



Background

- In advanced chronic kidney disease (CKD), obesity is paradoxically linked with greater survival.
- The potential mechanisms underlying the “obesity paradox” in kidney disease are still not well known.
- Omega 3 intake has been linked to many beneficial impacts in cardiovascular (CV) health, affecting lipid profile, insulin resistance, platelet aggregation, etc.
- Therefore, we postulate that patients (pts) who consume large amounts of fish may have more favorable CV status in hemodialysis (HD).

Objectives

Our aim is to identify the underlying factors behind the obesity paradox in HD patients.

Materials and Methods

- Prospective cohort study in 155 prevalent Portuguese HD patients.
- We obtained baseline demographic data, blood biochemistry and comorbidities.
- In order to evaluate omega 3 incorporation in red blood cell (RBC) membranes:
 - 10 ml of total blood is centrifuged at 3000 rpm for 5 minutes;
 - the supernatant is then collected to an Eppendorf tube and the "buffy coat" is discarded;
 - the pellet is washed with 3 mL of 0.9% sodium chloride and recentrifuged;
 - the supernatant is discarded and the pellet of RBCs is frozen at -80°C until it can be lyophilized and extracted
- The percentage of eicosapentaenoic (EPA) and docosahexaenoic (DHA) - omega 3 fatty acids is then measured by high-performance liquid chromatography (HPLC).

Results

Demographic / Clinical characteristics	
Male	79 pts
Mean age (years)	67 ± 9.6
Diabetes	39%
Average time on HD (months)	73 ± 27.5
Body mass index (BMI) (kg/m²)	26 ± 4.6
Follow up period time	21 months
Cardiovascular events	71
Hospitalizations	52

Table 1: Demographic / Clinical characteristics

Univariate analysis	Pearson correlation
BMI (body mass index) was associated with RBC omega 3 incorporation	p=0.045
Higher BMI was associated with a lower number of CV (cardiovascular) events	p=0.038
Higher BMI was associated with lower hospitalization time	p=0.04

Table 2: Univariate analysis



Multivariate analysis: omega3 (EPA+DHA) RBC incorporation	Exp (B)	IC (95%)	p
BMI (body mass index)	0.078	0.013-0.142	0.019

Table 3: Multivariate analysis (I)

In a multivariate analysis (linear regression), a higher EPA+DHA RBC incorporation was associated with a higher BMI, in a model adjusted to time on dialysis and age.

Multivariate analysis: Hospitalization time	Exp (B)	IC (95%)	p
EPA+DHA RBC incorporation	-5.7	-10.52-(-0.91)	0.023

Table 4: Multivariate analysis (II)

Larger hospitalization time was correlated with lower EPA+DHA RBC incorporation (linear regression), in a model adjusted to diabetes and age.

Multivariate analysis: Cardiovascular event	Exp (B)	IC (95%)	p
EPA+DHA RBC incorporation	-1.56	0.04-0.98	0.05

Table 5: Multivariate analysis (III)

In a binary regression, cardiovascular event was associated with EPA+DHA RBC incorporation.

Summary

- Obesity has been linked to better outcomes in HD patients. Also omega 3 intake has been associated with many beneficial effects.
- In order to evaluate omega 3 incorporation in red blood cell (RBC) membranes, we used frozen RBC for FAME (fatty acid methyl esters) preparation and obtained the sum of the percentage of eicosapentaenoic (EPA) and docosahexaenoic (DHA) in total FAME.
- We studied 155 prevalent Portuguese HD patients: 39% diabetic, average BMI 26 ± 4.6 kg/m²
- In our cohort, higher BMI was associated with higher EPA+DHA RBC incorporation. Higher RBC omega 3 incorporation presented better CV outcomes (CV events and lower hospitalization time).
- Higher omega 3 in HD patients may produce a slight attenuation in systemic inflammation.

Conclusion

- There appears to be a consistent association between obesity and higher omega 3 incorporation with better clinical outcomes in our cohort of HD patients.
- This fact may suggest a possible explanation for the reverse obesity epidemiology in advanced CKD.