# Relationship between body mass change and survival of patients on maintenance hemodialysis program

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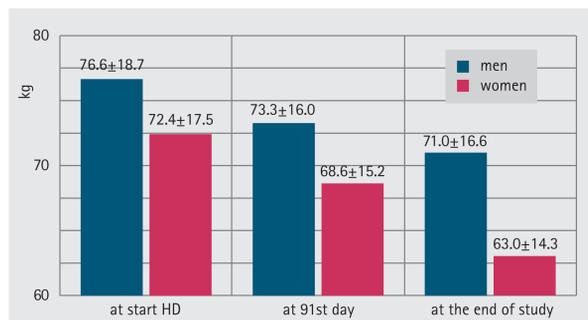**B. Braun Avitum Hungary Dialysis Network, Szombathely[2]**

## Introduction

The appearance of observations in favour of (reverse epidemiology) and against the higher survival rate of overweight dialysis patients has long been an exciting issue in nephrology. Many observational retrospective studies has been proved that patients on chronic dialysis program with higher body mass index had a better survival, although there were also observations that could at prove this in general.

## Aim of study

to analyse the correlation between body mass (body weight, BW) and survival as well as between BW change and survival.
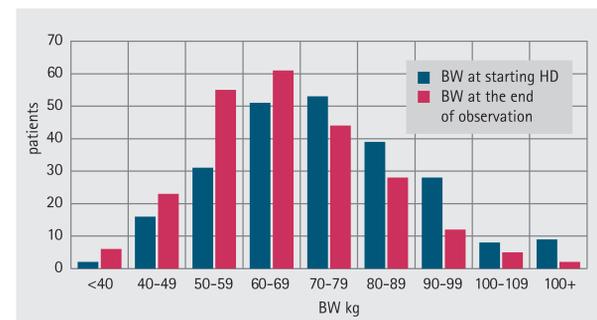
## Patients

238 pts treated in chronic hemodialysis (HD) program, who were on chronic HD treatment on 1st Jan 2005 and who entered into this program in 2005:

- end of observation: 31 Dec 2010
- mean age: 63,5 (21–89) years
- gender distribution: woman 129 (54%), men 109 (46%)
- mean follow-up period: 5,5±3,2 (0,7-17,7) years

## Methods

- retrospective observation
- according to the change in BW we created 2x3 patient-groups:
  1. BW loss ≥5kg or ≥5% BW/year
  2. BW loss = 2–4,9kg or 2–4,9% BW/year
  3. BW loss < 2kg or < 2% BW/year, or unchanged, or increased
- survival analyses models: Cox-regression, Kaplan-Meier analysis, log-rank method/end-point analysis

## Results

*Mean body weight at starting HD, at the 91st day and at the end of observation (or at drop-out) in men and women*



*Distribution of BW at starting hemodialysis and at the end of observation*



*Relationship between risk of mortality and BW at starting hemodialysis and at the end of observation univariate Cox-regression*

| | Hazard Ratio | 95% CI | Significance |
|---|---|---|---|
| **total patients** | | | |
| - BW at starting HD | 1.002 | 0.994-1.011 | p=0.546 NS |
| - BW at the end of observation | 1.001 | 0.991-1.011 | p=0.866 NS |
| **men** | | | |
| - BW at starting HD | 1.008 | 0.997-1.018 | p=0.157 NS |
| - BW at the end of observation | 1.002 | 0.988-1.015 | p=0.831 NS |
| **women** | | | |
| - BW at starting HD | 0.997 | 0.984-1.011 | p=0.680 NS |
| - BW at the end of observation | 0.977 | 0.980-1.014 | p=0.730 NS |

*Change in mean BW between at starting HD and at study end by gender*

| | Men | Women |
|---|---|---|
| BW change in kg | –5.5 | –9.4 (!) |
| change in BW % | –6.4% | –11.6% (!) |
| change in BW (kg/year) | –1.6 | –2.3 |
| change in BW % (%/year) | –1.9% | –3.0% |

*Change on mean BW between at starting HD and at study end by gender and age*

| | Men | | Women | |
|---|---|---|---|---|
| | < 65 years | ≥ 65 years | < 65 years | ≥ 65 years |
| BW change in kg | –3.9 | –7.3 | –6.7 | –11.3 |
| change in BW % | –3.9% | –9.0% | –8.0% | –14.2% |
| change in BW (kg/year) | –0.95 | –2.3 | –1.5 | –2.91 |
| change in BW % (%/year) | –1.03% | –2.87% | –1.79% | –3.78% |

*BW at starting HD and mortality rate (%) end-point analysis*

| BW | All pts | | Men | | Women | |
|---|---|---|---|---|---|---|
| | n | mortality rate % | n | mortality rate % | n | mortality rate % |
| < 50 kg | 18 | 55.6 | 13 | 53.8 | 5 | 60.0 |
| 50–69 kg | 83 | 49.4 | 50 | 52.0 | 33 | 45.5 |
| 70–89 kg | 92 | 58.7 | 40 | 60.0 | 52 | 57.7 |
| 90+ kg | 45 | 53.3 | 26 | 42.3 | 19 | 68.4 |
| total | 238 | 54.2 | 129 | 52.7 | 109 | 56.0 |

*Change of BW (kg) and survival (Kaplan-Meier analysis, n=238)*

| BW change/year (kg) | Survival (months) | | | |
|---|---|---|---|---|
| | mean | 95% CI | median | 95% CI |
| 1. 5 or more kg/year loss of BW | 38.7 | 27.5-50.0 | 30.2 | 16.0-44.5 |
| 2. 2.0-4.9 kg/year loss of BW | 67.1 | 56.7-77.4 | 61.8 | 48.6-74.9 |
| 3. <2.0 kg/year loss of BW or unchanged BW or putting on BW | 115.1 | 101.8-128.6 | 94.4 | 77.2-115.5 |

*Change of body weight (kg) and mortality rate end-point analysis*

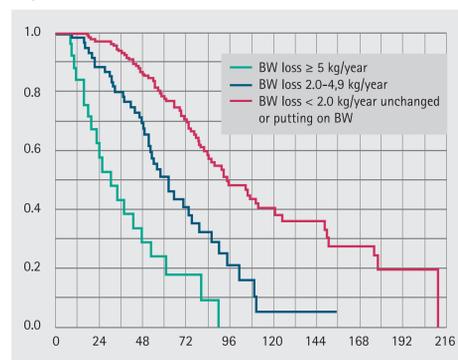| BW change/year (kg) | N | Died | Mortality rate (%) |
|---|---|---|---|
| 1. 5 or more kg/year loss of BW | 26 | 20 | 76.9 |
| 2. 2.0-4.9 kg/year loss of BW | 61 | 40 | 65.6 |
| 3. <2.0 kg/year loss of BW or unchanged BW or putting on BW | 151 | 69 | 45.7 |
| total | 238 | 129 | 54.2 |

## Conclusions

1. In this observational period our patients' body weight loss was higher in older than younger group, and was higher in women than in men.
2. We did not find any significant correlation between BW measured at the commencement of HD and survival, and similarly between BW measured at the end of observation and survival. It is possible, that this correlation would be significant in a larger population.
3. The analyses clearly showed that the best survival rate occurred in that groups, where the weight loss per year was the lowest.

## Discussion

Although these observations were made on a low number of patients, the follow-up period was rather long. The notable malnutrition (protein-energy wasting) plays a very important role in survival of chronic HD patients, probably independently from the BW measured at the beginning of dialysis. We hope that our observations will help resolve the still existing controversies of the issue studied.

*Change of body weight (kg)/year and survival Kaplan-Meier curve  n=238*



*Change of body weight (kg)/year and survival Kaplan-Meier curve  n=238*