

# Cardioprotection of haemodiafiltration – myth or truth?

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## Introduction

Haemodiafiltration (HDF) and haemodialysis (HD) use different processes to remove waste products: diffusion (HD) and diffusion and convection (HDF). In this way HDF removes middle-sized uremic solutes which conventional HD does not. By using ultra-pure substitution fluid HDF stabilizes the patients circulation status during dialysis sessions better than HD. HDF is associated with multiple clinical advantages: lower mortality risk, anti-inflammatory effect, correction of malnutrition, blood pressure control, hemodynamic stability, better control of anemia and hyperphosphatemia. Our primary goal was to evaluate the influence of the dialysis modality on the values of cardiac biomarkers – high-sensitivity troponin I (hs-cTnI) and N-terminal pro B-type natriuretic peptide (NT-proBNP).

## Methods

Data of 68 patients (25 females, 43 males) undergoing chronic HD/HDF programme at Dubrava University Hospital were collected after acquiring informed consent. Troponin levels were measured multiple times during the period of one week, using Beckman Coulter High-Sensitivity Troponin I assay – before every HD session, after the first session that week and the day after the first session, what resulted with 3 to 5 values per patient depending on the dialysis regiment. NT-proBNP levels were measured before and after the first HD session of the week using Abbott Alinity assay.

### Upper reference limit (URL)

hs-cTnI	<14.9ng/L (♀), <19.8ng/L (♂)
NT-proBNP	< 450 pg/ml

## Results

There were 43 patients (63%) in the HD group (25 males and 18 females) and 25 patients (37%) in the HDF group (18 males and 7 females). In the HD group the mean basal value of hs-cTnI (before the first dialysis session) was 30.59 ng/L (range 6.7-199.70 ng/L), and the mean hs-cTnI value after the first session was 34.03 ng/L. The mean value of all the measures (3-5 per patient) of hs-cTnI of HD patients was 31.09 ng/L, with lower value in female patients (27.31 ng/L), when comparing to male patients (33.81 ng/L). In the HDF group the mean basal value of hs-cTnI was 31.73 ng/L (range 5.1-211.2 ng/L), and the mean hs-cTnI value after the first session was 30.12. The mean value of all the hs-cTnI measures of HDF patients was 30.22 ng/L with lower value in female patients (22.01 ng/L) than in male patients (33.413 ng/L). The mean value of NT-proBNP before the first session of the week was similar in the HD patients (21079.9 pg/mL) and HDF patients (20437.9 pg/mL) but there was a significant difference in the mean values after the first weekly session. HD patients had the mean NT-proBNP value of 18865.4 pg/mL and HDF patients 11831.6 pg/mL. Mean values of C-reactive protein (CRP) and interleukin 6 (IL-6) were 20% lower in the HDF patients.

HD	before the 1st session	after the 1st session	mean value (3-5 per patient)
hs-cTnI	30.59	34.03	31.09
NT-proBNP	21079.9	18865.4	

HDF	before the 1st session	after the 1st session	mean value (3-5 per patient)
hs-cTnI	31.73	30.12	30.22
NT-proBNP	20437.9	11831.6	

## Conclusions

In male patients there is no difference in mean hs-cTnI value between HD and HDF, while in female patients the hs-cTnI is lower on HDF. There is no significant difference in the NT-proBNP values between patients on HD and HDF before the dialysis session, but HDF significantly lowers NT-proBNP post-dialysis. Further larger prospective trials are needed to determine if this leads to more cardioprotection in HDF patients compared to HD patients and to determine the true significance and URL for these biomarkers in ESRD patients.