Clinical Nephrology Conferences

In-Center Thrice Weekly Hemodialysis Treatment:
Endangered Species or Scapegoat?

In-Center Meals During Dialysis

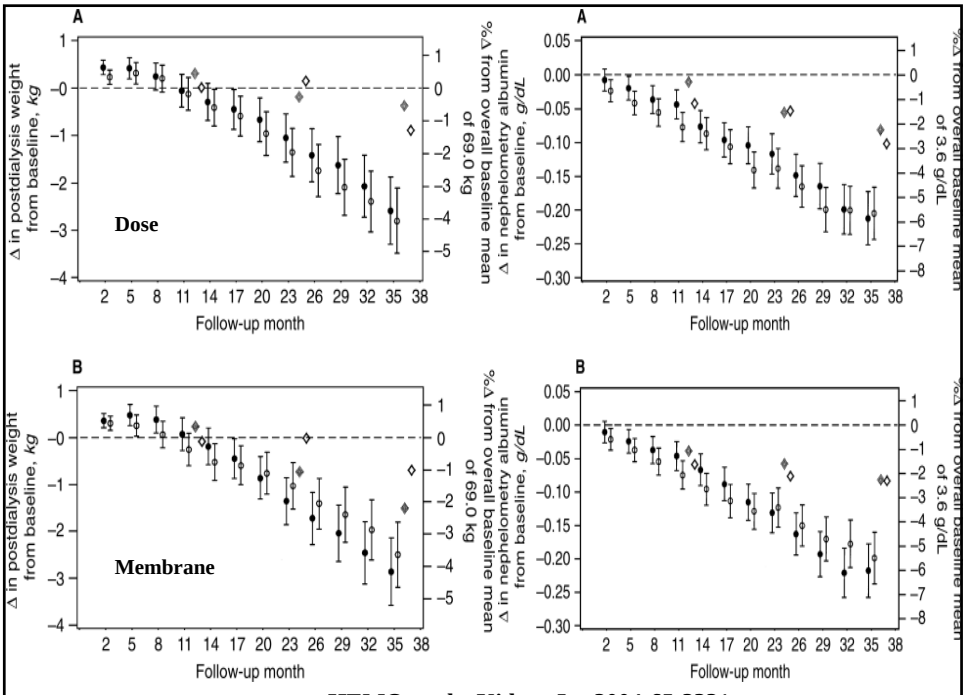
Charles Chazot, MD, Anne-Lise Bernollin, RD,
Patrik Deleaval, MD, Guillaume Jean, MD,

NephroCare Tassin, France

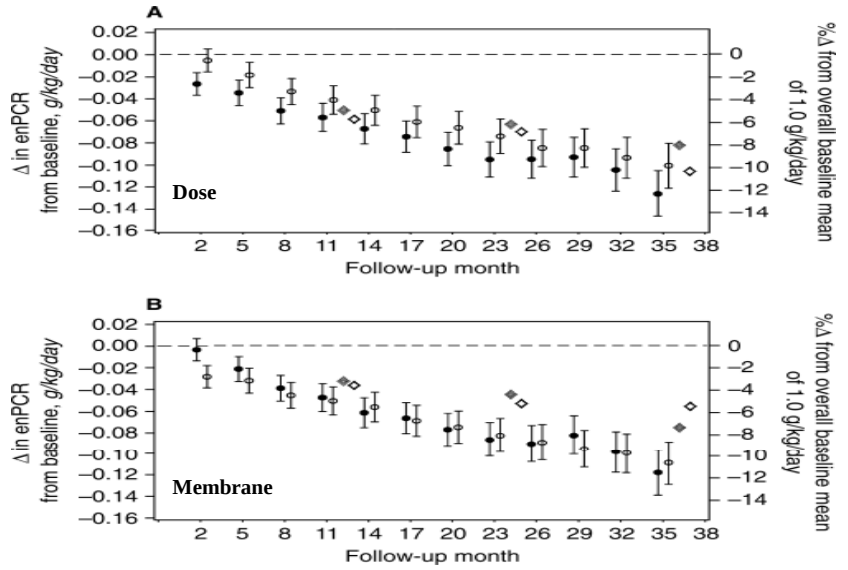
Renal week, Denver, November 14th -21st 2010

- Focus on nutrition: a topic under the spotlight
- Tassin: 40-years experience with intradialytic meals provision
- Time for scientific evidences
- The educational value of low salt diet

The HEMO study or what does standard dialysis do to nutrition

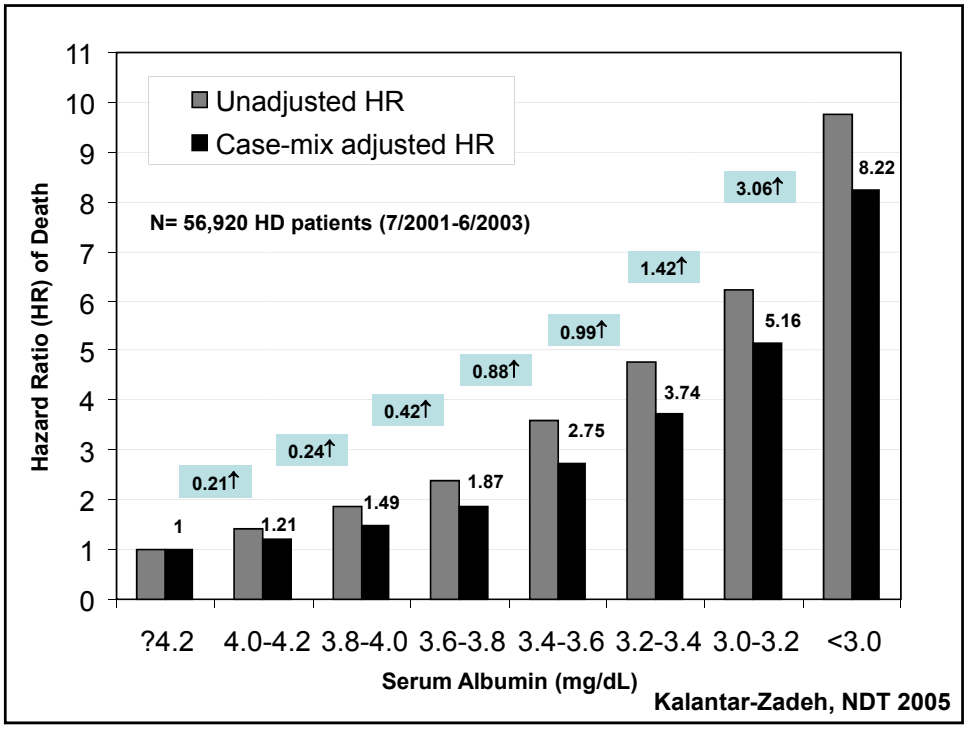


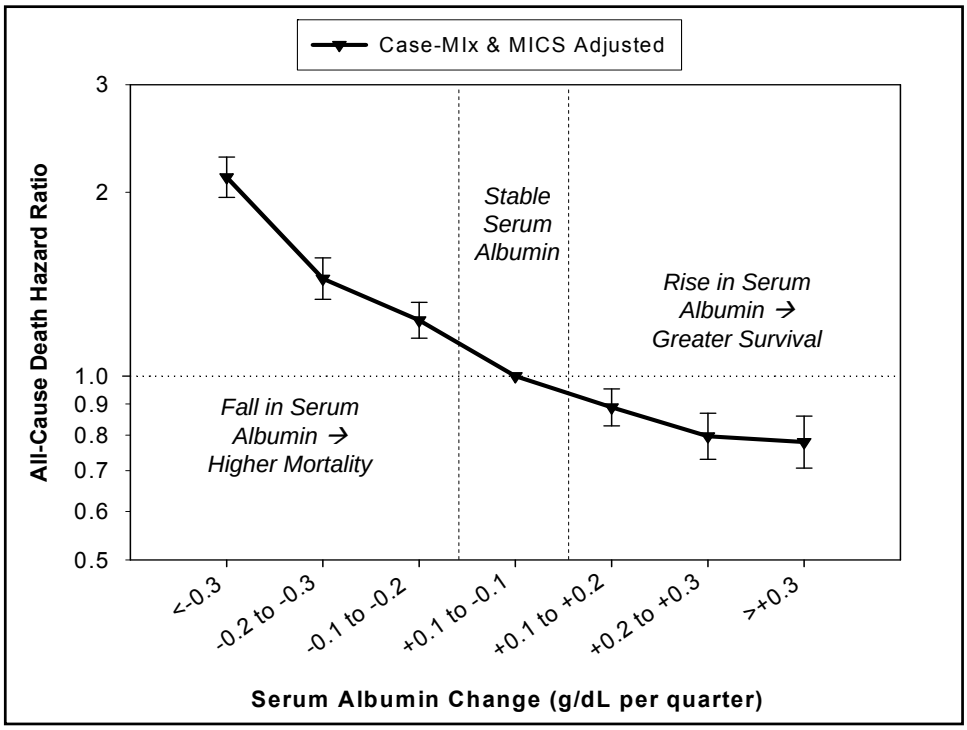
HEMO study, Kidney Int 2004;65:2321



HEMO study, Kidney Int 2004;65:2321

Serum albumin, a major predictor of dialysis patients mortality risk


Unadjusted HR
Case-mix adjusted HR
N= 56,920 HD patients (7/2001-6/2003)
Hazard Ratio (HR) of Death
11
10
9
8
7
6
5
4
3
2
1
0
1
1.21
1.49
1.87
2.75
3.74
5.16
8.22
0.21↑
0.24↑
0.42↑
0.88↑
0.99↑
1.42↑
3.06↑
?4.2
4.0-4.2
3.8-4.0
3.6-3.8
3.4-3.6
3.2-3.4
3.0-3.2
<3.0
Serum Albumin (mg/dL)
Kalantar-Zadeh, NDT 2005


Case-MIx & MICS Adjusted
All-Cause Death Hazard Ratio
3
2
1.0
0.9
0.8
0.7
0.6
0.5
Stable Serum Albumin
Rise in Serum Albumin → Greater Survival
Fall in Serum Albumin → Higher Mortality
<-0.3
-0.2 to -0.3
-0.1 to -0.2
+0.1 to -0.1
+0.1 to +0.2
+0.2 to +0.3
>+0.3
Serum Albumin Change (g/dL per quarter)

Hypothesis

All interventions expected to influence the nutritional status and its surrogate, serum albumin, can be supposed to improve patient outcomes

Providing meals during the dialysis session might be one of those interventions

- Focus on nutrition: a topic under the spotlight
- Tassin: 40-years experience with intradialytic meals provision
- Time for scientific evidences
- The educational value of low salt diet

Tassin background 1969-1998 (1)

- Tassin dialysis unit founded by Guy Laurent, MD, in 1969
- For-profit unit
- Long-hour dialysis experience for all patients until mid-nineties: 3x8 hours per week: the session is like a transatlantic flight
- Up to 200 in-center dialysis patients

Tassin background 1969-1998 (2)

- Own kitchen and own chef for 150 meals per day (including the staff)
- Progressive introduction of meals in incident dialysis patients to avoid side-effects
- Low-salt food (including bread)

Tassin background 1998-2010

- Purchased by Fresenius Medical Care in 1998
- Food service outsourced to a catering company since 2002 (meal preparation+meal service)
- The catering Cie has approved and follows specifications:
  - ✓ **Low-salt diet and avoidance of higk-K content foods**
  - ✓ **Always a protein course even at dinner**
  - ✓ **Side-order choice always includes carbo-hydrates**
  - ✓ **8-weeks menu turn-over**

Intradialytic feeding in 2010 (1)

Hemodialysis 5-8 hours x 3/week: 120 patients with a full meal served to the patient during the session:
First course
Main course
Dairy product
Dessert
Salt-free bread
One/two glass beverage (water or wine)

Intradialytic feeding in 2010 (2)

- Cooking perfomed in the kitchen's facility opened from 7:00 am to 8:00 pm with 8 employees (catering company)
- Trays are prepared in the kitchen and served in liaison chaude
- Average meal time is 40 minutes
- Meal service including cleaning done by the caregivers since 2008
- After 7:00 pm patients on nocturnal shift eat in the dining room before treatment

Nutritional value of the meal provided during the session

Average content per serving:
Energy : 842.5 Kcal
Proteins: 39.7 g
Potassium: 1333.8 mg
Phosphorus: 530.8 mg
Sodium: 542.6 mg ↔ 1.4 g of salt

Intradialytic meal survey

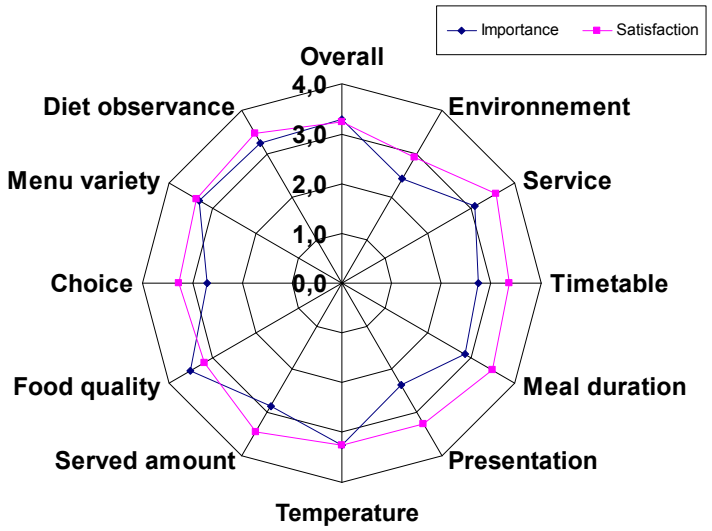
In May 2010: 100 HD patients were receiving a full meal during dialysis.

69 patients answered the survey

Appetite: Good or very good in 59% - So-so in 27% - Bad or very bad in 14%

82% of the patients enjoy the lunch or dinner during the session

18% do not enjoy the meal because of the environnement – because they feel seek – because of discomfort



4 = +++
3 = ++
2 = +
1 = -

Synthesis #1

- The great majority of the patients enjoy the meal
- Session timing covers the meal time (session time from 5 to 8 hours)
- It is progressively introduced in new patients to test the tolerance
- Very few patients eat after the session because of intolerance (less than 5%)
- A good way for patient appetite checking

Pitfalls

- Cost: 9 €/treatment
- Increased workload for the staff
- Hygiene burden
- May favor intradialytic side effects: BP drop, vomiting
- Time constraint in short treatment
- Inadequate timing of session schedule needing menu adaptation
- No scientific analysis of the nutritional benefit

Intradialytic feeding in 2010 (3)

Hemodiafiltration 4hours x 3/week since June 2009 for 80 patients

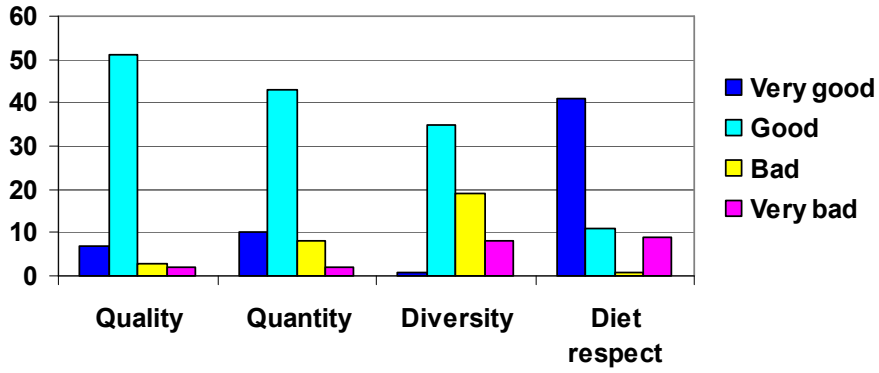
- Time constraint and no possibility for the staff to serve a meal
- Session schedule does not cover meal time: why should I eat lunch at 10:00 am or diner at 4:00 pm? Not a french habit…
- Switch from a real meal to snack

Nutritional value of the snack provided during the session

Average content per serving compared with the regular meal
Energy : 460-580 Kcal vs 842.5 Kcal
Proteins: 5-15g vs 39.7 g
Potassium: 430-575 mg vs 1333.8 mg
Phosphorus: 114-266 mg vs 530.8 mg
Salt: 0.15-1.3 g vs 1.4 g of salt

Intradialytic snack survey (May 2010)

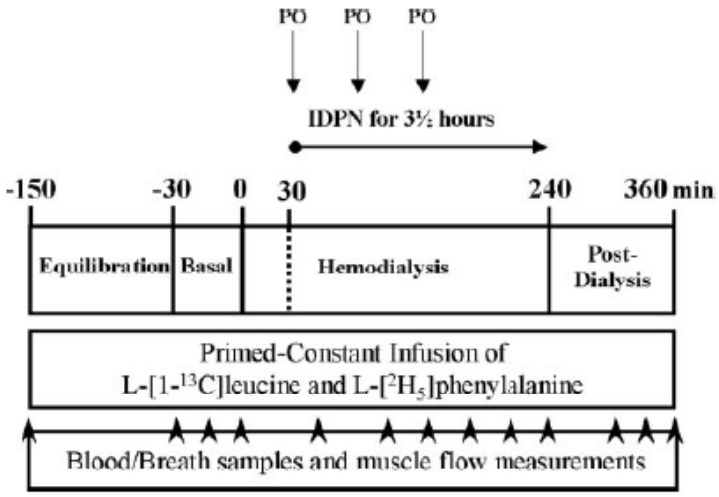
- 87 patients were proposed the intradialytic snack. 9 patients refused it because not hungry at the moment of the service
- 63 have answered the survey



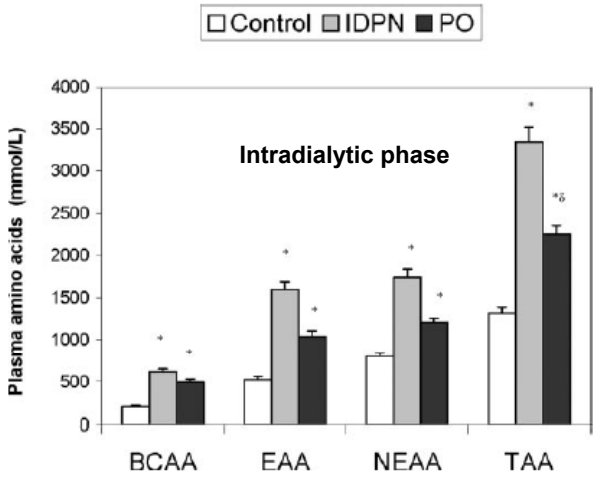
- Focus on nutrition: a topic under the spotlight
- Tassin: 40-years experience with intradialytic meals provision
- Time for scientific evidences
- The educational value of low salt diet

The nutritional impact of oral intradialytic feeding

Pupim et al, JASN 2006 (1)

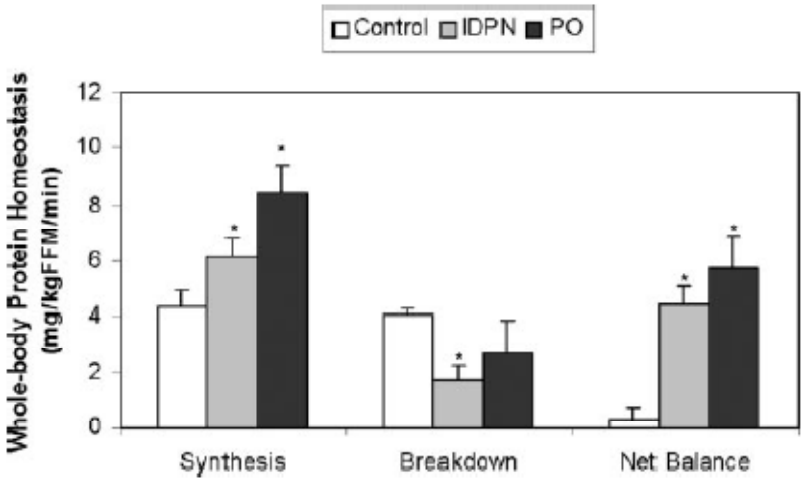


Pupim et al, JASN 2006 (2)

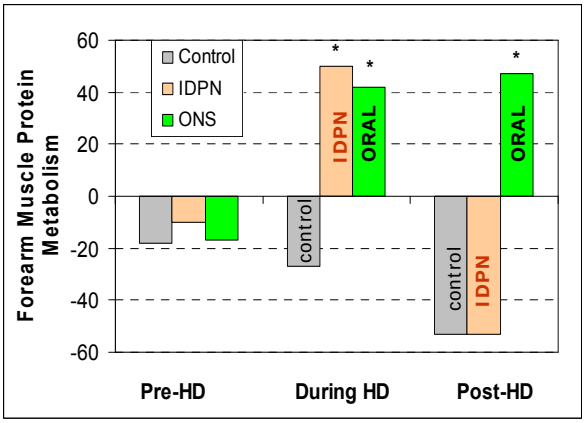


Post-dialysis phase: plasma [AA] significantly higher in PO group

Pupim et al, JASN 2006 (3)



Anabolic effect of Oral vs. Parenteral Nutrition in Dialysis Patients



IDPN: intra-dialytic parenteral nutrition

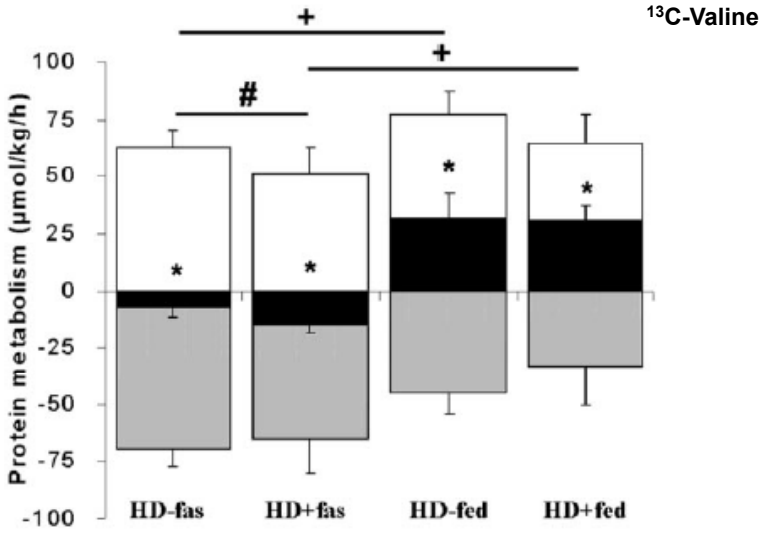
Oral: one can of Nepro during HD

Adapted from Pupim et al, JASN 2006

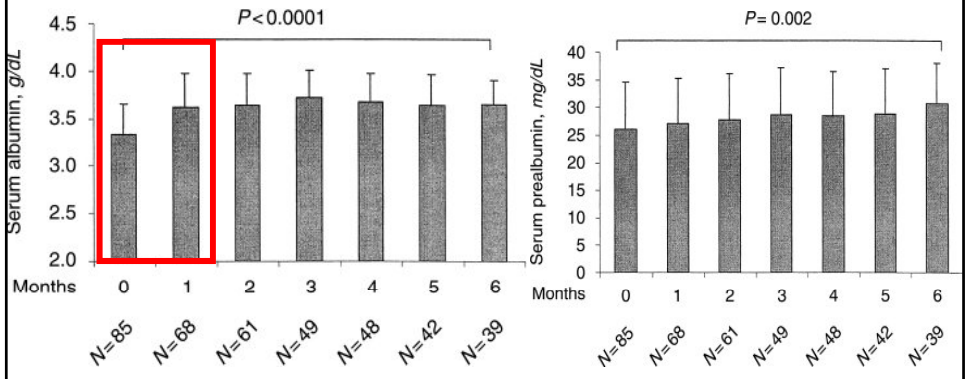
Figure is from Kalantar-Zadeh/Cano et al, Nature Nephrology 2010/1011 [in press]

Veenemann Am J Physiol Endoc Metab 2003

^{13}C-Valine



6-month non controlled trial in 85 malnourished HD patients
Disease-specific supplement 475 Kcal & 16.6 g of proteins



Caglar KI 2002;62:1054

Non randomized controlled study in 41 HD patients with albuminemia < 38g/L
Antioxydant & anti-inflammatory specific oral supplement,
830 Kcal + 33,5 g of protein at each dialysis for 4 weeks

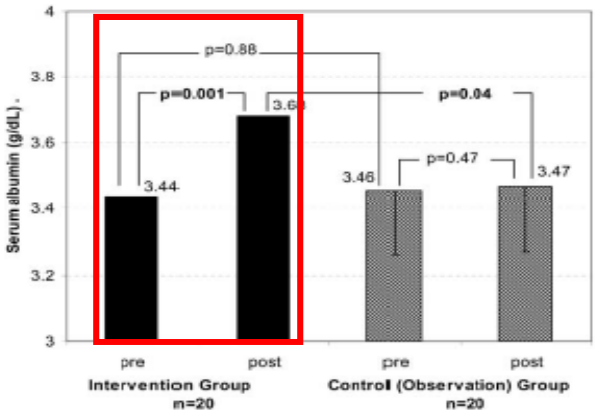


Figure 1. Serum albumin changes in both groups of hypoalbuminemic MHD patients.

Kalantar-Zadeh JRN 2005

The hemodynamic consequences of oral intradialytic feeding

Small brief from litterature

Mathias, Hypertension 1991
O'Donovan, J Physiol 1995

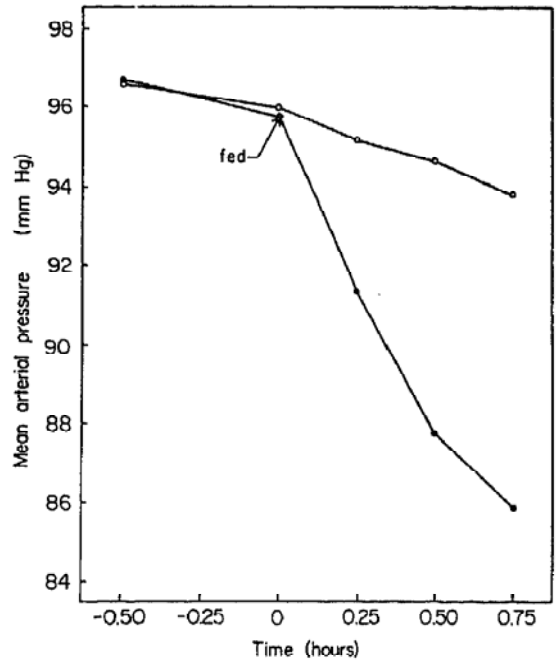
Carbo-hydrates have the main hemodynamic effect during food ingestion.

Carbs type impacts the hemodynamic effect

Fat and proteins, fructose and xylose: no significant effect

The higher the speed delivery of glucose to the duodenum, the higher the reduction of BP

Elderly and diabetic patients at risk



Sherman, AJKD 1988

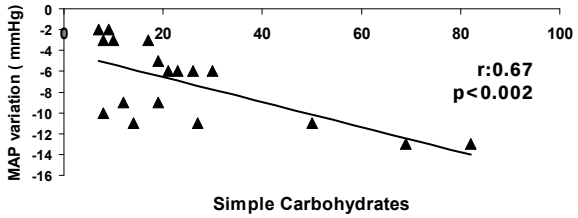
9 non-diabetic patients

Cross-over study

62 sessions with or without feeding

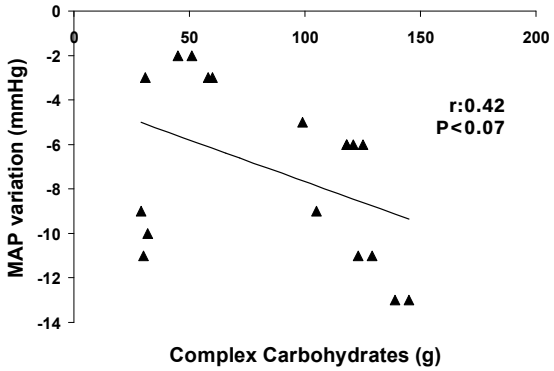
Symptomatic hypoTA: 21 vs 3%

Benziane A. courtesy

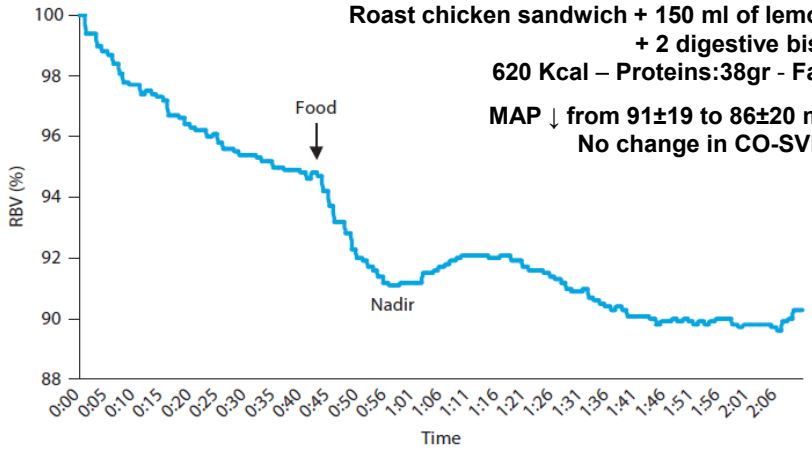


18 patients

Fed with 2 different amount of Carbs (164 vs 53 g)



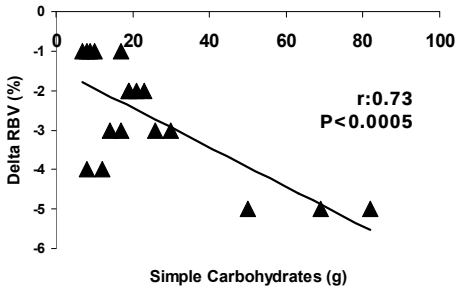
Sivalingam, Blood Purif 2008



Roast chicken sandwich + 150 ml of lemonade
+ 2 digestive biscuits
620 Kcal – Proteins:38gr - Fat:31g

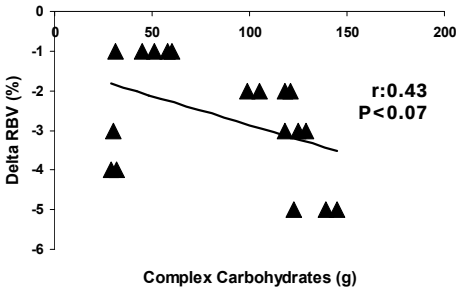
MAP ↓ from 91±19 to 86±20 mmHg
No change in CO-SVR- HR

Benziane A. courtesy



18 patients in 2 groups

Fed with 2 different amount of Carbs (164 vs 53 g)



- Focus on nutrition: a topic under the spotlight
- Tassin: 40-years experience with intradialytic meals provision
- Time for scientific evidences
- The educational value of low salt diet

Importance of low salt food

Taste education

Educational value of intradialytic meals

Low salt diet and interdialytic weight gain

3x4 hours/week in prevalent patients
Strict UF policy, low salt diet, extra UF sessions
36 months of follow-up

	Start	6	12	24	36	>36
n Patients	**67**	**67**	**60**	**43**	**22**	**19**
BW (kg)	**64.5±13**	**63.5±14**	**65.0±11**	**67±9**	**66±12**	**67±13**
IDWG (kg)	**2.9±1.3**	**1.7±0.9**	**1.8±1.0**	**1.8±1.1**	**1.9±1.2**	**1.8±1.2**
CTI (%)	**52±4**	**47±3**	**45±3**	**43±3**	**42±4**	**42±5**
Syst BP (mmHg)	**173±17**	**139±16**	**131±17**	**122±11**	**118±12**	**114±10**
Dia BP (mmHg)	**102±9**	**86±11**	**81±9**	**76±6**	**73±6**	**71±7**

Ozkahya, Am J Kid Dis 1999,34:218-221

Interventional studies on salt restriction

TABLE 1. Interventional studies of salt restriction in dialysis patients

Reference	Year	Patients and method	Daily salt prescription (g/j)	Follow-up	Control group (yes/no)	Salt intake assessment (yes/no)	Dialysate Na^+ decrease	DW decrease	↓IDWG (yes/no)	↓BP (yes/no)	↓Anti-HTN drugs (yes/no)
Krautzig (35)	1998	8 HD	6 g	Unknown	No	No	Yes 140 → 135	No	Yes[a]	Yes	Yes
Ang (36)	1999	5 HD	6–8 g	??	No	No	Yes 142 → 135	No	NA	Yes	NA
Ozakhya (31)	1999	67 HD	6 g	36 months	No	No	NA	Yes	Yes	Yes	Yes
Rigby-Mattews (22)	2000	28 HD	1 g	44 hours	Yes[b]	No	No	No	Yes	NA	NA
Machuel (21)	2000	15 HD	7 g	2 weeks	Yes[a]	Yes[c]	No	No	Yes	Yes	NA
Gunal (19)	2001	47 DP	6 g	4 weeks	No	No	No	No	NA	Yes[d]	Yes
Al-Hilali (37)	2006	105 HD	NA	??	No	No	No	Yes	NA	Yes	NA
Kayikcioglu (20)	2009	394 HD	5 g	Cross-sectional	No	No	No	Yes	Yes	Yes	Yes

NA, no available; BP, blood pressure; IDWG, interdialytic weight gain; HTN, hypertension.
[a]In 50% of the patients; [b]cross-over study; [c]sodium mass transfer; [d]in 20/47 patients.

Chazot, Sem Dial 2009

Effect of salt restriction
Retrospective cross-sectional study

	Centre A Salt restriction strict UF policy	Centre B Standard Loose DW policy
n	**190**	**204**
HTN history (%)	**78**	**83**
Anti-HTN drugs	**7%**	**42%****
IDWG	**2.29 kilos**	**3.31 kilos****
Predial BP	**126/75**	**126/75**
% SBP>140	**18%**	**37%***
BP drops	**11%**	**27%***
LV hypertrophy	**74%**	**88%***

What conclusions about feeding the patients during the dialysis session?

- Nutritional impact of the meal during the session: never evaluated
- However evidence that oral feeding counteracts the catabolic consequences of dialysis
- A good way to spot the patients with low appetite and reinforce counselling
- A good way to distract the patient
- Few important side-effects. Progressive introduction to test idiosyncratic reaction
- Food type remains to be defined. Avoid simple carbs
- Good educational value, especially for low-salt diet

Special thanks to Abdelkader Benziane, MD*, for allowing the use of his hemodynamic and RBV data according to carbs type ingestion

***: Service de Néphrologie, Centre Hospitalier d'Arras, France**