Διαιτητικές οδηγίες στην Αιμοκάθαρση

Αντωνία Ν. Παπαδάκη
Διευθύντρια ΕΣΥ
ΜΤΝ/ Νεφρολογική Κλινική
Γ.Ν.Ν. Χανίων

Review > Semin Dial. 2018 Sep;31(5):479-486. doi: 10.1111/sdi.12713. Epub 2018 May 29.

Assessment and misassessment of potassium, phosphorus, and protein in the hemodialysis diet

David E St-Jules [1], David S Goldfarb [2], Mary Lou Pompeii [1], Scott E Liebman [3], Richard A Sherman [4]

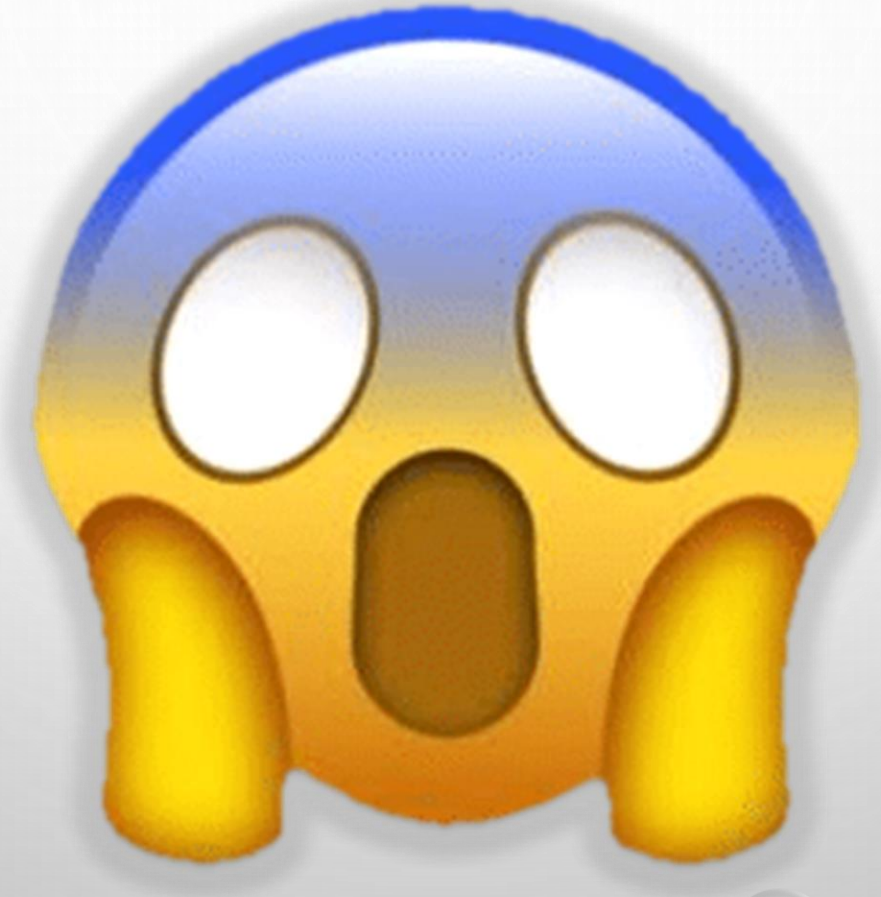
TABLE 1 Nutrient-based dietary restrictions in hemodialysis patients by food group

Food group (servings)	Dietary restrictions	Rationale
Fruit and vegetables (2-3 servings each/day)	Avoid high-potassium fruit and vegetables	Restrict potassium intake
Grains (6-11 servings/day)	Avoid whole grain and high-fiber grain products	Restrict phosphorus intake
Dairy (0.5 servings/day)	Limit dairy products	Restrict potassium and phosphorus intake
Protein foods (8-10 servings/day)	Avoid nuts, seeds, and legumes	Restrict potassium and phosphorus intake

Adapted from the National Kidney Foundation dietary guidelines for adults starting on hemodialysis.[1]

Διαιτητικές οδηγίες στην Αιμοκάθαρση

Αφού όλα απαγορεύονται τι μπορώ να τρώω τελικά??

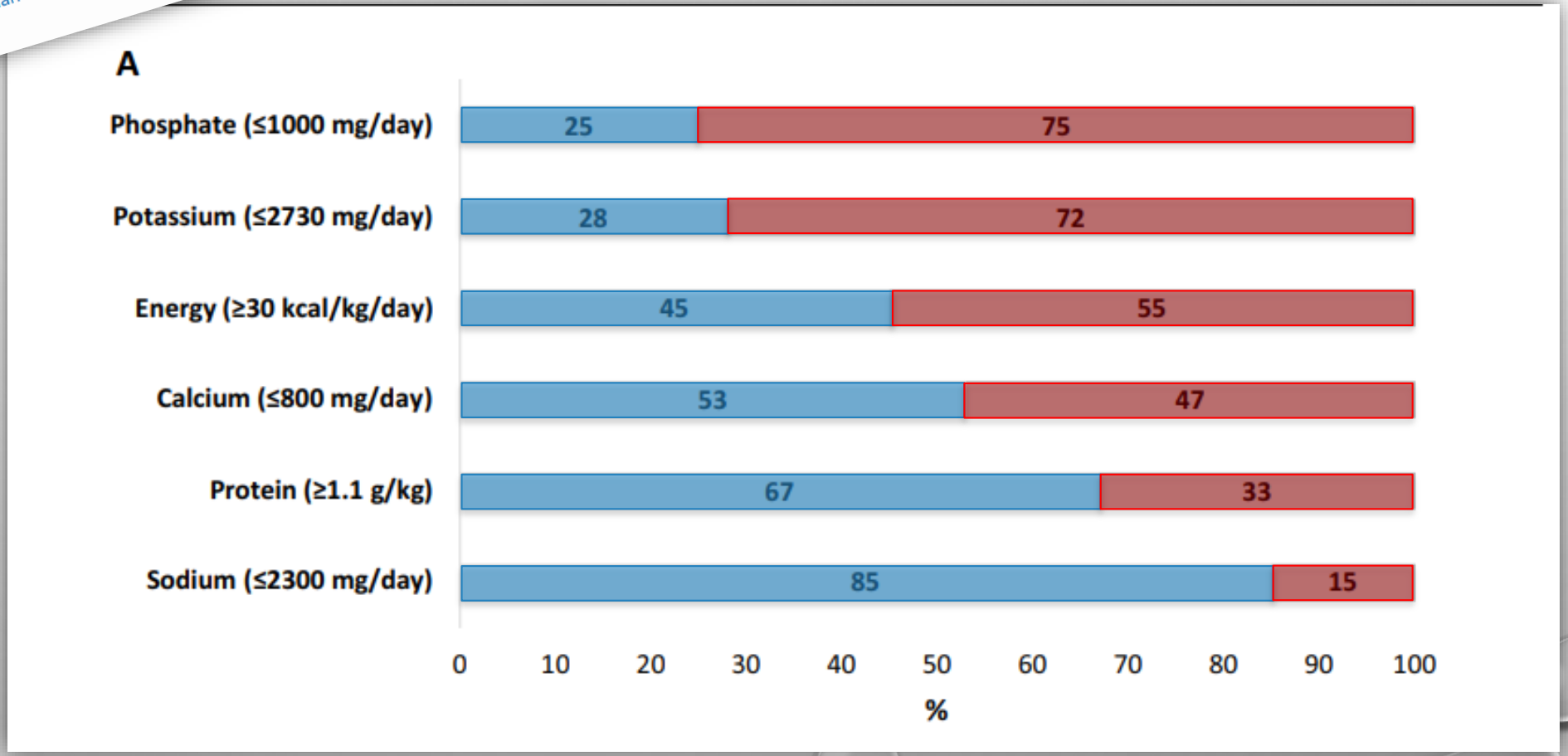


J Nephrol. 2021 Dec;34(6):1999-2007. doi: 10.1007/s40620-020-00962-3. Epub 2021 Feb 16.

Dietary intake in adults on hemodialysis compared with guideline recommendations

Valeria M Saglimbene [1 2], Guobin Su [3 4 5], Germaine Wong [1 6], Patrizia Natale [1 2], Marinella Ruospo [2], Suetonia C Palmer [7], Jonathan C Craig [8], Juan J Carrero [5], Giovanni F M Strippoli [9 10]

DIET-HD
N~7000



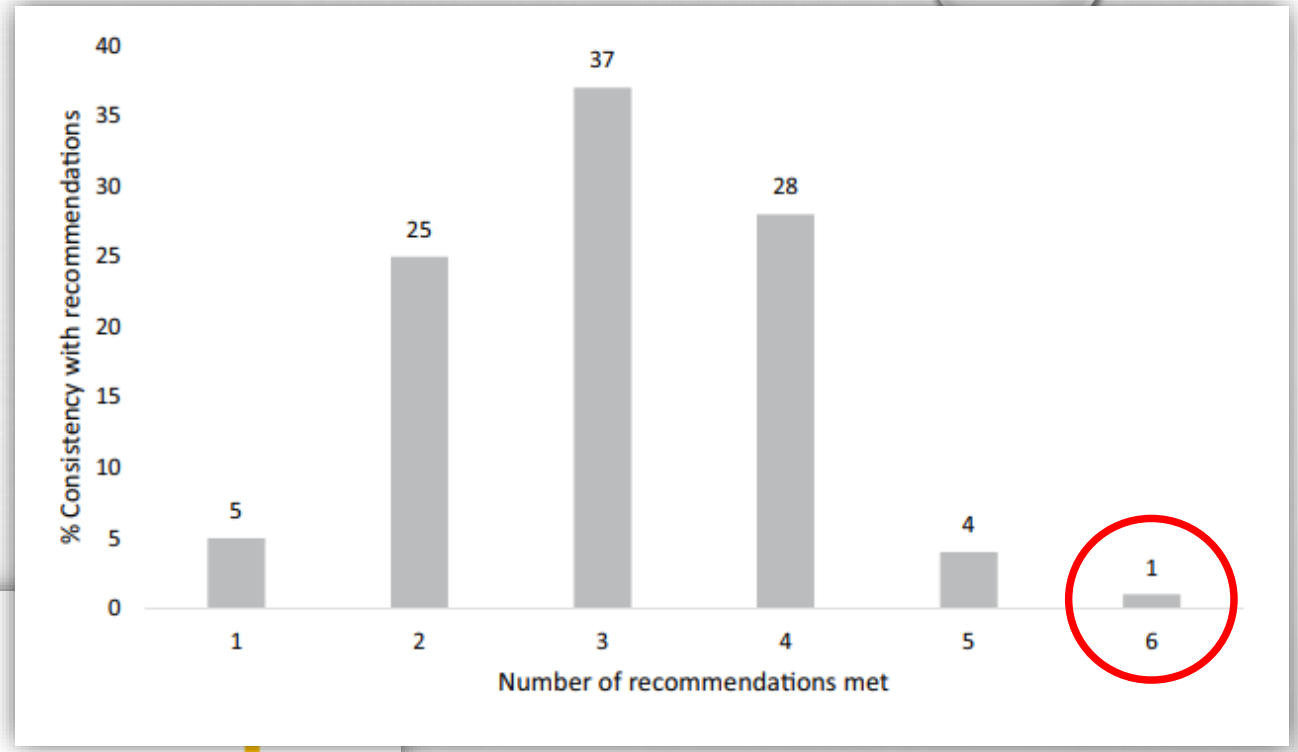
EBPG

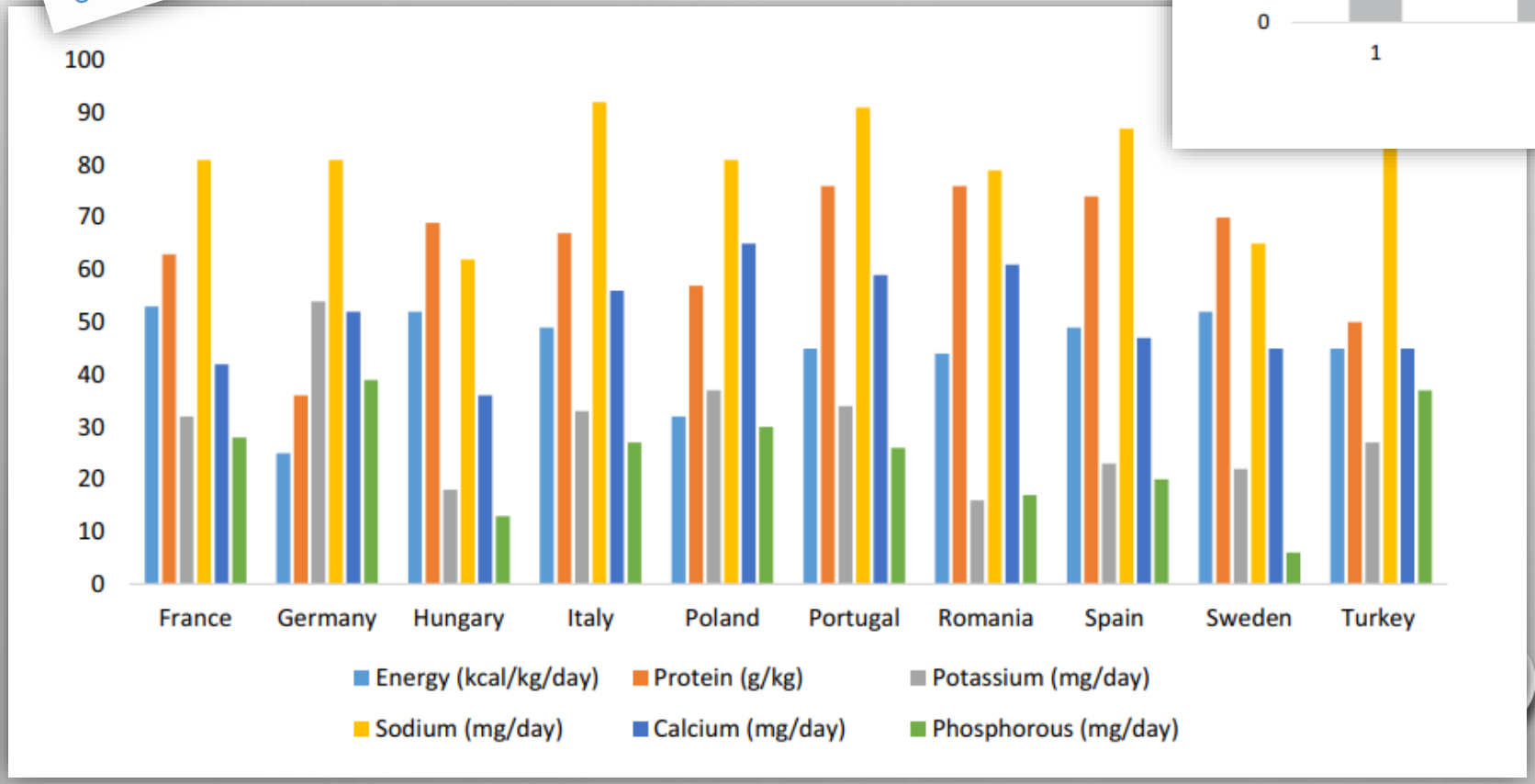
Energy	> 30 Kcal/kg/day
Protein	> 1,1 g/kg
Phosphate	< 1000 mg/day
Potassium	< 2370 mg/day
Sodium	< 2300 mg/day
Calcium	< 800 mg/day

J Nephrol. 2021 Dec;34(6):1999-2007. doi: 10.1007/s40620-020-00962-3. Epub 2021 Feb 16.

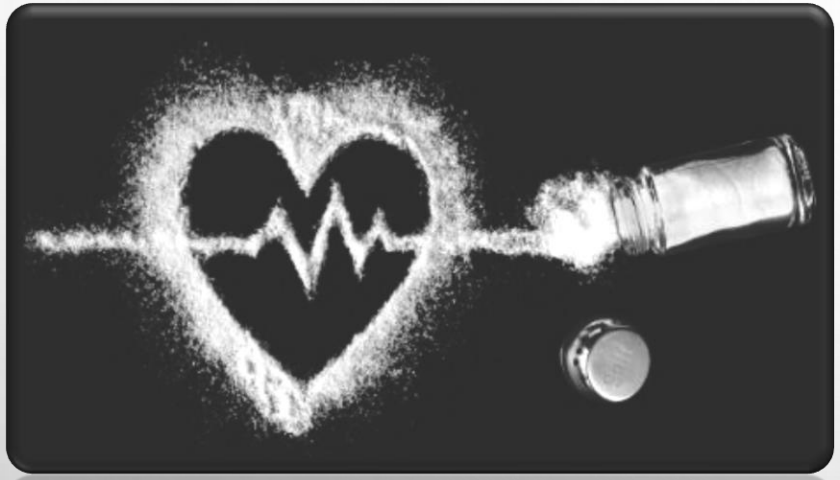
Dietary intake in adults on hemodialysis compared with guideline recommendations

Valeria M Saglimbene [1 2], Guobin Su [3 4 5], Germaine Wong [1 6], Patrizia Natale [1 2], Marinella Ruospo [2], Suetonia C Palmer [7], Jonathan C Craig [8], Juan J Carrero [5], Giovanni F M Strippoli [9 10]





N~10.000



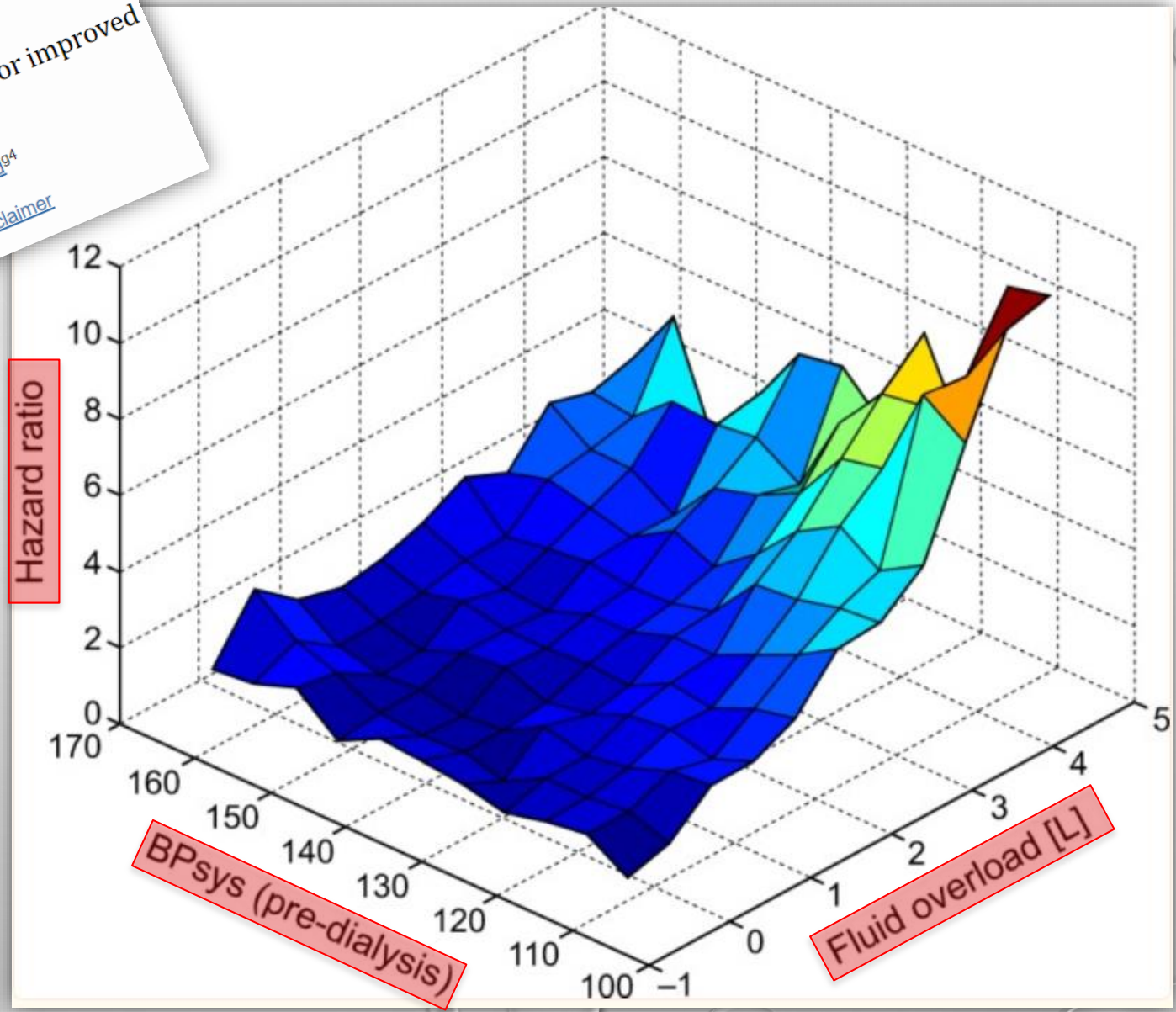
Νάτριο

- Οδηγία σε ESRD: < 2 gr/day (<5 gr αλάτι)
- Βασικό εξωκυττάριο κατιόν
- Κύριος ρυθμιστής οσμωτικότητας του πλάσματος
- Υπερυδάτωση- αρτηριακή υπέρταση
- Υπερτροφία αριστεράς κοιλίας- αυξημένος καρδιαγγειακός κίνδυνος
- 75% σε συντηρητικά, 15% πρόσθετο, 10% ενδογενές

Nephrol Dial Transplant. 2020 Mar; 35(Suppl 2): ii23–ii30.
Published online 2020 Mar 12. doi: 10.1093/ndt/gfaa017
PMCID: PM
PMID

Sodium, volume and pressure control in haemodialysis patients for improved cardiovascular outcomes

Jule Pinter,[g1] Charles Chazot,[g2] Stefano Stuard,[g3] Ulrich Moissl,[g3] and Bernard Canaud[g4]



Πολυκεντρική, 2020
~32000 ασθενείς/ >5 έτη

ndt NEPHROLOGY DIALYSIS TRANSPLANTATION
ERA
OXFORD UNIVERSITY PRESS

Nephrol Dial Transplant. 2009 Mar;24(3):956-62. doi: 10.1093/ndt/gfn599. Epub 2008 Nov 11.

The benefit of salt restriction in the treatment of end-stage renal disease by haemodialysis

Meral Kayikcioglu [1], Murat Tumuklu, Mehmet Ozkahya, Oner Ozdogan, Gulay Asci, Soner Duman, Huseyin Toz, Levent H Can, Ali Basci, Ercan Ok

Table 2. Blood pressure characteristics of the patients treated in two centres

	Centre A ($n = 190$)	Centre B ($n = 204$)	*P*-value
Use of antihypertensive medication (n = %)	13 (7%)	86 (42%)	.001
ACE-/I or ARB	8	27	
Calcium channel blocker	1	43	
Beta blocker	2	3	
Furosemide	1	1	
Combination of two medications	1	12	
Interdialytic weight gain (kg)	2.29 ± 0.83	3.31 ± 1.12	0.001
Interdialytic weight gain (kg for 70 kg man)	2.61 ± 0.98	4.05 ± 1.52	0.001
Systolic BP (mmHg)	126 ± 15	126 ± 21	ns
Diastolic BP (mmHg)	75 ± 12	76 ± 11	ns
Pulse pressure (mmHg)	51 ± 9	50 ± 12	ns
Systolic BP ≥140 (%)	18	37	0.001
Diastolic BP ≥90 (%)	12	8	ns
Patients with systolic BP ≥140 and/or diastolic BP ≥90 (%)			
At the time of starting the HD programme	78	83	ns
Current situation	19	37	0.001
Intradialytic hypotension (number of episode per 100 HD sessions)	11	27	0.009

Table 3. Echocardiographical data of the centres

	Centre-A ($n = 190$)	Centre-B ($n = 204$)	*P*-value
LA indices			
LA index (cm/m^2)	2.40 ± 0.34	2.74 ± 0.53	.0001
LA volume index (mL/m^2)	29.5 ± 10.0	36.7 ± 21.7	.0001
LV measurements and indices			
LV diastolic index (cm/m^2)	2.61 ± 0.33	2.97 ± 0.64	0.0001
LV end-systolic index (cm/m^2)	1.60 ± 0.29	1.96 ± 0.47	0.0001
Interventricular septalindex (cm/m^2)	0.79 ± 0.13	0.83 ± 0.14	0.018
Posterior wall index (cm/m^2)	0.76 ± 0.11	0.83 ± 0.11	0.0001
LV ejection fraction (%)	68 ± 10	63 ± 09	0.0001
LV fractional shortening (%)	39 ± 8	35 ± 6	0.0001
LV mass indexed to height$^{2.7}$ (g/m$^{2.7}$)	59 ± 16	71 ± 27	0.0001
LV hypertrophy (%)[a]	124 (74%)	171 (88%)	.001
Pulsed Doppler parameters			
Mitral-inflow *E* (cm/s)	73 ± 22	76 ± 27	ns
Mitral-inflow *A* (cm/s)	83 ± 18	82 ± 25	ns
Deceleration time (min/s)	0.23 ± 0.06	0.28 ± 0.07	0.0001
Isovolumic relaxation time (min/s)	0.08 ± 0.01	0.12 ± 0.02	0.0001
Mitral-inflow *A*-wave duration (min/s)	0.14 ± 0.02	0.16 ± 0.03	0.0001
E/*A* ratio	0.90 ± 0.31	0.96 ± 0.33	0.076
Mitral valve lateral annulus Ee/Ae (min/s)	0.99 ± 0.43	0.89 ± 0.41	0.034

Αναδρομική διασταυρούμενη ~400 ασθενείς

ndt NEPHROLOGY DIALYSIS TRANSPLANTATION ERA OXFORD UNIVERSITY PRESS

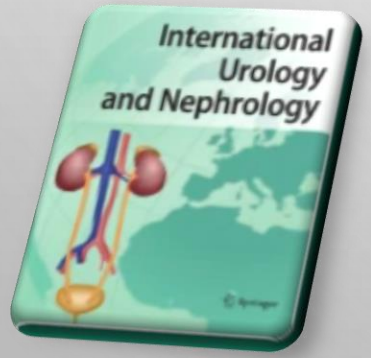
Effect of dietary sodium restriction on body water, blood pressure, and inflammation in hemodialysis patients: a prospective randomized controlled study

Nephrology – Original Paper | Published: 23 January 2013
Volume 46, pages 91–97, (2014) Cite this article

Table 3 Serum biochemical, inflammatory, and hematological markers in group A ($n = 21$)

	Baseline	Week 8	Week 16	p
Albumin (g/dl)	3.79 ± 0.26	3.85 ± 0.22	3.92 ± 0.36	0.14
Creatinine (mg/dl)	10.40 (9.20; 12.30)	10.70 (9.30; 12.10)	10.90 (9.20; 12.00)	0.85
Urea (mg/dl)	109 (93; 126)	99 (92; 119)	116 (91; 132)	0.41
Glucose (mg/dl)	90 (84; 140)	103 (83; 131)	97 (82; 141)	0.26
Cholesterol (mg/dl)	134.94 ± 21.67	135.86 ± 26.96	132.24 ± 25.17	0.65
HDL cholesterol (mg/dl)	38.76 ± 8.89	39.30 ± 10.84	37.43 ± 8.87	0.09
Triglycerides (mg/dl)	155.33 ± 82.91	153.09 ± 67.75	139.05 ± 54.02	0.29
Bicarbonate (mEq/l)	21.53 ± 3.11	23.08 ± 2.72	22.59 ± 2.58	0.09
Hemoglobin (g/dl)	11.40 (10.70; 12.50)	11.80 (10.70; 12.60)	11.90 (11.10; 13.00)	0.31
Hematocrit (%)	[illegible]	36.2 ± 5.42	[illegible]	0.31
Lymphocytes (cells/mm^3)	1,795.0 (1,386; 2,036)	1,507.0 (1,345; 1,856)	1,531.0 (1,267; 1,777)	0.13
C-reactive protein (mg/dl)	1.1 (0.90; 1.40)	0.7 (0.30; 1.10)*	0.6 (0.30; 1.30)*	0.022
TNF-α (pg/ml)	691 (633; 760)	542 (476; 628)*	443 (386; 530)*, **	<0.001
IL-6 (pg/ml)	5.47 (4.96; 5.86)	3.87 (3.33; 4.92)*	307 (2.42; 3.90)*, **	<0.001

* $p < 0.05$ versus baseline; ** $p < 0.05$ versus week 8



Τυχαιοποιημένη ελεγχόμενη ~ 2 gr Na+ BP, IDWG, δείκτες φλεγμονής/ 16 εβδομάδες

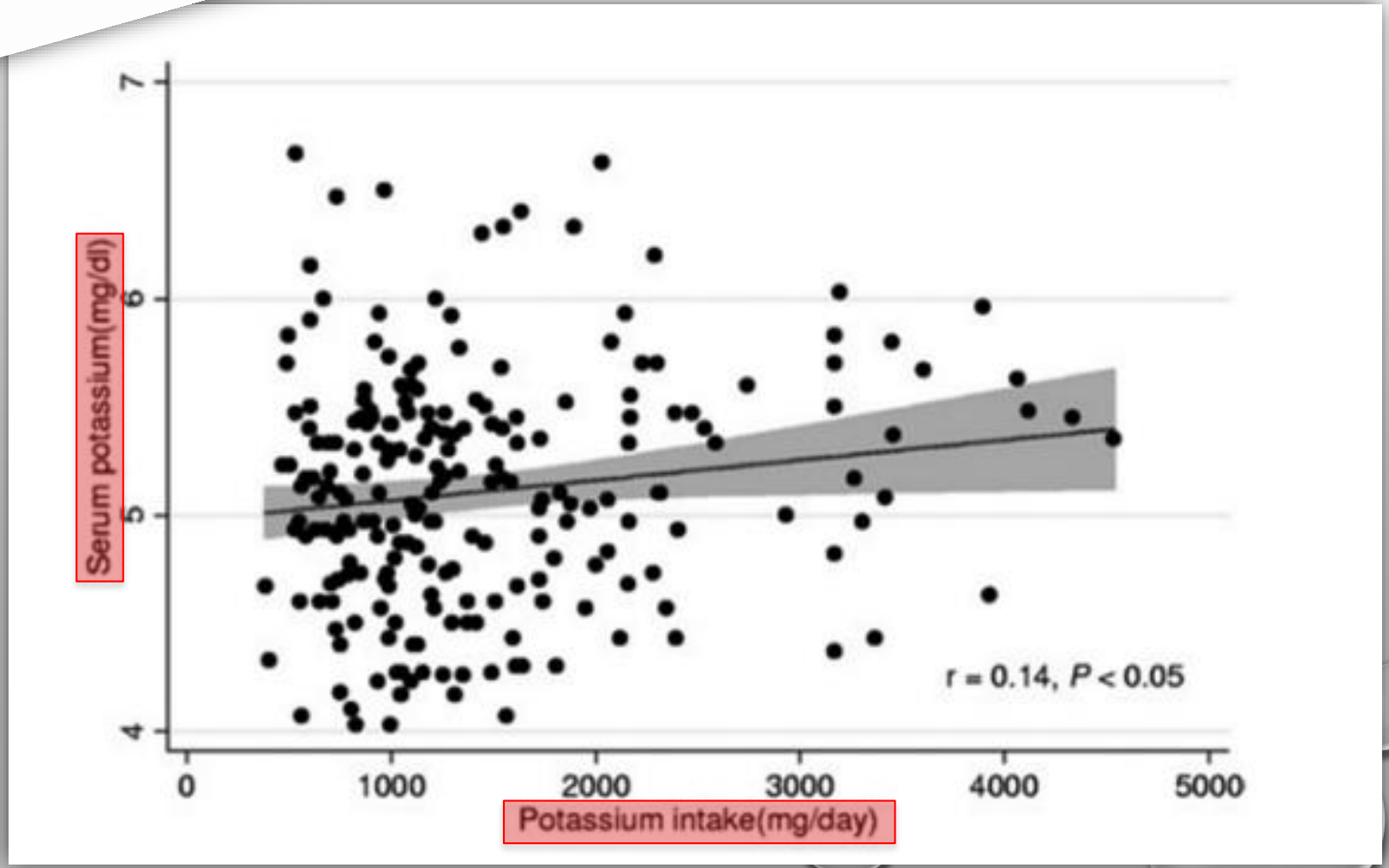
Κάλιο

- Οδηγία σε ESRD: 2-4 gr/day (NKF Council on Renal Nutrition)
- Ενδοκυττάριο κατιόν (κυτταρικά δυναμικά, νευρομυϊκή αγωγιμότητα, σύσπαση μυϊκών ινών)
- 6,5% K^+>5,5 meq/lt
- Οξεοβασική ισσοροπία, δυσκοιλιότητα, μεταβολισμός S, συνθήκες αιμοκάθαρσης
- 3πλάσια αποβολή K^+ από τα κόπρανα, διούρηση
- Διατροφή
- ↑(2) ποσότητα K^+ σε συντηρητικά/ βράσιμο >75% μείωση του K^+

Review > J Ren Nutr. 2016 Sep;26(5):282-7. doi: 10.1053/j.jrn.2016.02.005. Epub 2016 Mar 12.

Nutrient Non-equivalence: Does Restricting High-Potassium Plant Foods Help to Prevent Hyperkalemia in Hemodialysis Patients?

David E St-Jules [1], David S Goldfarb [2], Mary Ann Sevick [3]

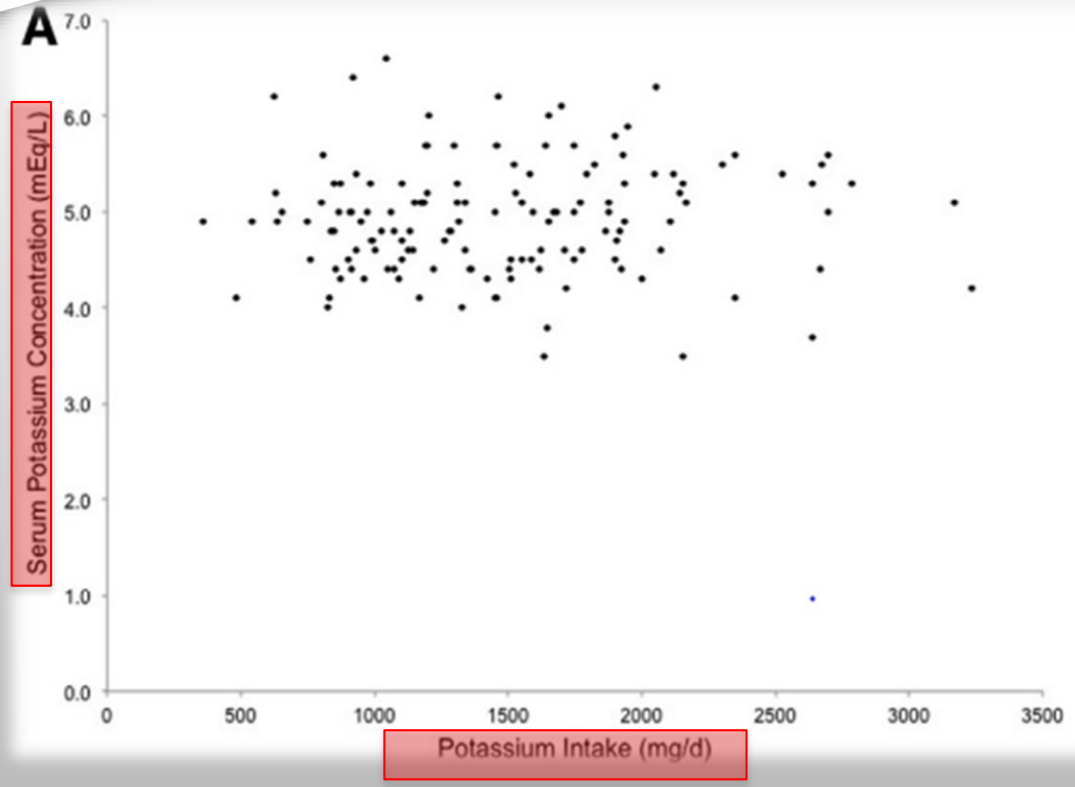


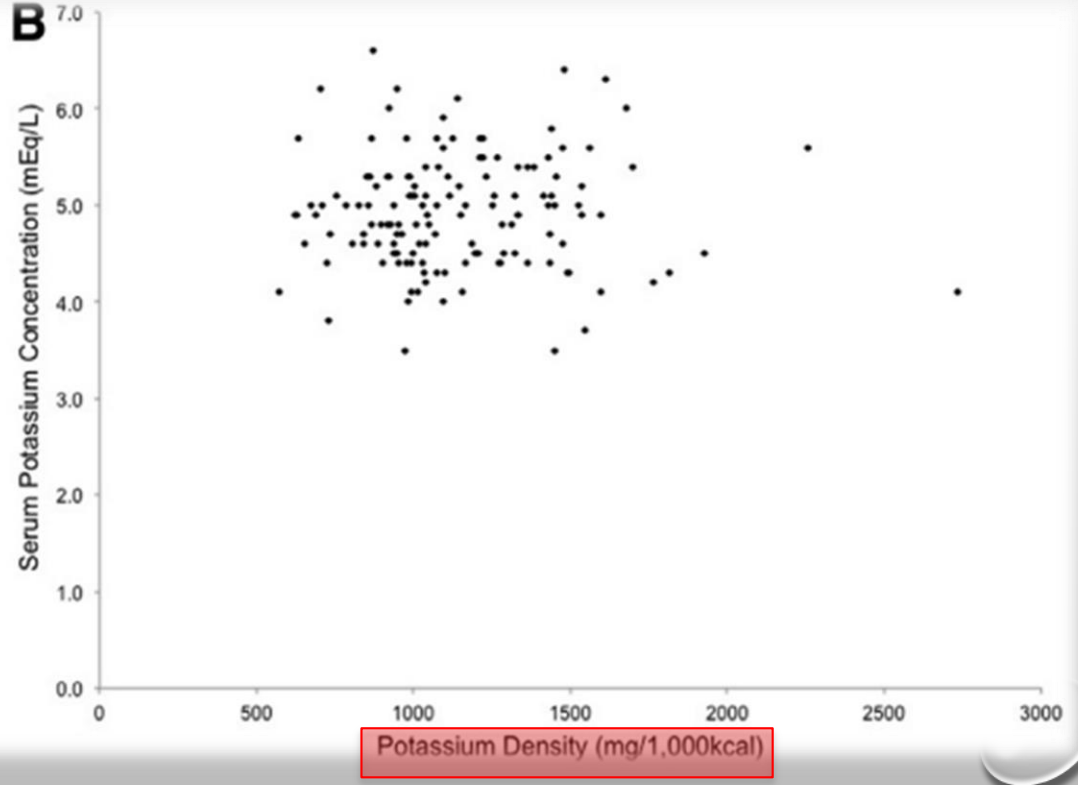
Κοορτή, 2010
224 ασθενείς, 2%, ↑0,4 meq/lt

Review > J Ren Nutr. 2016 Sep;26(5):282-7. doi: 10.1053/j.jrn.2016.02.005. Epub 2016 Mar 12.

Nutrient Non-equivalence: Does Restricting High-Potassium Plant Foods Help to Prevent Hyperkalemia in Hemodialysis Patients?

David E St-Jules [1], David S Goldfarb [2], Mary Ann Sevick [3]





140 ασθενείς, 2016
Balance Wise Study

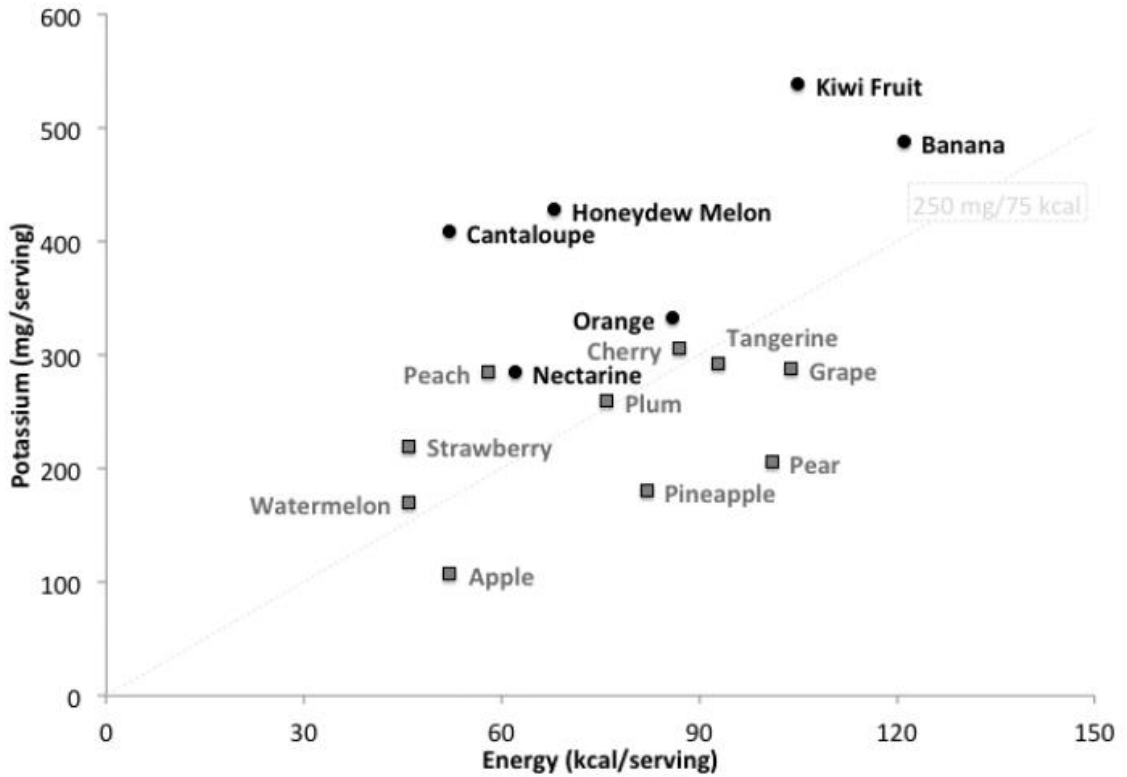
Κάλιο

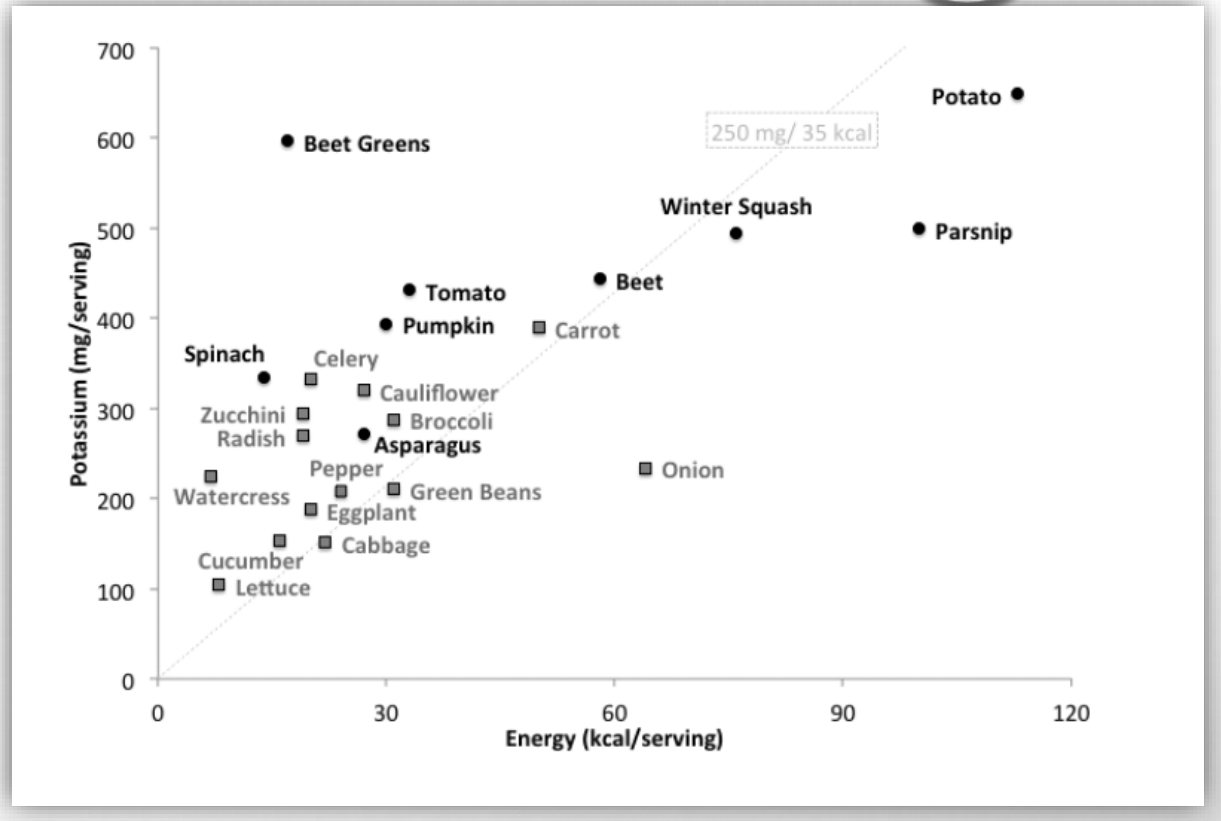
- Οδηγία σε ESRD: 2-4 gr/day (NKF Council on Renal Nutrition)
- Ενδοκυττάριο κατιόν (κυτταρικά δυναμικά, νευρομυϊκή αγωγιμότητα, σύσπαση μυϊκών ινών)
- 6,5% K^+>5,5 meq/lt
- Οξεοβασική ισσοροπία, δυσκοιλιότητα, μεταβολισμός S, συνθήκες αιμοκάθαρσης
- 3πλάσια αποβολή K^+ από τα κόπρανα, διούρηση
- Διατροφή
- ↑(2) ποσότητα K^+ σε συντηρητικά/ βράσιμο >75% μείωση του K^+

Review > Semin Dial. 2018 Sep;31(5):479-486. doi: 10.1111/sdi.12713. Epub 2018 May 29.

Assessment and misassessment of potassium, phosphorus, and protein in the hemodialysis diet

David E St-Jules [1], David S Goldfarb [2], Mary Lou Pompeii [1], Scott E Liebman [3], Richard A Sherman [4]





Heliyon 9 (2023) e18991

Contents lists available at ScienceDirect

Heliyon

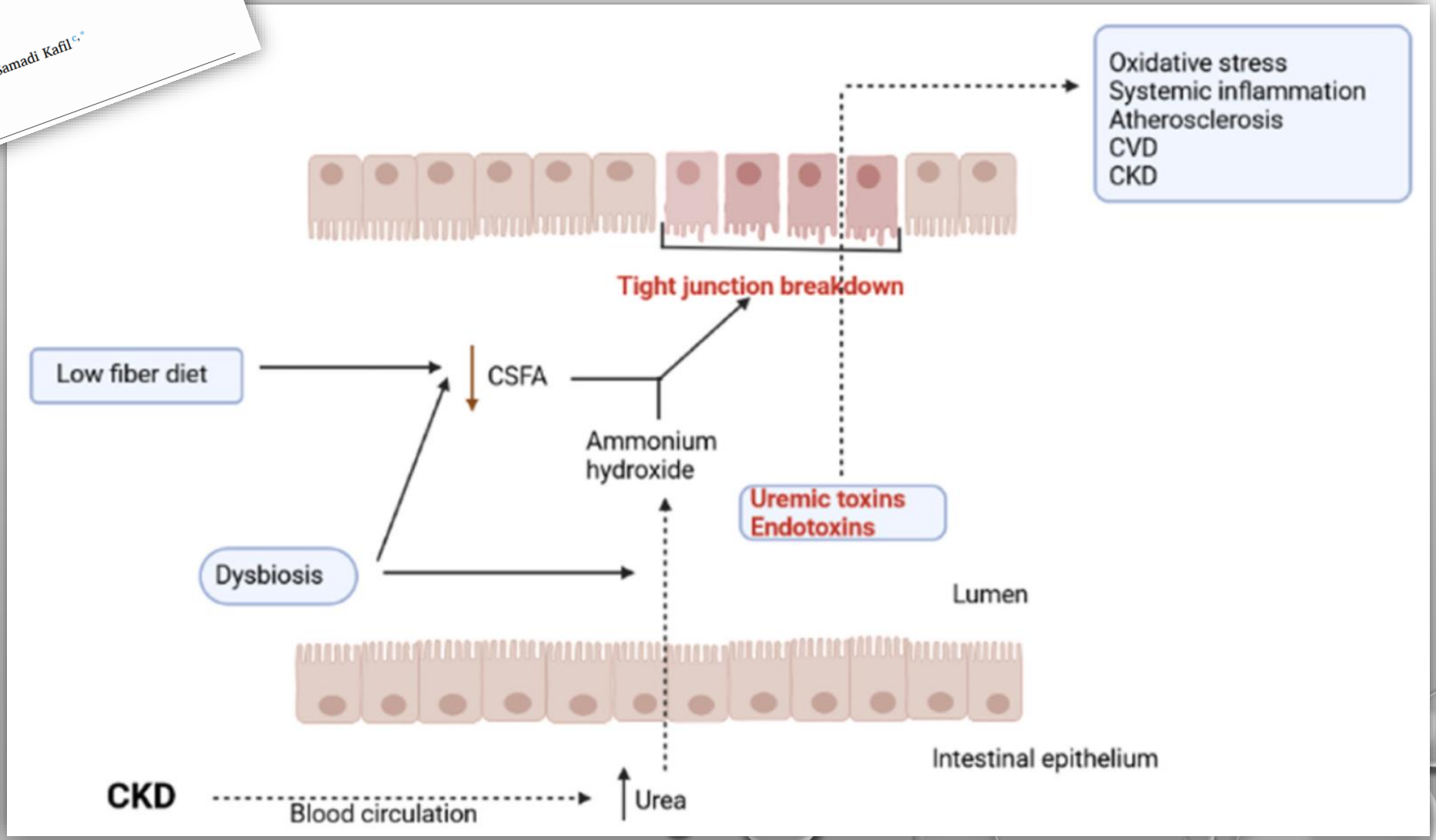
journal homepage: www.cell.com/heliyon

Review article

Chronic kidney disease and gut microbiota

Siamak Amini Khiabani [a], Mohammad Asgharzadeh [b], Hossein Samadi Kafil [c,*]

[a] Research center for Pharmaceutical Nanotechnology, Tabriz University of Medical Sciences, Tabriz, Iran
[b] Biotechnology Research Center, Tabriz University of Medical Sciences, Tabriz, Iran
[c] Drug Applied Research Center, Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran



Heliyon 9 (2023) e18991

Contents lists available at ScienceDirect

Heliyon

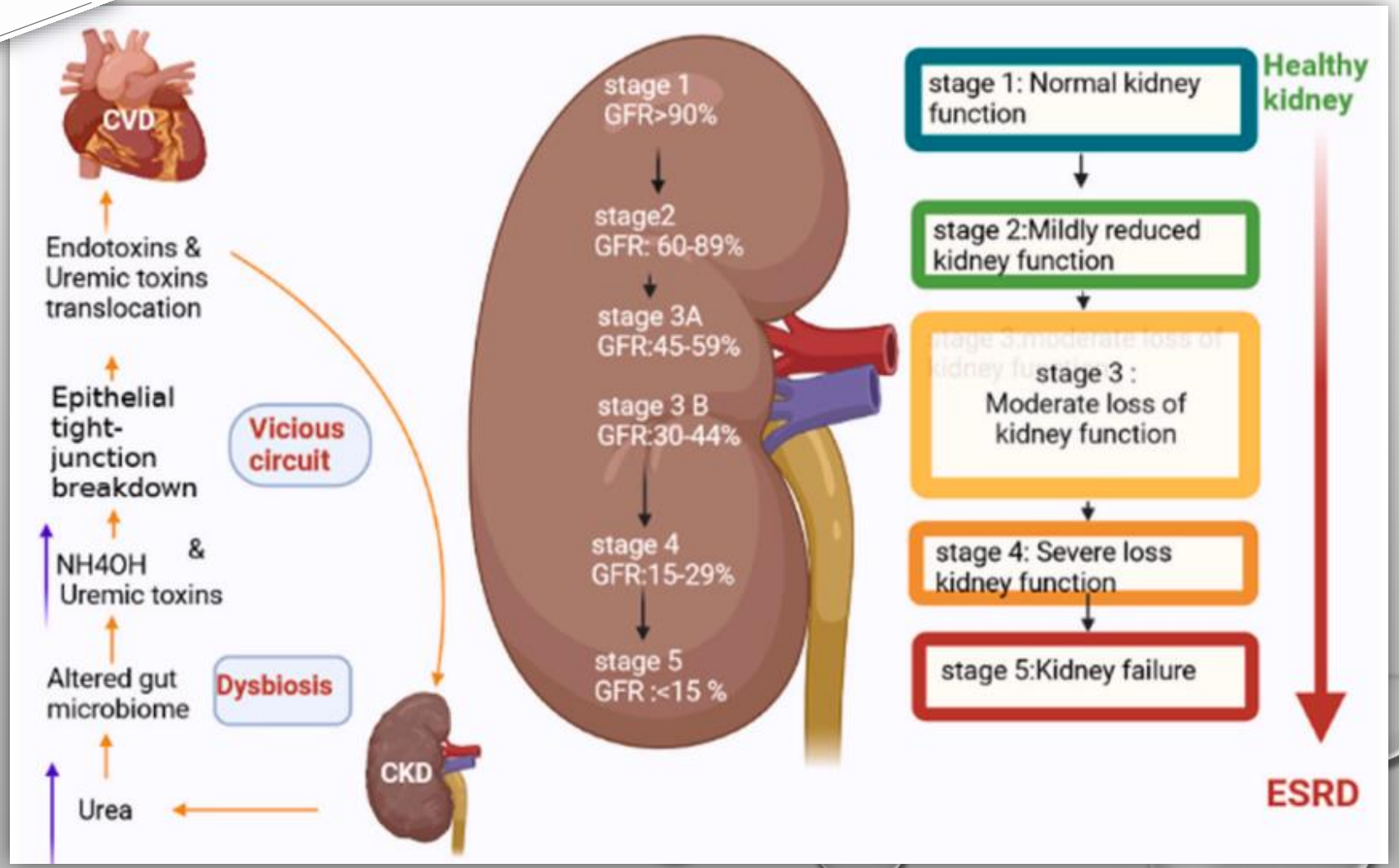
journal homepage: www.cell.com/heliyon

Review article

Chronic kidney disease and gut microbiota

Siamak Amini Khiabani [a], Mohammad Asgharzadeh [b], Hossein Samadi Kafil [c,*]

[a] Research center for Pharmaceutical Nanotechnology, Tabriz University of Medical Sciences, Tabriz, Iran
[b] Biotechnology Research Center, Tabriz University of Medical Sciences, Tabriz, Iran
[c] Drug Applied Research Center, Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran



Review > J Ren Nutr. 2016 Sep;26(5):282-7. doi: 10.1053/j.jrn.2016.02.005. Epub 2016 Mar 12.

Nutrient Non-equivalence: Does Restricting High-Potassium Plant Foods Help to Prevent Hyperkalemia in Hemodialysis Patients?

David E St-Jules [1], David S Goldfarb [2], Mary Ann Sevick [3]

- Κρέας → πρωτεΐνη → οξέωση
- Δίαιτα χαμηλή σε ίνες → φλεγμονή
- Φρούτα → υδατάνθρακες → αλκάλωση
- Φρούτα → υδατάνθρακες → ↑ινσουλίνη
- Δίαιτα χαμηλή σε ίνες → δυσκοιλιότητα

KDOQI
KIDNEY DISEASE OUTCOMES QUALITY INITIATIVE
National Kidney Foundation

eat right® Academy of Nutrition and Dietetics

KDOQI CLINICAL PRACTICE GUIDELINE FOR NUTRITION IN CKD: 2020 UPDATE

1ο παράδοξο:
Περιορισμός στο Κ και υγειϊνή διατροφή

Plant based food is good for your heart.
Potassium is dangerous for your heart…

PROS: plant based food in dialysis patients:

The relationship between regular consumption of fruit and vegetables and cardiovascular health is of potential importance in subjects at risk for cardiovascular diseases, such as dialysis patients.

Regular consumption of plant derived food may have a protective effect on the development of neoplasia, whose risk is increased in dialysis patients.

Plant derived, fiber rich food helps prevent constipation and diverticulosis.

CONS: plant based food in dialysis patients:

Since fruits and vegetables are relatively rich in potassium and poor in calorie, the balance may be unfavorable for caloric intake and risk of hyperkalemia.

Pre dialysis hyperkalemia, and rapid decrease of potassium during dialysis may induce arrhythmia in dialysis patients, which is associated with a higher risk of death.

Potassium binding resins are associated with risk of intestinal ischemia, especially if assumed with sorbitol or laxatives, and may chelate important nutrients.

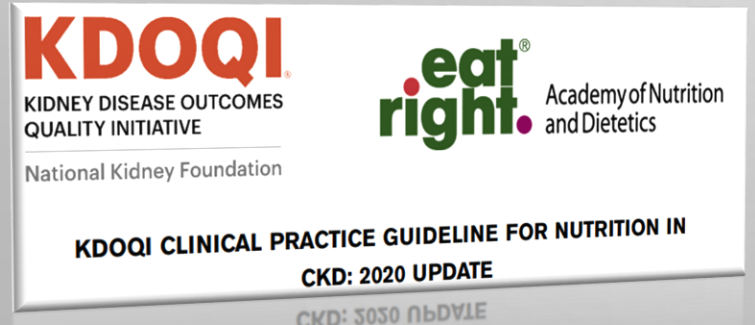
Σχετική απελεθεύρωση της δίατας σε K^+ (μαγείρεμα)

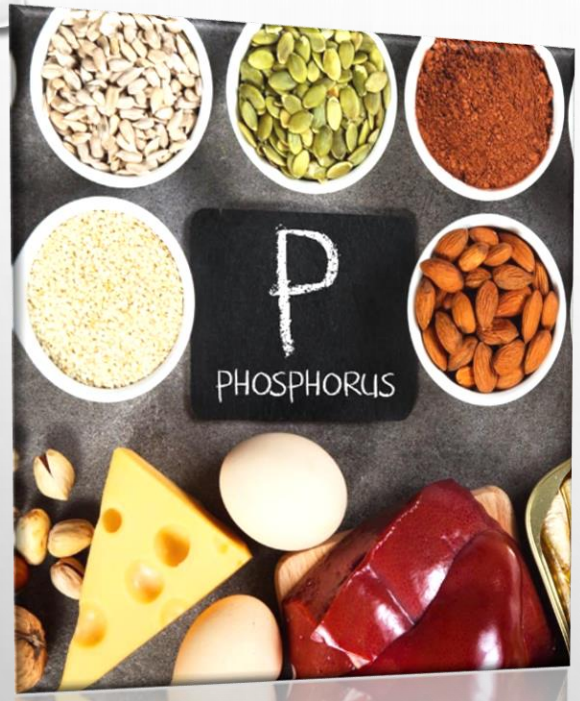
Περιορισμός πρόσθετου K^+

Έλεγχος για φλεγμονή, αιμορραγία, αιμόλυση

Εντατική αιμοκάθαρση

Καλιοδεσμευτικά σκευάσματα





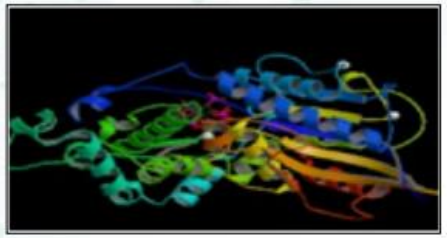
Φώσφορος

- Οδηγία σε ESRD: 800- 1000 mg/day/ 50% ↑P αιμία
- 85% σε οστά, 15% αίμα- μαλακούς ιστούςΔιαταραχή του άξονα Ca+2-P04- PTH / Νεφρική οστεοδυστροφία
- ↑ PTH, ↑ FGF23, αθηροσκλήρυνση
- Αίτια: Άρνηση λήψης των P-binders, υπερPTH, ελλιπής κάθαρση,διατροφή
- Οργανικός vs Ανόργανος P
- Τρόπος μαγειρέματος

Nutritional Management of CKD-MBD

Linda McCann, RD, CSR
Nephrology Dietitian Consultant/Speaker
Eagle, ID
mccannlinda1@yahoo.com

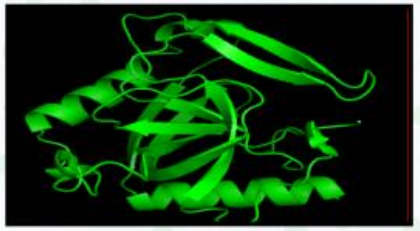
Not all phosphorus is created equal!



Organic Phosphorus

Example: Phytate

- Absorbed at slow rate
- 40-60% animal source abs
- 10-30% veg source abs
- Generally low bioavailability
- Bioavailability can increase if degraded by enzyme action/processing



Inorganic Phosphate Salts

Example: Food Additives

- High digestibility (> 90%)
- Absorbed rapidly
- Not bound to fats/CHO
- No enzyme action needed

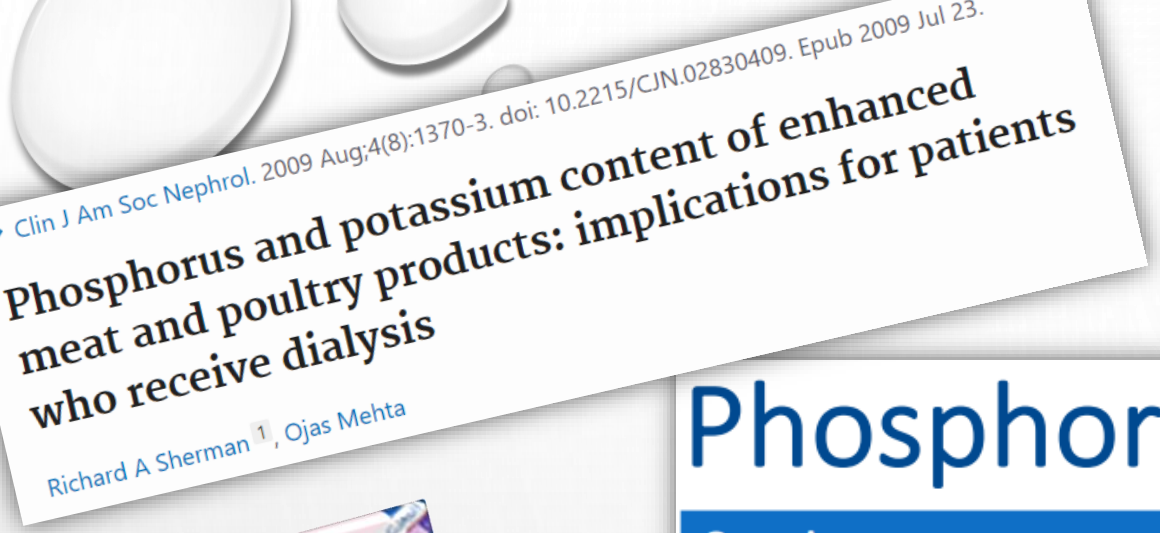
Noori N, et al. Organic and Inorganic Dietary Phosphorus and Its Management in CKD. Iranian Journal of Kidney Diseases, 2010; 4(2):89-100.
Kalantar-Zedeh K, et al. Understanding sources of dietary phosphorus in the treatment of patients with chronic kidney disease. CJASN, 2010; 5(3):519-30.

Clin J Am Soc Nephrol. 2009 Aug;4(8):1370-3. doi: 10.2215/CJN.02830409. Epub 2009 Jul 23.

Phosphorus and potassium content of enhanced meat and poultry products: implications for patients who receive dialysis

Richard A Sherman [1], Ojas Mehta

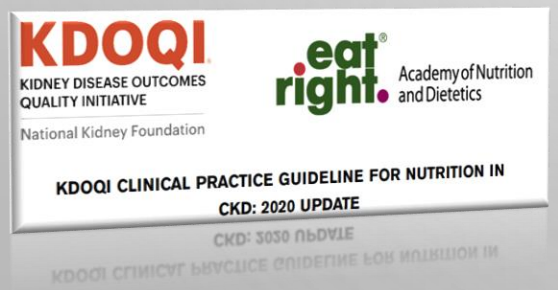
Hidden Phosphate



Phosphorus: Organic and Inorganic

Organic	Serv	Phos mg	Phos:Pro	GI absorb
Milk , skim	8 oz	247	29:1	40-60%
Yogurt, plain nonfat	8 oz	385	27:1	40-60%
Cheese, Mozzarella	1 oz	131	20:1	40-60%
Egg	1 large	86	14:1	40-60%
Beef, cooked	3 oz	173	7:1	40-60%
Chicken	3 oz	155	8:1	40-60%
Fish	3 oz	250	11:1	40-60
Almonds	1 oz	134	23:1	10-30%
Peanuts	1 oz	107	15:1	10-30%
Lentils	½ cup	178	20:1	10-30%
Chocolate	1.4 oz	142-216	27:1	10-30%
Cola	12 oz	40	NA	80-100%

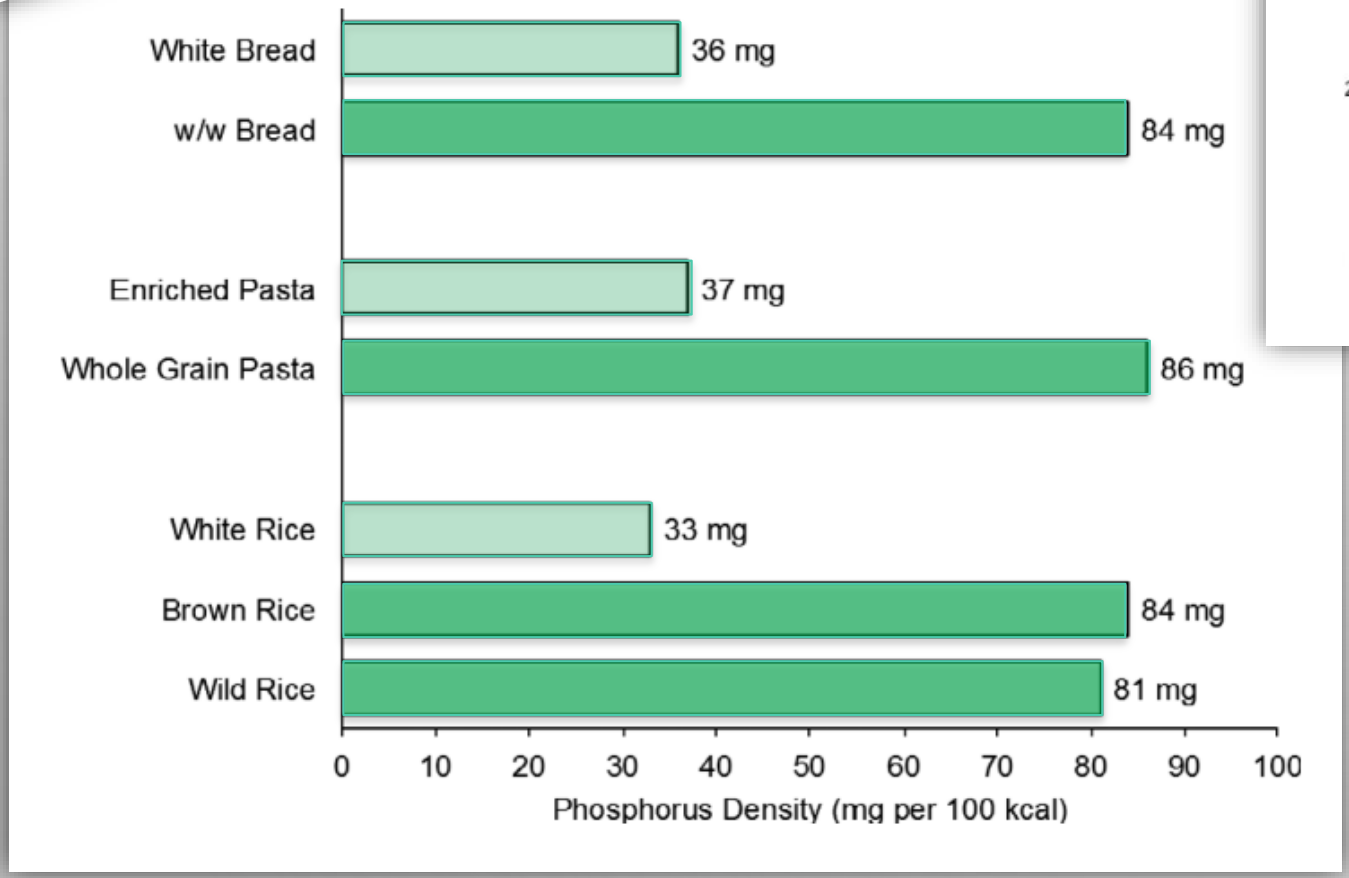
KDIGO

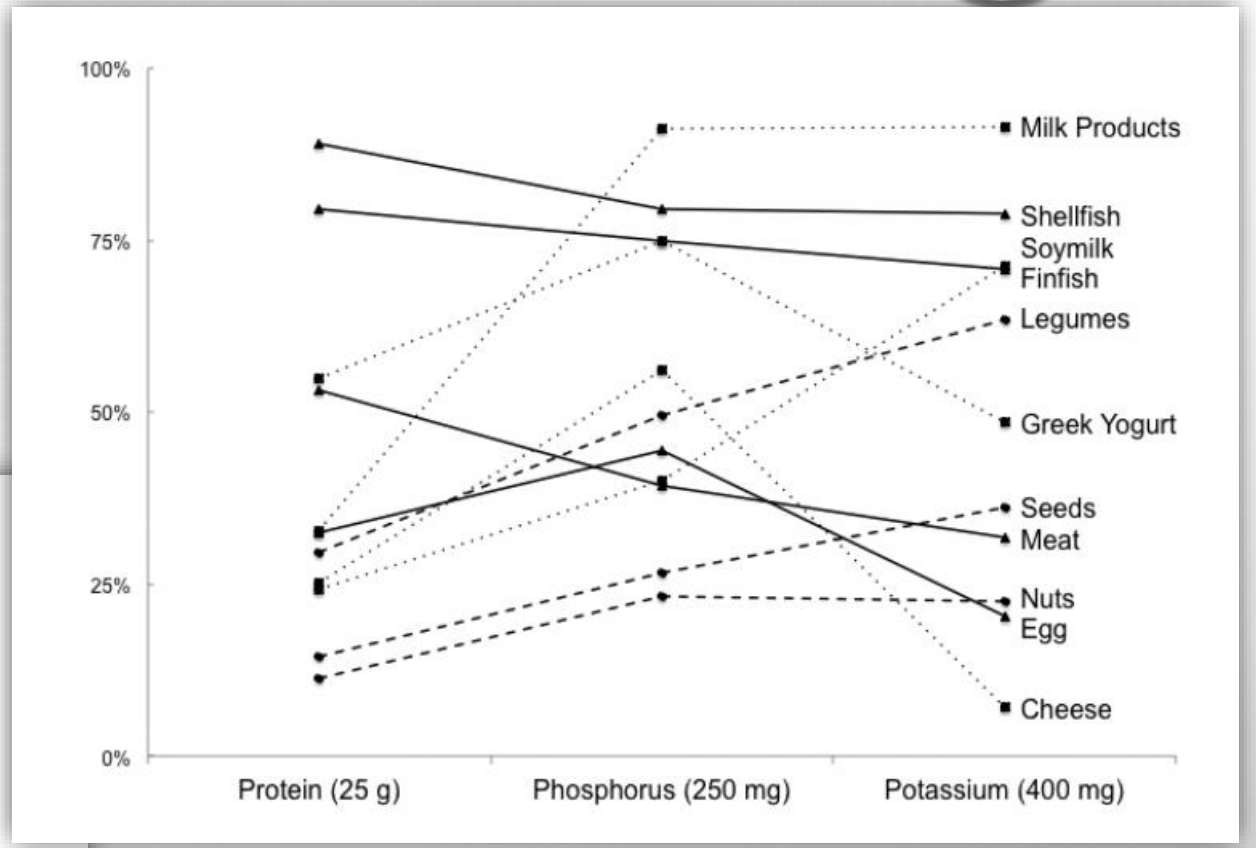


eview > Semin Dial. 2018 Sep;31(5):479-486. doi: 10.1111/sdi.12713. Epub 2018 May 29.

Assessment and misassessment of potassium, phosphorus, and protein in the hemodialysis diet

David E St-Jules [1], David S Goldfarb [2], Mary Lou Pompeii [1], Scott E Liebman [3], Richard A Sherman [4]





Other sources of phosphate

- Phosphate-containing excipients, largely inert salts used in the formulation of drugs found in ~11% of frequently used medications without any indication of the concentration (buffers, dilutants, density for the preparation)
- Example: phosphate content of a single 20-mg tablet of paroxetine may be as high as 296 mg, while 10 mg of amlodipine may have up to 165 mg. Many other commonly prescribed CKD medications contain at least some phosphorus.
- Even tap water may need to be scrutinized because phosphate salts are often added to soften hard water in the United States and Europe.

Calvo M, Sherman RA, Uribarri J. AJKD, 2019; 73(4)542–551

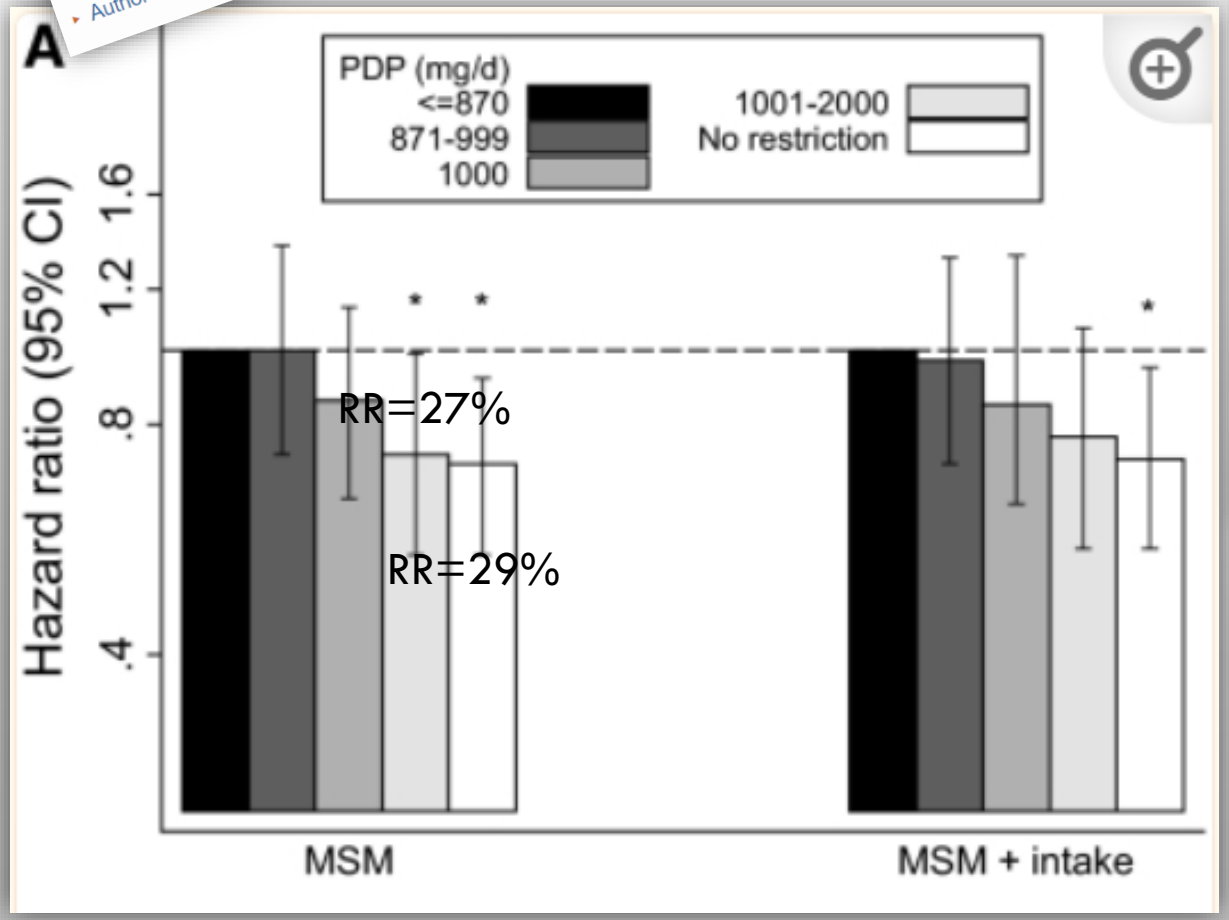
Seana ML, et al. JREN, 2017, 27(2):9196

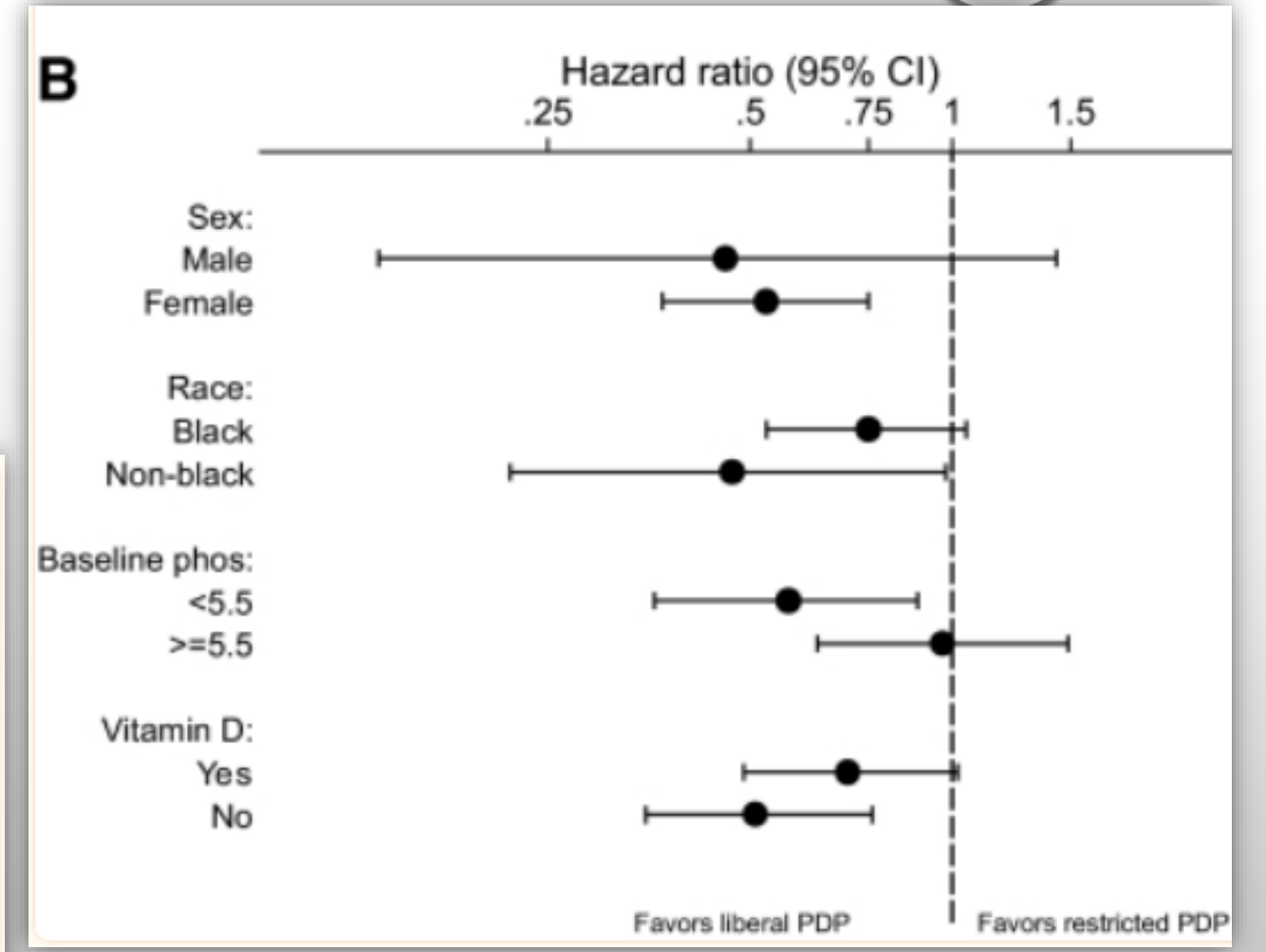
Clin J Am Soc Nephrol. 2011 Mar; 6(3): 620–629.
doi: 10.2215/CJN.04620510
Original Articles

Prescribed Dietary Phosphate Restriction and Survival among Hemodialysis Patients

Katherine E. Lynch,*† Rebecca Lynch,‡ Gary C. Curhan,†‡§ and Steven M. Brunelli*†‡

Post-hoc HEMO
N=1751





2ο παράδοξο:
Πρωτεϊνική κάλυψη και περιορισμοί στον P

Hyperphosphatemia: what do we want to find?
Three cases where nutritional approaches aimed at reducing phosphate content in food may fail

Low-efficiency dialysis, due to erroneous prescription, recirculation, competition between weight loss and depuration

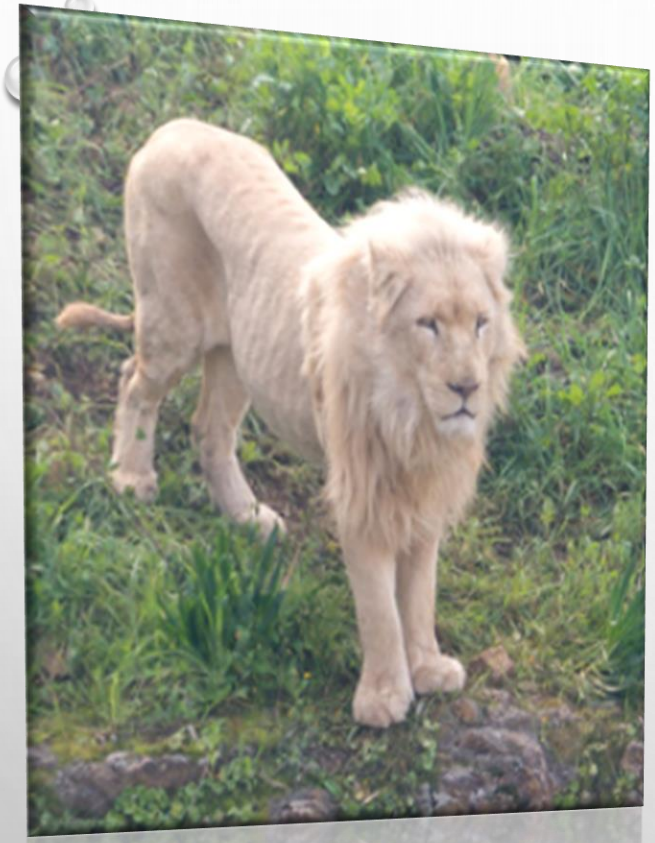
Consider increasing dialysis frequency, duration or convection

Severe hyperparathyroidism or adynamic bone disease;

Consider increasing dialysis frequency, duration or convection

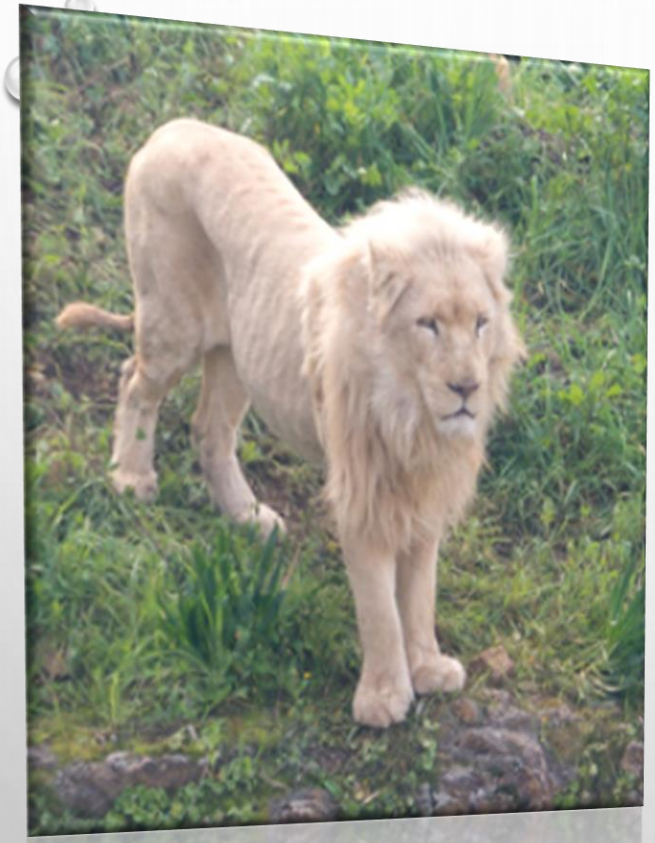
A diet rich in processed or preserved food;

Consider quality versus quantity of processed or natural food



Υποθρεψία (PEW)

- Ημερήσια πρόσληψη πρωτείνης 1,2gr/ Kg ΒΣ
- Θερμιδική κάλυψη ~30-35 Kcal/Kg /day ΒΣ
- Διατήρηση φυσιολογικών επιπέδων υδατοδιαλυτών βιταμινών και FA
- 1999 ~ 1% 20 έτη ΤΝ / 2018 ~8,6%
- Γήρανση πληθυσμού, ↑ προσδόκιμου επιβίωσης
- Ουραιμική υποθρεψία/ καχεξία
- Malnutrition Inflammation Atherosclerosis (MIA)



Υποθρεψία (PEW)

- 2009 IRNM PEW (απώλεια μυϊκής μάζας και ενέργειας)
- Salb, Scr/ BSA, BMI, nPCR
- Alb<3,8, BMI<23, ↓ ΣΒ>5%/ 3 μήνες
- SGA, MIS score, BIA, DEXA
- Η βελτίωση της διατροφής μπορεί να μην είναι αρκετή

SGA Score
MIS Score

Table 1: Recommended nutritional parameters in hemodialysis patients

Nutritional parameters	Recommendations
Protein	1.2 g/kg/d (at least 50% should be of high biological value)
Calories	35 kcal/kg/d (<60 years)
	30-35 kcal/kg/d (60 years or older)
Total fat	25%-35% of total energy intake
Saturated fat	<7%
Sodium	80-100 mmol
Potassium	<1 mmol/kg if elevated
Cholesterol	<200 mg
Total fiber	20-30 g/d

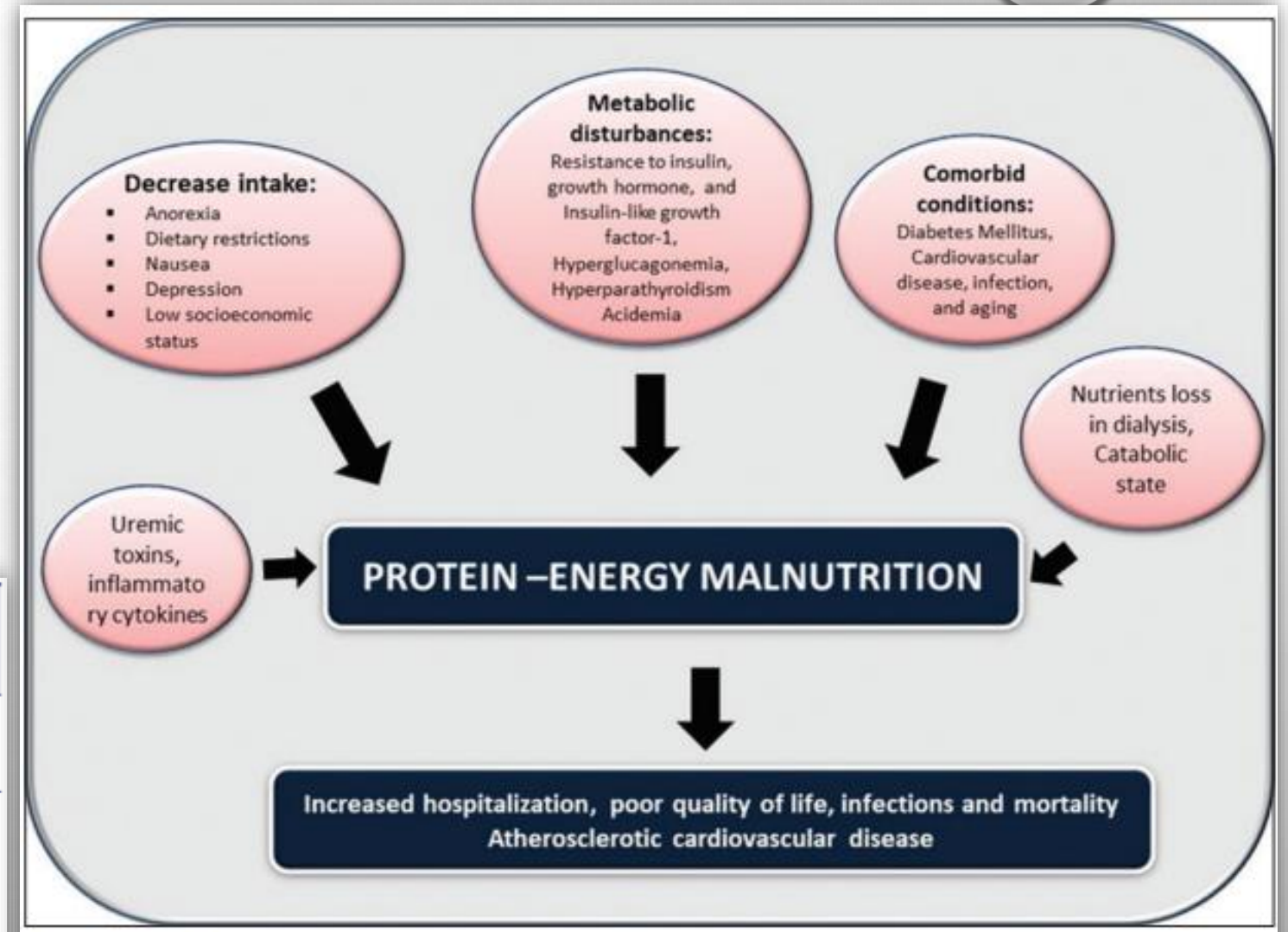


Figure 1: Pathogenesis of protein–energy wasting in dialysis patients

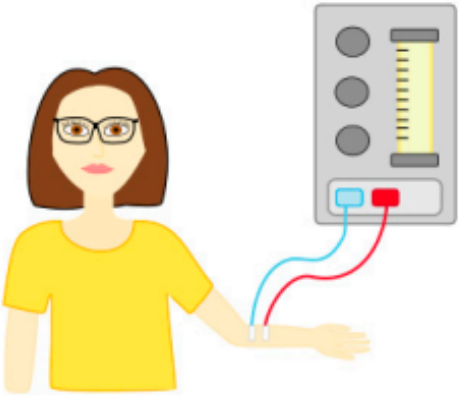
nutrients

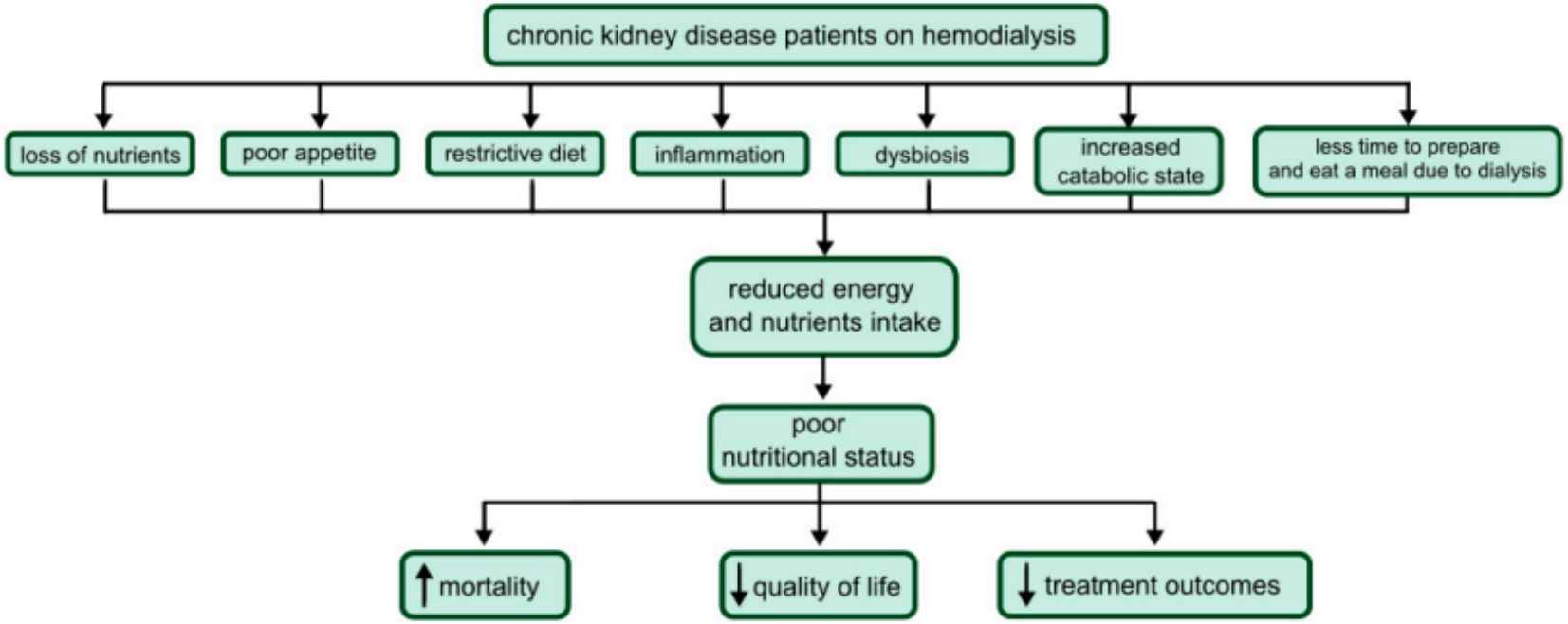
Article

Adherence to Caloric and Protein Recommendations in Older Hemodialysis Patients: A Multicenter Study

Sylwia Czaja-Stolc [1,*], Ewelina Puchalska-Reglińska [2], Sylwia Małgorzewicz [1], Marta Potrykus [3], Małgorzata Kaczkan [1], Aneta Kałużna [1], Zbigniew Heleniak [4] and Alicja Dębska-Ślizień [4]

1 Department of Clinical Nutrition, Medical University of Gdansk, 80-211 Gdańsk, Poland
2 Dialysis Unit, 7th Navy Hospital in Gdansk, 80-305 Gdańsk, Poland
3 Department of General, Endocrine and Transplant Surgery, Medical University of Gdansk, 80-211 Gdańsk, Poland
4 Department of Nephrology, Transplantology and Internal Medicine, Medical University of Gdansk, 80-952 Gdańsk, Poland
* Correspondence: sylwia.czaja-stolc@gumed.edu.pl



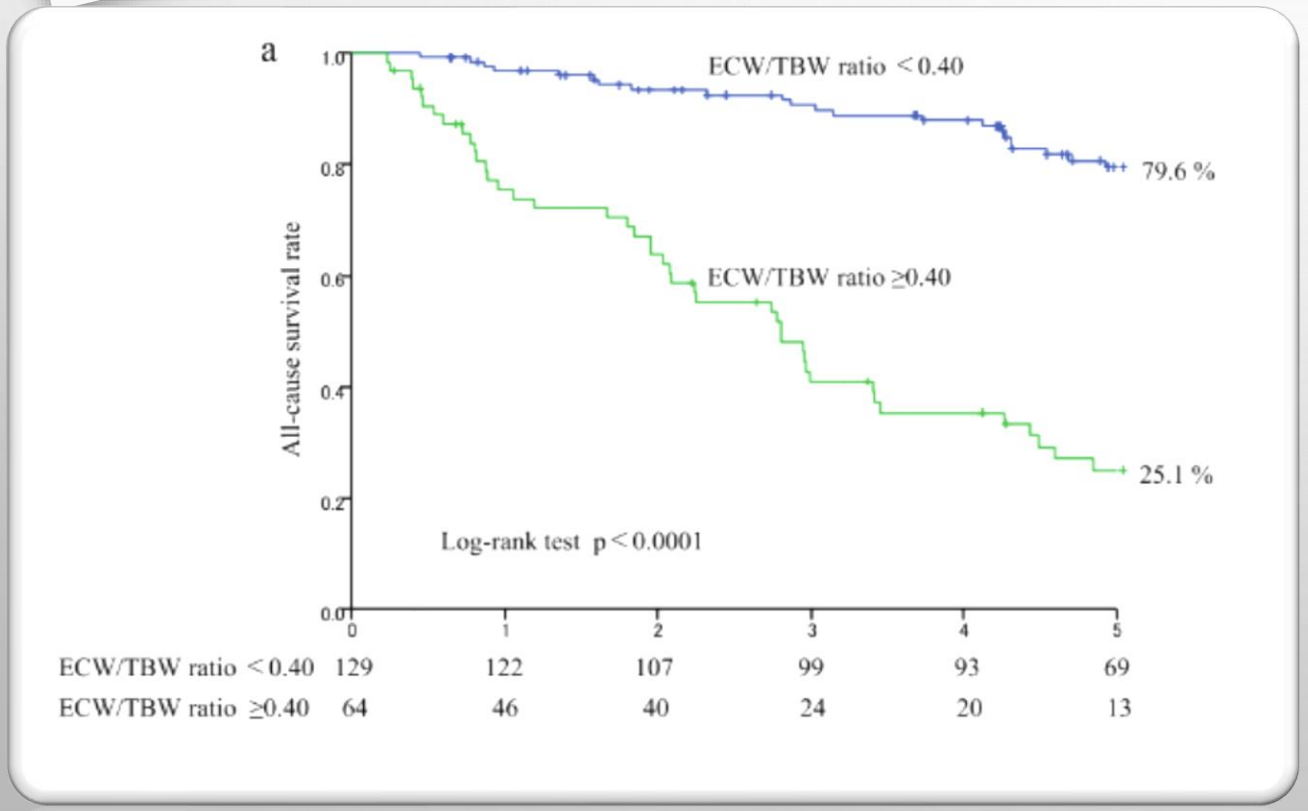


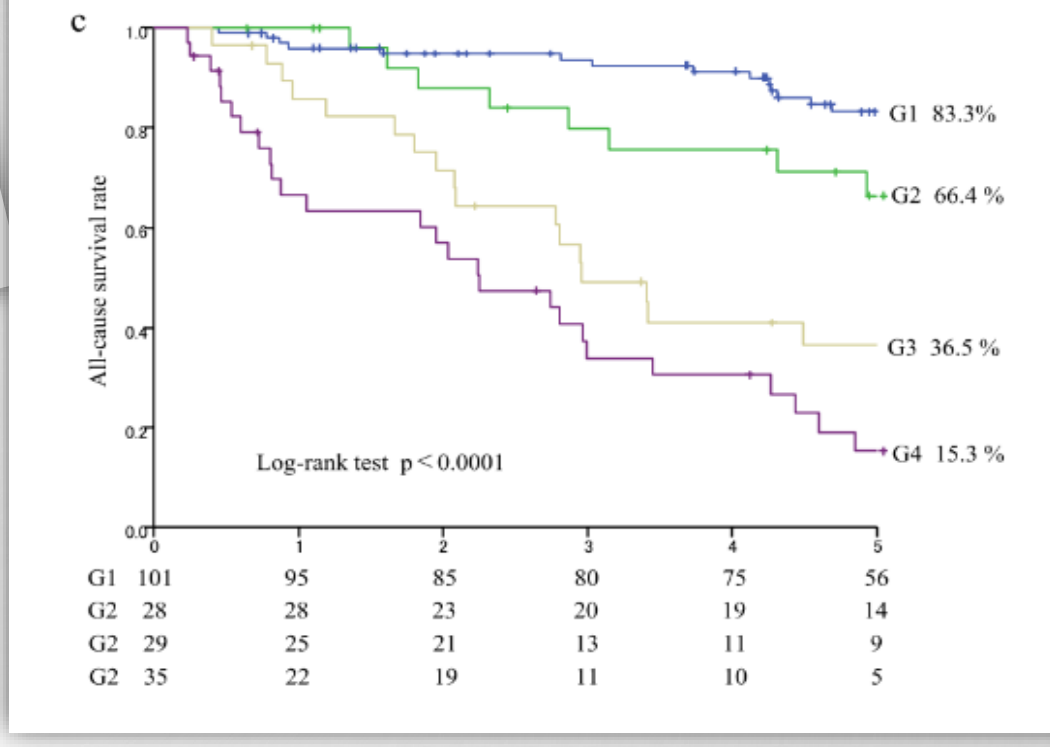
OUCI

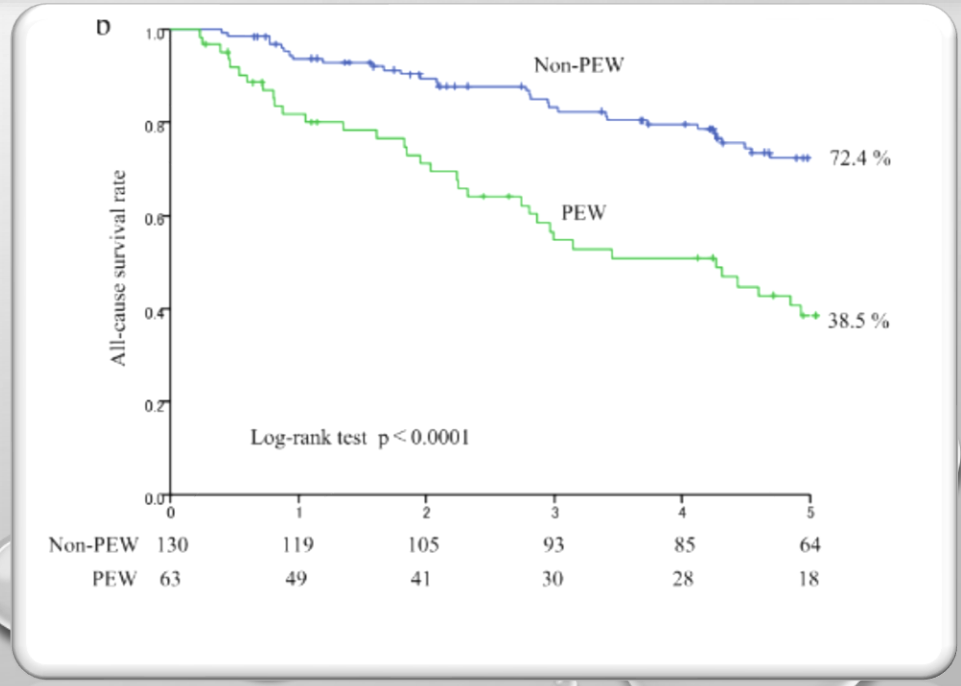
Association of extracellular water/total body water ratio with protein-energy wasting and mortality in patients on hemodialysis

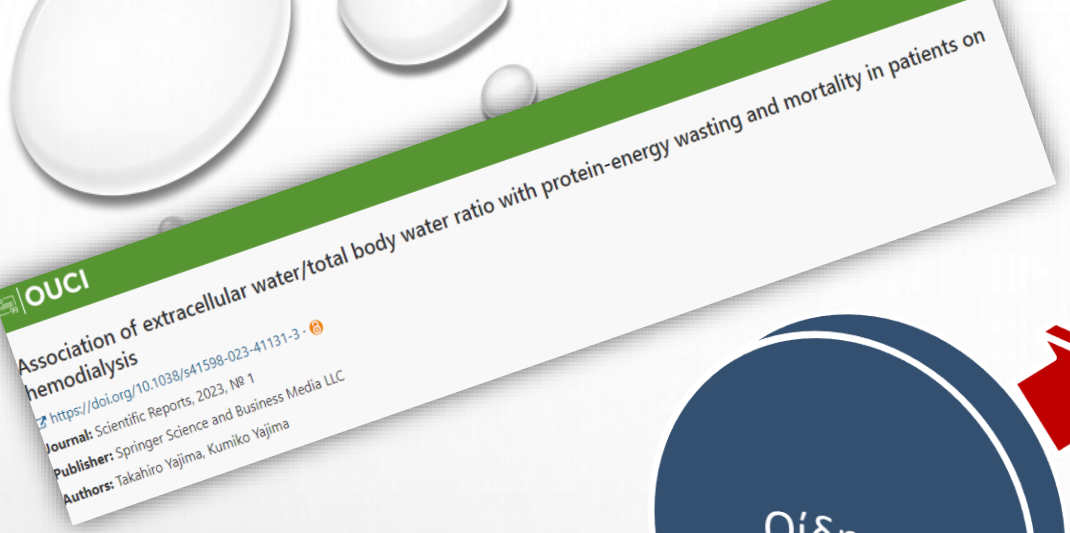
https://doi.org/10.1038/s41598-023-41131-3 ·
Journal: Scientific Reports, 2023, № 1
Publisher: Springer Science and Business Media LLC
Authors: Takahiro Yajima, Kumiko Yajima

Αναδρομική, 2023
~200 ασθενείς/ 5έτη









Υπερυδάτωση - οίδημα εντέρου

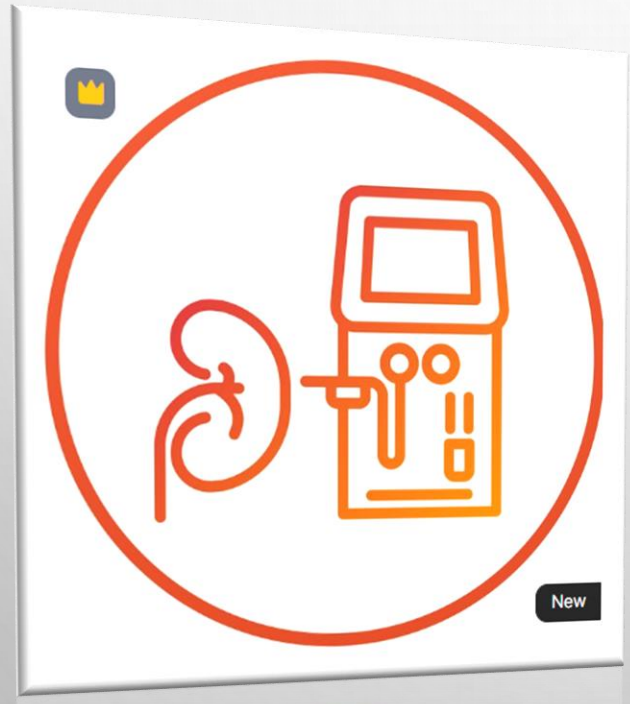
Ενδοτοξίνες-Φλεγμονώδεις κυτταροκίνες

Υπερκαταβολισμός

Υποαλβουμιναιμία (PEW)

Οίδημα

3ο παράδοξο:
HDF και απώλεια αλβουμίνης



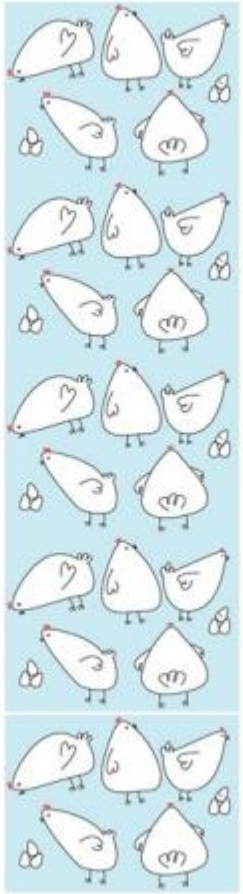
Dialysis efficiency and serum albumin levels: chicken or egg?
But how many chickens, how many eggs in HDF?

Nutritional advantages of high flux HDF :

High dialysis efficiency is correlated with improved nutritional status; improved nutritional status is correlated with better survival; HDF should correlate with improved nutritional status and better survival.

Patients with high comorbidity, including long dialysis vintage, should be treated with biocompatible membranes and efficient modalities.

HDF is a high efficiency, high tolerance dialysis modality, that should be used in fragile patients and in patients with long-term exposure to uremia.



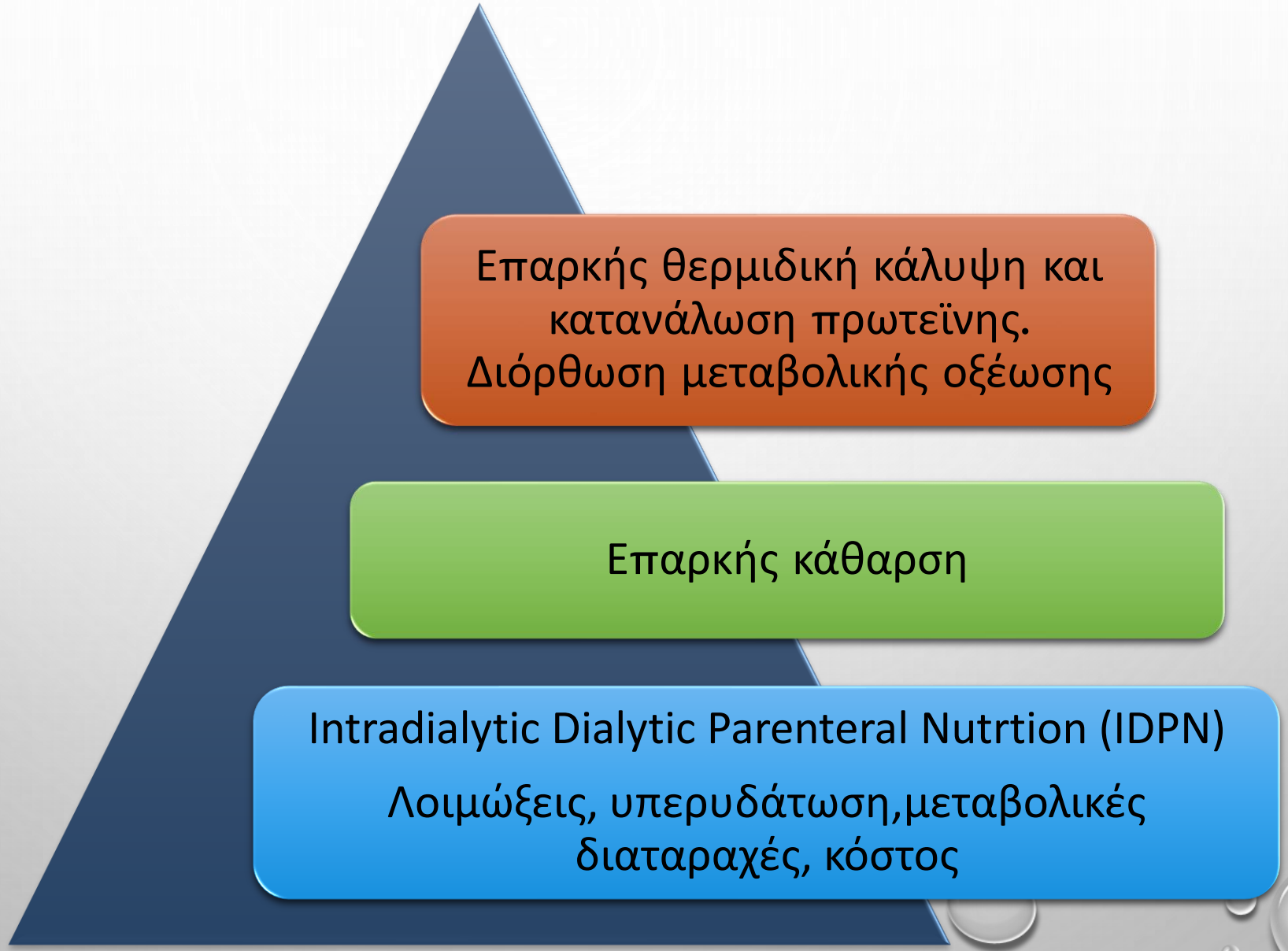
Nutritional disadvantages of high flux HDF :

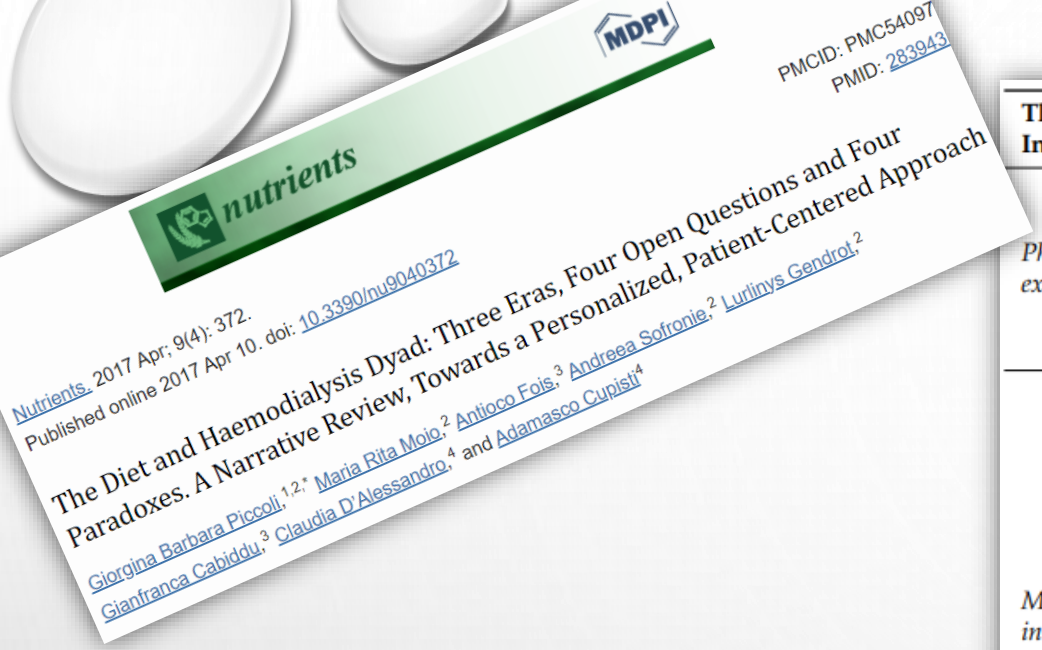
Albumin level is the most robust measure of nutritional status; Impaired nutritional status heralds poor survival; Albumin level decreases in HDF.

Patients with high comorbidity, including long dialysis vintage, are more prone to develop malnutrition and inflammation, with consequent reduction of albumin synthesis.

The albumin losses that are not compensated in fragile patients with chronic inflammation.

Αντιμετώπιση PEW





nutrients

PMCID: PMC5409705
PMID: 28394328

Nutrients. 2017 Apr; 9(4): 372.
Published online 2017 Apr 10. doi: 10.3390/nu9040372

The Diet and Haemodialysis Dyad: Three Eras, Four Open Questions and Four Paradoxes. A Narrative Review, Towards a Personalized, Patient-Centered Approach

Giorgina Barbara Piccoli,[1,2,*] Maria Rita Moio,[2] Antioco Fois,[3] Andreea Sofronie,[2] Lurlinys Gendrot,[2] Gianfranca Cabiddu,[3] Claudia D'Alessandro,[4] and Adamasco Cupisti[4]

The Field of Intervention	Intervention	Pros	Cons
Physical exercise	Physical exercise is theoretically a powerful means of improving clinical conditions and nutritional status in patients with a chronic disease [243–252]	The best results have been reported in observational studies; biases linked to self-selection limit the generalization of results.	Barriers are evident in the elderly population, in which inactivity is often the result of the same comprehensive physical failure that causes malnutrition
Metabolic interventions *	Anemia correction [253,254]	ESA improved quality of life, fertility and sex life, issues associated with nutritional status	The association between lack of response to ESAs, inflammation, malnutrition and atherosclerosis is part of the MIA syndrome
	Thyroid hormones [255]	The euthyroid sick syndrome or "low T3 syndrome" is typical of malnutrition/starvation	Correction of the metabolic deficit can worsen the clinical picture
	Androgen steroids [256–259]	Recently reconsidered therapeutic options include nandrolone decanoate and oxymetholone, which display good effects on sarcopenia	Side effects may be relevant; this treatment could be considered in males with testicular failure and severe sarcopenia
	Recombinant growth hormone [260–267]	Recombinant growth hormone is routinely used in children on dialysis. In adults, growth hormone is often low, and the effect on severe malnutrition has been favorable	High costs and side effects limit its use
Nutritional interventions	Increasing the quantity/quality of food [268–278]	The best tool for improving nutritional status, eating during dialysis may be an important way to improve the nutritional status of dialysis patients	If malnutrition is linked to inflammation and atherosclerosis, it is difficult to increase the quantity or quality of food
	Nutritional supplements (oral) [279–292]	Can be of use especially for limited periods of time; specific supplements for dialysis patients (poor in phosphate) are also available	Can decrease appetite for "normal" food; may be less tasty after a longer period
	Intravenous or enteral supplements [293–295]	Can help reverse acute malnutrition, especially in the case of failure of the two previous interventions	May further reduce food intake; and create a need for a high quantity of fluids; metabolic derangements are frequent in the long term

4ο παράδοξο: Παχυσαρκία και CKD

The paradox of being obese across CKD phases

Pre dialysis	Dialysis	Transplantation
Obese patients have an increased risk of CKD progression, which is at least partially reversed by weight loss.	Obese patients have a survival advantage, which may be at least partially offset by weight loss.	Obese patients may be excluded from kidney transplantation programs; the survival disadvantage may be partially reversed by weight loss.
Weight loss is advised, under strict control to avoid malnutrition; bariatric surgery is associated with improved clinical parameters, but is not devoid of side effects.	Weight loss may be required for being waitlisted for transplantation; strict control is needed to avoid malnutrition; bariatric surgery has high morbidity and conflicting results	Weight loss is usually required; strict control is needed to avoid malnutrition; bariatric surgery has high morbidity but overall favorable results

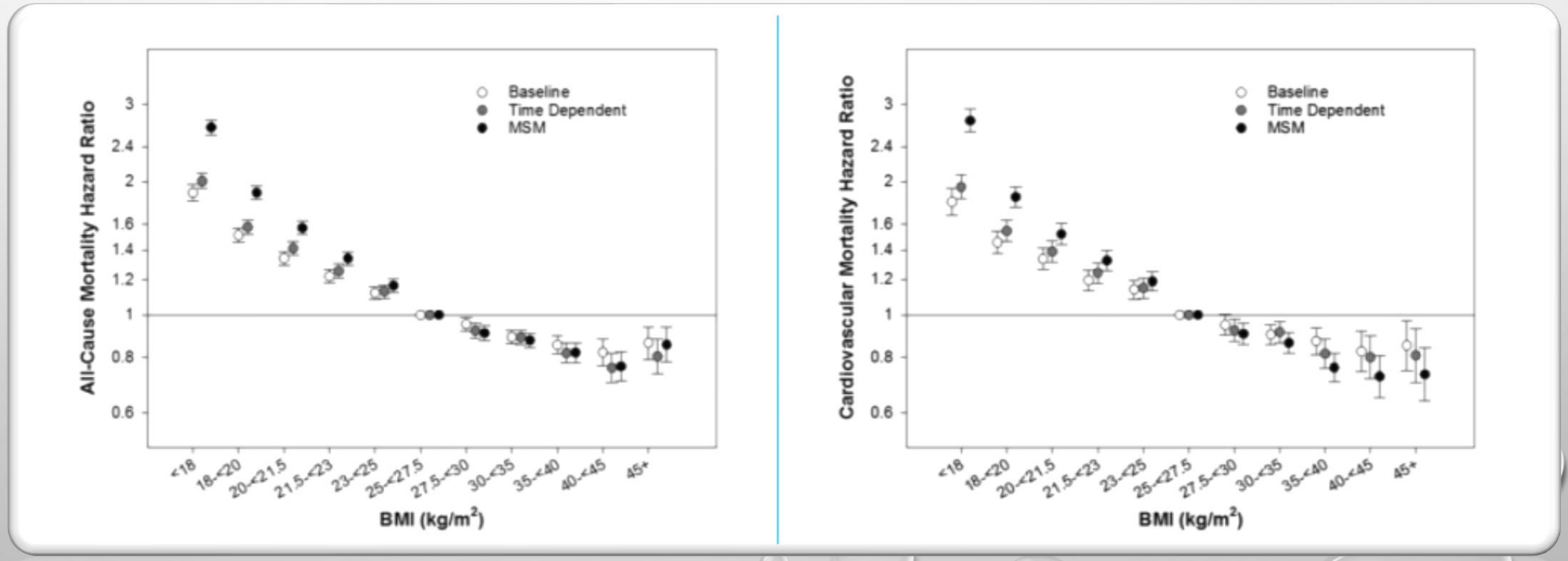
JOURNAL ARTICLE

Examining the robustness of the obesity paradox in maintenance hemodialysis patients: a marginal structural model analysis FREE

Megha Doshi ✉, Elani Streja, Connie M. Rhee, Jongha Park, Vanessa A. Ravel, Melissa Soohoo, Hamid Moradi, Wei Ling Lau, Rajnish Mehrotra, Sooraj Kuttykrishnan ...
Show more

Nephrology Dialysis Transplantation, Volume 31, Issue 8, August 2016, Pages 1310–1319,
https://doi.org/10.1093/ndt/gfv379
Published: 19 November 2015 **Article history** ▾

Αναδρομική, πολυκεντρική
2001-2006
123.624 ασθενείς

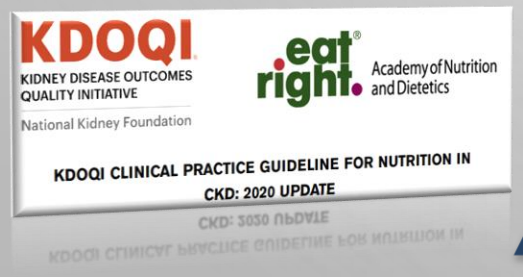


Συμπεράσματα

Η αιμοκάθαρση και η δίαιτα είναι άρρηκτα συνδεδεμένες προκειμένου να διατηρείται η μεταβολική ισορροπία των ασθενών.

Οι πρόσφατες κατευθυντήριες οδηγίες προτείνουν μία τάση απελευθέρωσης των διαιτητικών οδηγιών μας με σύγχρονη εκπαίδευση των ασθενών για αποφυγή συντηρημένων τροφίμων

Οι οδηγίες μας θα πρέπει να είναι απλές, εξατομικευμένες, με στόχο την επαρκή θερμιδική και πρωτεϊνική κάλυψη με σύγχρονη κινητοποίηση και κάλυψη τυχόν απωλειών σε υδατοδιαλυτές βιταμίνες και φυλλικό οξύ.



Diet Plan

You can eat 1/3 cup of pinto beans unless your phosphorus is high, then you should eat ½ cup of potatoes, unless your potassium is high, then you should eat lots of protein, unless your BUN or phosphorus is high, then you should drink clear broth unless your fluid weight gain is high, then you should eat hard candy unless your glucose is high…. Any questions?

Prioritize and simplify instructions!


ΕΛΛΗΝΙΚΗ ΝΕΦΡΟΛΟΓΙΚΗ ΕΤΑΙΡΕΙΑ
HELLENIC SOCIETY OF NEPHROLOGY
25ο Πανελλήνιο Συνέδριο
ΝΕΦΡΟΛΟΓΙΑΣ
WWW.25PSN.GR
ΜΕΓΑΡΟ ΔΙΕΘΝΕΣ ΣΥΝΕΔΡΙΑΚΟ ΚΕΝΤΡΟ
19-21 ΙΟΥΝΙΟΥ 2024
Α Θ Η Ν Α
ΟΡΓΑΝΩΣΗ-ΓΡΑΜΜΑΤΕΙΑ:
C.T.M.International S.A.
Βασ. Σοφίας 131, 151 21 Αθήνα
Τηλ.: 210 3244932 | Fax: 210 3250660
E-mail: info@25psn.gr