# RELATIONSHIP BETWEEN PARAMETERS OF BLOOD PRESSURE AND CHRONIC HEART FAILURE IN HEMODIALYSIS PATIENTS

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## Objectives

**The CRIC Study [Kidney Int. 2016 Dec; 90(6):1348-1356] showed that pulse blood pressure (PP) was associated with chronic heart failure (CHF) in patients with estimated glomerular filtration rate <30 ml/min/1.73 $m^2$ and not on dialysis.**

## Aim

**The aim of this study was to evaluate the relationship between blood pressure parameters and CHF in hemodialysis patients.**

## Methods

**Hemodialysis patients (n=63, 31 males, 32 females, mean age was 53±13 years) with dialysis period 1 year and more in one dialysis department were studied (Tabl.). Chronic heart failure with preserved left ventricular ejection fraction (LVEF≥50%) was diagnosed in 25 patients and 2 pts had LVEF<50%. Pre-dialysis systolic blood pressure (SBP), diastolic blood pressure (DBP), pulse pressure (PP) and post-dialysis SBP, DBP, PP and variability blood pressure parameters were studied. Self-measured home morning and evening BP (HBPM) was obtained within 4 weeks. 24 hours blood pressure monitoring (ABPM) was performed the next day after hemodialysis. Blood pressure variability of office pre- and post-dialysis, home and ABPM parameters was assessed. Echocardiography was performed and LVMI was calculated. LVEF was measured by the echocardiographic Simpson method. Diastolic parameters were determined by tissue Doppler echocardiography.**

| Parameters | Abs (M±SD) |
|---|---|
| Patients | 63 |
| Males | 31 |
| Females | 32 |
| Mean age, years | 53±13 |
| Causes of chronic kidney disease: | |
| Glomerulonephritis | 28 |
| ADPKD | 12 |
| Diabetes | 10 |
| Kidney stones | 8 |
| Others | 5 |
| Chronic heart failure (CHF) | |
| CHF with preserved EF (≥50%) | 25 |
| CHF with mid-range EF (40-49%) | 1 |
| CHF with reduced EF (<40%) | 1 |
| Left ventricular mass index (g/$m^2$) | 123.5±39.3 |

## Results

**Arterial hypertension (mean 24 h BP > or =135 and 85 mm Hg) was diagnosed in 25 (40%) patients. The number of non-dipper patients was 36 (57%) for SBP and 24 (38%) for DBP. Left ventricular hypertrophy was detected in 41 (65%) patients.**

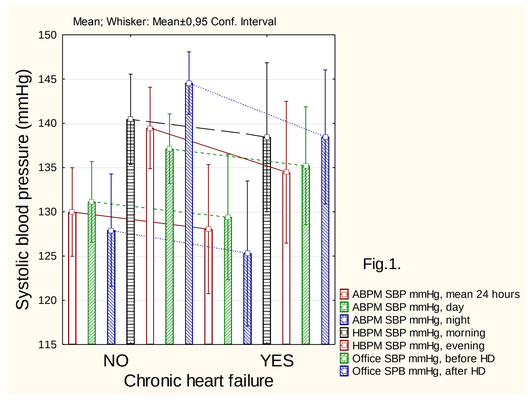


Fig.1.

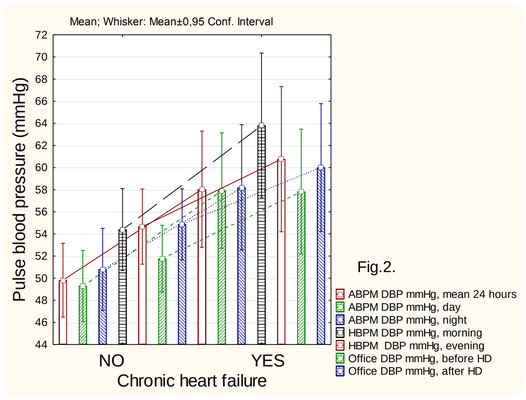


Fig.2.


Fig.3.

Fig.1. Systolic blood pressure in patients with chronic heart failure in HD patients

Fig.2. Pulse blood pressure and chronic heart failure in HD patients

Fig.3. Diastolic blood pressure and chronic heart failure in HD patients

**Patients with CHF had lower 24 hours DBP (P<0.001), higher PP ( P=0.007), but SBP did not differ ( P=0.5). Self-measured mean DBP was significantly lower in patients with CHF (morning DBP 75.0±9.1 vs 86.0±11.3 mmHg, P<0.001 and evening DBP 73.8±10.9 vs 84.4±8.4 mmHg, P<0.001.**

**Multiple regression analysis in which independent variables were age, gender, LVMI, hemoglobin, diabetes, myocardial infarction in the past and self-measured mean morning and evening DBP shown that self-measured mean morning and evening DBP were negatively independently associated with CHF (Beta = – 0.62, p=0.001 and Beta = – 0.56, p=0.003, resp.), LVMI had positive independent association.**

**In multivariate logistic regression analysis, DBP< 80 mmHg increased risk CHF, odds ratio 1.16 (95% CI 1.06-1.27) for self-measured mean morning DBP and 1.16 (95% CI 1.05-1.28) for evening DBP. The correlation between office DBP and CHF was not detected. Hypotension time index and hypotension area under curve of SBP, DBP and reduce of the degree of night fall of SBP and DBP on off dialysis day were associated with CHF in simple correlation only.**

## Conclusion

**Self-measured mean morning and evening diastolic blood pressure obtained within 4 weeks negatively independently are associated with chronic heart failure stronger than 24 home blood pressure monitoring parameters the next day after hemodialysis including mean pulse pressure, diastolic blood pressure, hypotension time index and hypotension area under curve of SBP, DBP and reduce of the degree of night fall of SBP and DBP.**

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