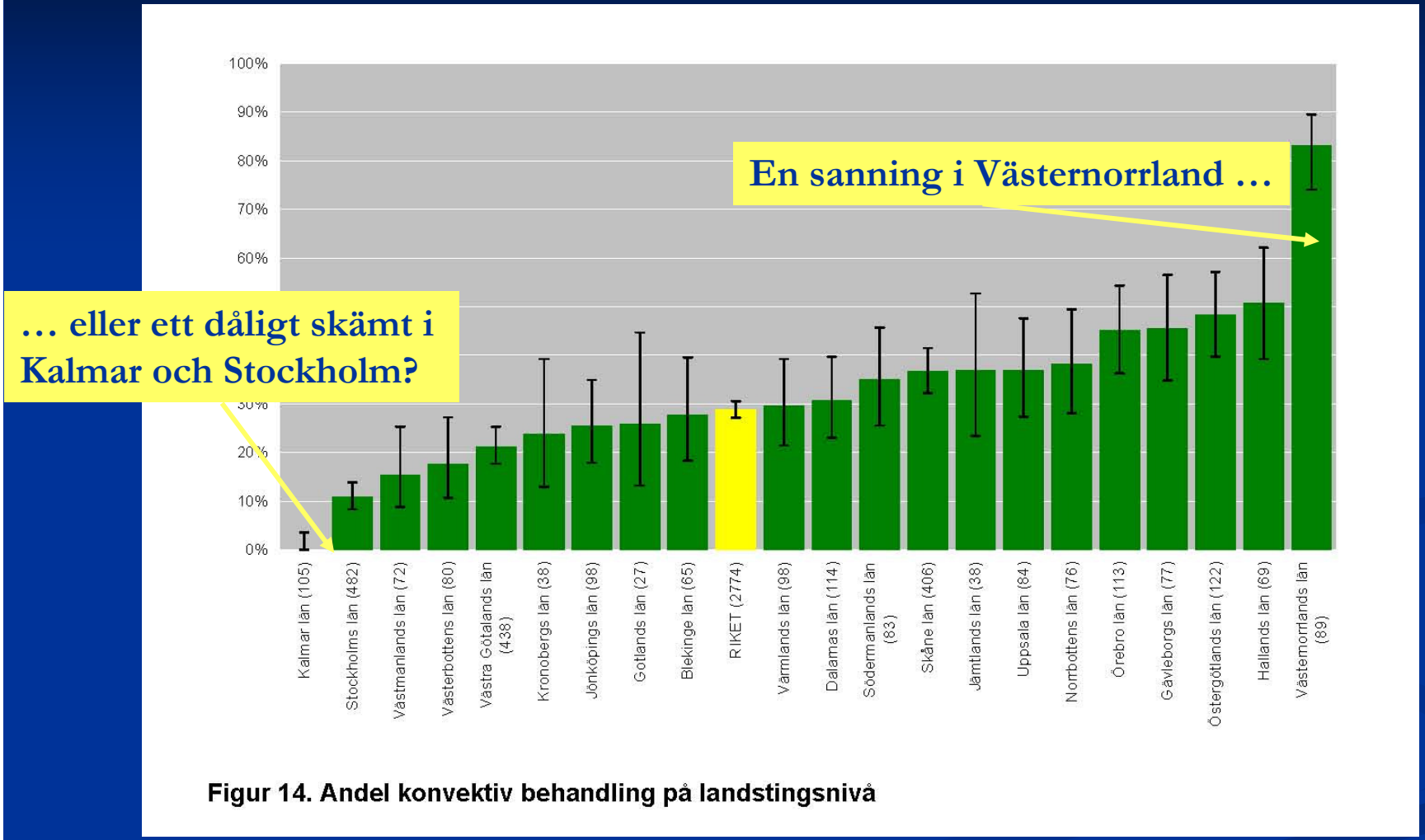


Guideline 2.2 (EBPG 2007)

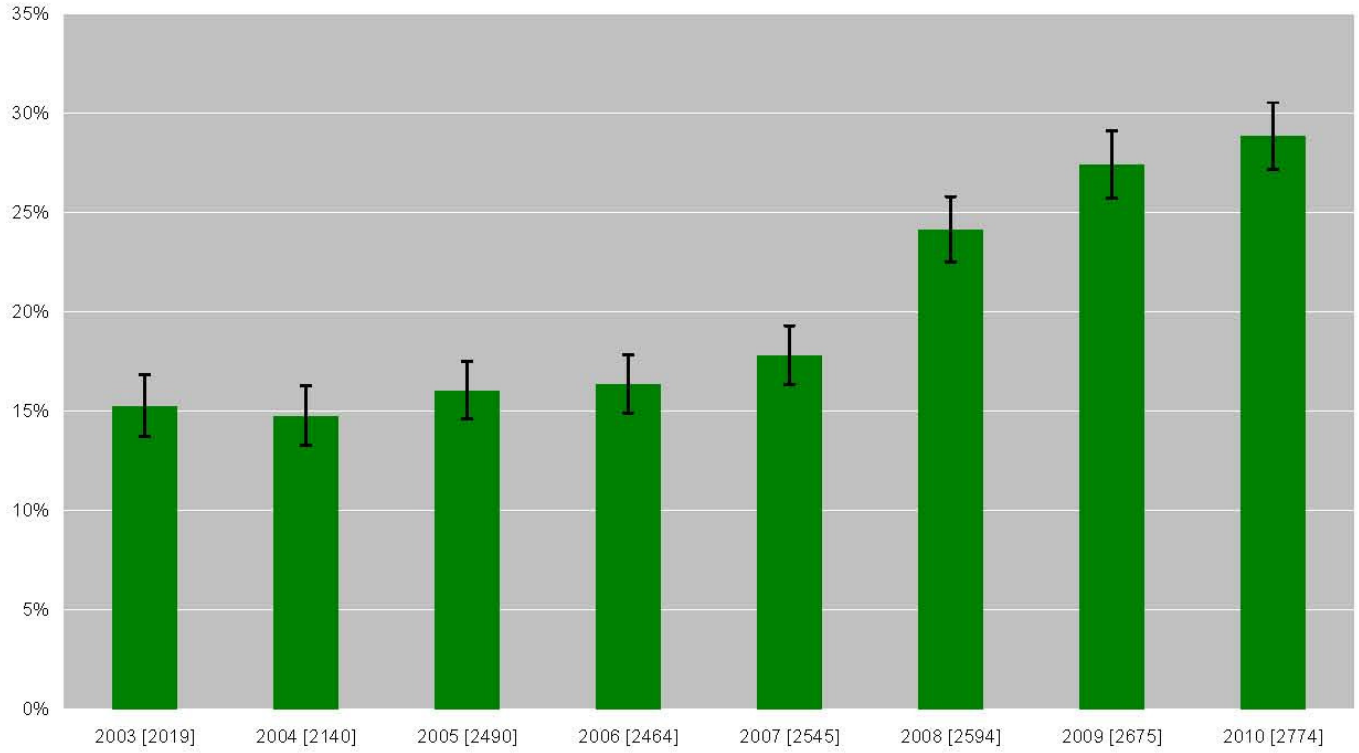
In order to exploit the high permeability of high-flux membranes, on-line haemodiafiltration or haemofiltration should be considered.

The exchange volumes should be as high as possible, with consideration of safety. (Evidence level II).

Riktlinjer i Sverige?



Figur 14. Andel konvektiv behandling på landstingsnivå



Figur 12. Andel (95% KI) med konvektiv terapi under åren 2003-2010

Ökad mortalitet vid användning av centrala dialyskatetrar

Oliver, MJ, Rothwell, DM, Fung, K, et al. Late creation of vascular access for hemodialysis and increased risk of sepsis. J Am Soc Nephrol 2004; 15:1936.

Dhingra RK, Young, EW, Hulbert-Shearon, TE, et al. Type of vascular access and mortality in U.S. hemodialysis patients. Kidney Int 2001; 60:1443.

Pastan, S, Soucie, JM, McClellan, WM. Vascular access and increased risk of death among hemodialysis patients. Kidney Int 2002; 62:620.

Xue, JL, Dahl, D, Ebben, JP, Collins, AJ. The association of initial hemodialysis access type with mortality outcomes in elderly medicare ESRD patients. Am J Kidney Dis 2003; 42:1013.

Polkinghorne, KR, McDonald, SP, Atkins, RC, Kerr, PG. Vascular access and all-cause mortality: a propensity score analysis. J Am Soc Nephrol 2004; 15:477.

Thomson, PC, Stirling, CM, Geddes, CC, et al. Vascular access in haemodialysis patients: a modifiable risk factor for bacteraemia and death. QJM 2007; 100:415.

Astor, BC, Eustace, JA, Powe, NR, et al. Type of vascular access and survival among incident hemodialysis patients: The choices for healthy outcomes in caring for ESRD (CHOICE) study. J Am Soc Nephrol 2005; 16:1449.

Allon, M, Daugirdas, J, Depner, TA, et al. Effect of change in vascular access on patient mortality in hemodialysis patients. Am J Kidney Dis 2006; 47:469.

- Patienterna bör efter utbildning och information få tidig anlagd AV-fistel (SNF 2007)

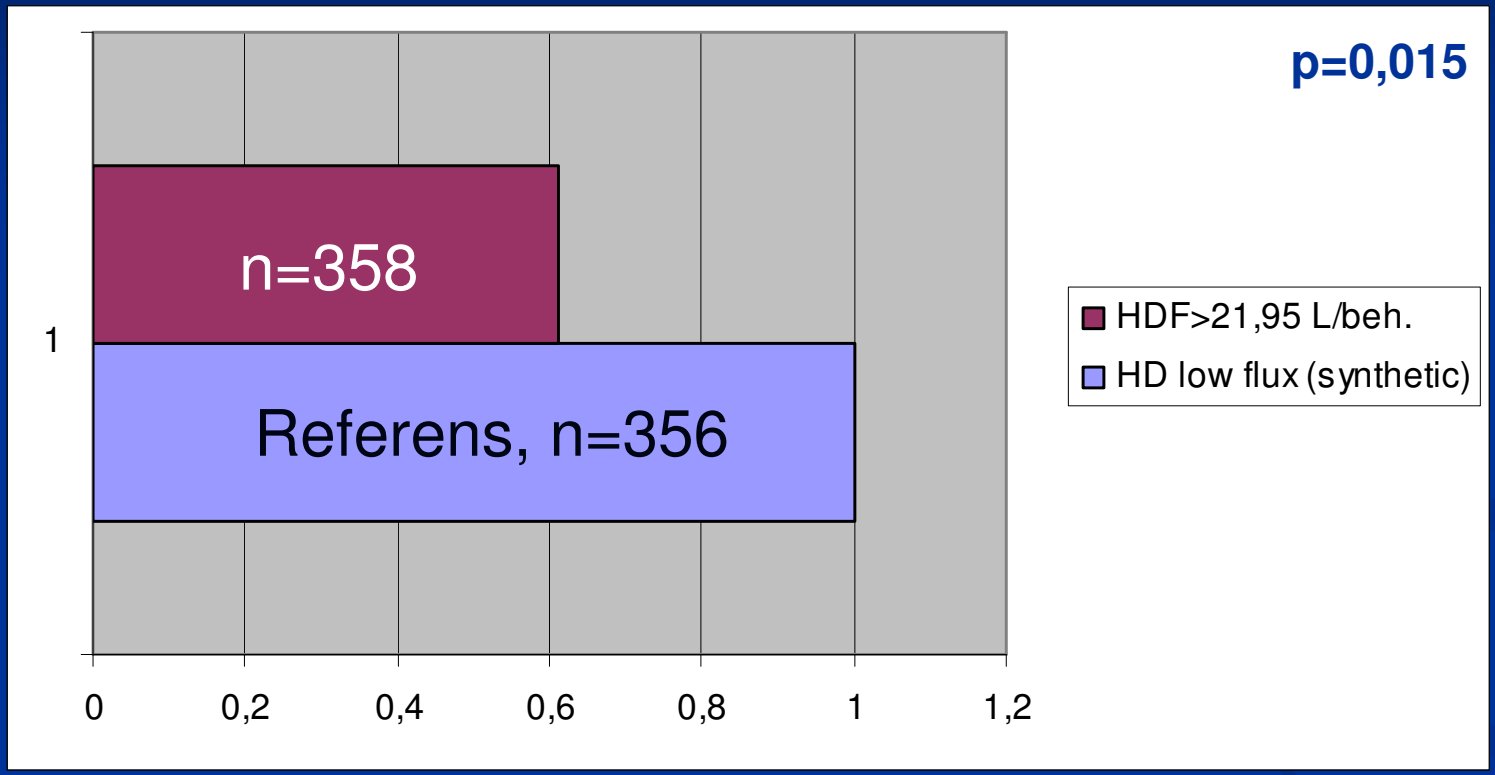
- *Guideline 3.2.* Autogenous arteriovenous fistulae should be preferred over AV grafts and AV grafts should be preferred over catheters (Evidence level III). (EBPG 2007)

”HDF, det är ju bara kosmetik …”

… en del värden som ser lite bättre ut, vad har det för betydelse – egentligen?

Tjaa, Jennifer Lopez före och efter lite kosmetik kanske säger oss något?

CONTRAST, *post hoc* analys
Hazard Ratio, mortalitet (Cox-analys)

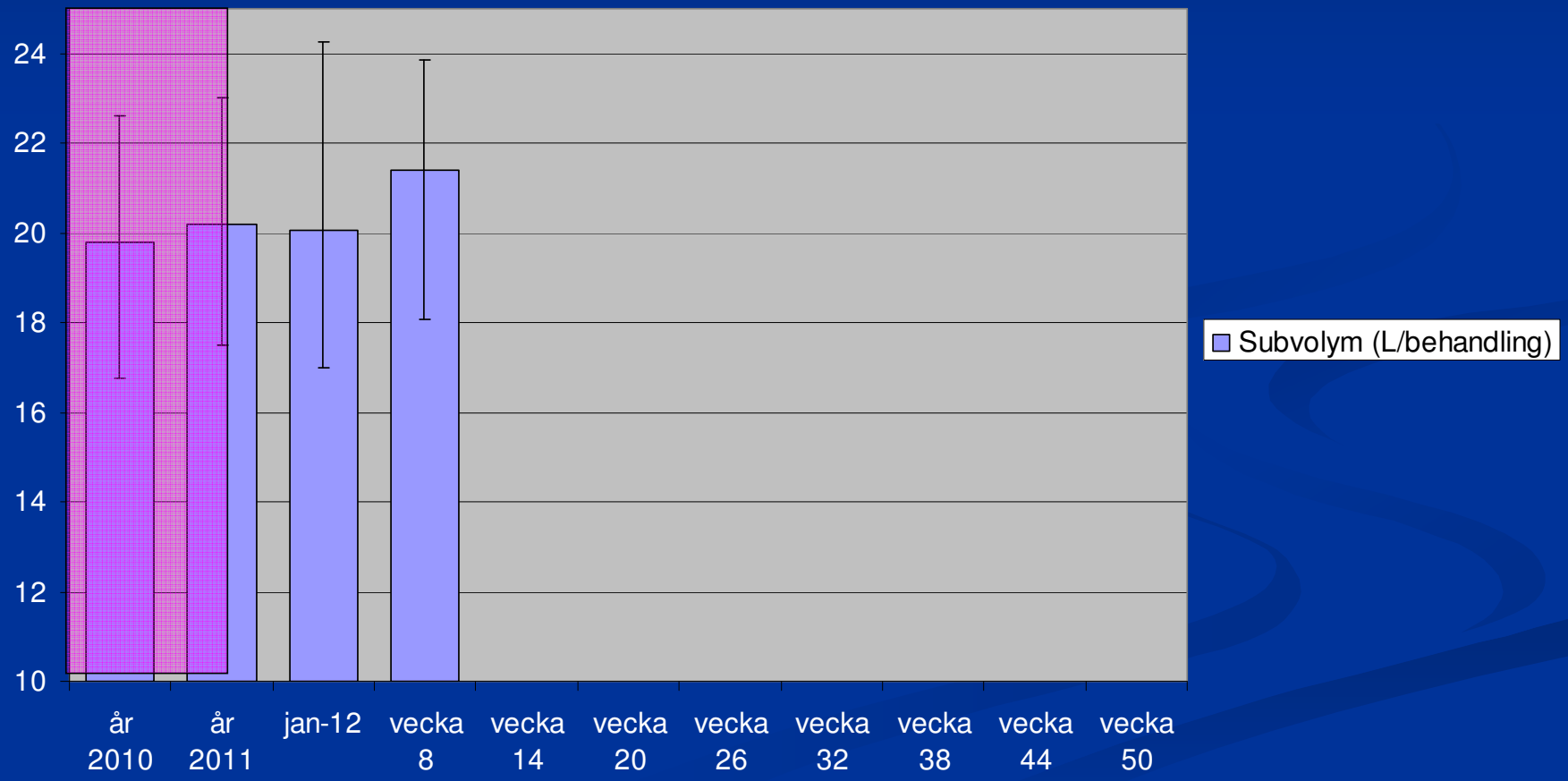


Adjusted for determinants of mortality, i.e. age, gender, previous vascular disease, diabetes, previous transplantation, spKt/V, baseline eGFR, baseline albumin, baseline creatinin, baseline haematocrit, use of alpha- and betablockers, calciumantagonists and angiotensin converting inhibitors at baseline, and for center differences.

Grootemann M. P. C. et al. J Am Soc Nephrol 23: 2012. doi: 10.1681/ASN.2011121140

Kvalitetsuppföljning, Njurmedicinska kliniken, US

Subvolym (L/behandling) medelvärde samt 1:a resp. 3:e kvartilerna



CONTRAST vs Turkish HDF study

	CONTRAST (n=715) June 2004-Dec 2010	**Turkish** (n=782) Jan 2007-March 2010
control therapy	low-flux HD	high-flux HD
intervention therapy	HDF, postdilution	HDF, postdilution
patients – age diabetes CVD vintage	64 yrs 24 % 44 % 2.9 yrs	56.5 yrs 35 %
time in study	3.03 yrs	23 months
target convection volume	24 L	>15 L
achieved convection volume	19.1 L	17.2 L
High dose group: RR: all-cause mortality RR: CV mortality	> 20.3L 43% (p<0.016) 59 % (p=0.06)	>17.4 L 46% (p=0.02) 71% (p=0.003) **Cox-analys**

Gambro Research and Development (modifierad bild)

RCTs comparing HDF and HD

	CONTRAST	Turkish	ESHOL	French
control therapy	low-flux HD	high-flux HD	high-flux HD (94%)	high-flux HD
intervention	postdil HDF 19.1 L	postdil HDF 17.2 L+ WL	postdil HDF >18 L+ WL	postdil HDF
patients	715 prev	782 prev	906 prev	420 prev
time	3 yrs	2 yrs	3 yrs	2 yrs
prim endpoint	ACM + CV events	ACM + CV events	survival	morbidity
sec endpoints	numerous	numerous		survival
end of study	Dec 2010	March 2010	Oct 2011	Feb 2013

Om vi vidhåller de attityder och uppfattningar vi hittills haft och fortsätter att göra det vi hittills gjort,
måste vi förvänta oss att även fortsättningsvis få de resultat vi hittills fått.

(Paul Batalden
Professor, pediatrik)

- http://www.uptodate.com/contents/alternative-renal-replacement-therapies-in-end-stage-renal-disease?source=see_link#H20

- A 2007 systematic review pooled results from six prospective cross-over studies evaluating the effect of HF/HDF/acetate-free biofiltration (AFB) on survival as compared with HD [79]. Overall, no significant difference was found, although four of the six studies had no deaths in either group. An additional study, which suggested increased mortality with convective therapy was excluded due to excessive heterogeneity.

In conclusion, we found that a high and pure convection technique, such as on-line HF, may improve outcomes in dialysis patients with severe comorbidity and/or those prone to hypotension during dialysis … every effort should be made to improve the hemodynamic stability of dialysis to gain advantages in terms of morbidity and mortality.

Santoro et al. The Effect of On-line High-flux Hemofiltration Versus Low-flux Hemodialysis on Mortality in Chronic Kidney Failure: A Small Randomized Controlled Trial. AJKD 52(3);507-518, 2008

Retrospektiv, multicenterstudie; n = 233 pat.

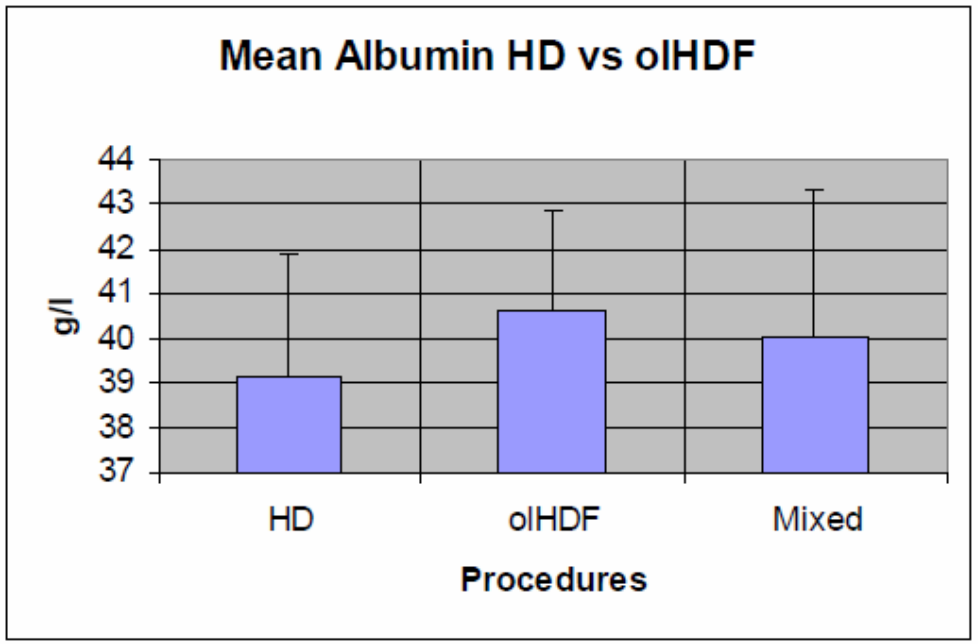
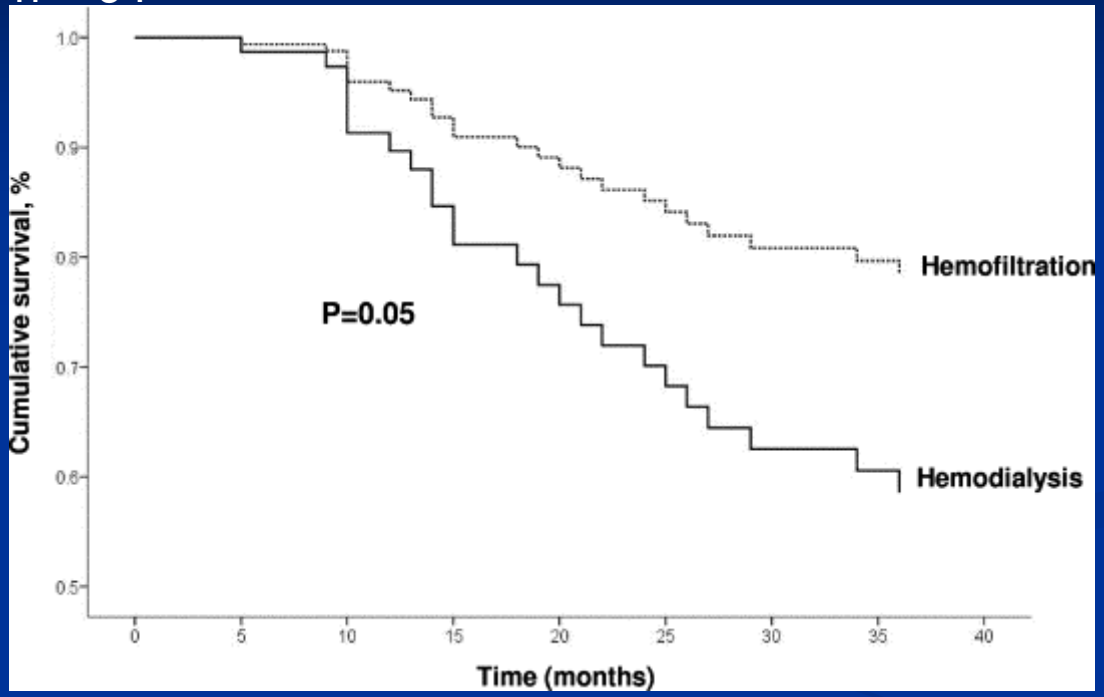


Fig. 2. Mean serum albumin concentration HD vs. olHDF (p=0.01)

Influence of Online Hemodiafiltration on Hemoglobin Level, ESA-Dosage and Serum Albumin – A Retrospective, Multicenter Analysis. In: Progress in Hemodialysis – From Emergent Biotechnology to Clinical Practice. Winkler R. E. et al., (chapter 8) 161 – 174, 2011

n = 64



Santoro et al. The Effect of On-line High-flux Hemofiltration Versus Low-flux Hemodialysis on Mortality in Chronic Kidney Failure: A Small Randomized Controlled Trial. AJKD 52(3);507-518, 2008