

PULSE PRESSURE INCREASES AFTER 6-MIN WALK TEST WITH ADVANCEMENT OF CKD

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Introduction

The 6-min walk-test (6MWT) is currently recommended in EBPB 2016 as to be performed every 6-8 weeks in with GFR <45ml/min/1.73m², especially in elderly. Numerous demographic, physiological and anthropometric factors can influence the 6MWT in healthy adults but hemodynamic parameters measured during 6MWT may result from advanced stage of chronic kidney disease (CKD).

Patients & methods

Sixty seven CKD patients (25 pts in G1-2, 20 pts in G3-4 and 22pts in G5; all age, gender and BMI adjusted) participated in the study (table 1). To verify variability of hemodynamic parameters and distance walked the test was repeated within next 2-5 days. Dialyzed pts (G5) did the test on non dialysis days. Both tests were performed in the same conditions (hospital corridor with definite 20m distance, the same temperature, morning hours, the same footwear). In addition to anthropometric data (sex, age, height, weight), the following data were recorded pre- and post-exercise oxygen saturation, heart-rate, systolic/ diastolic blood pressure, dyspnoea Borg value, hemoglobin and albumin level. All patients did not participated in last 6 months in supervised physical therapy program and met following exclusion criteria: active infection or cancer, cardiovascular event in last 3 months, NYHA >II, difficulty walking or vision problems.

Objectives

The aim of the study was to compare hemodynamic parameters (blood pressure, pulse pressure, HR) pre- and post-submaximal exercise (6MWT) in three groups of CKD patients G1-2, G3-4 and G5 according to KDIGO2012 classification.

Results

Majority hemodynamic measures in the second test repeated after 2-5 days did not differ significantly with the previous ones (p>0.5 in Wilcoxon test) except for sys blood pressure in CKD G1-2 (136 vs 132 mmHg, p=0,04). Expected physiological changes resulting from CKD progression were noticed in parameters taken in rest (pre test) and were most prominent between CKD G1-2 and G5 for pulse pressure and sys blood pressure, G1-2 and G3-4 for heart rate and pulse pressure (table 1).

Hemodynamic responses to a submaximal stress (6MWT) differed among CKD G1-5 patients mostly in pulse pressure and sys blood pressure (table1). Dialyzed pts (CKD G5) showed highest pulse pressure after the test revealing poorer vascular reactivity. It also increased during the test (56 vs 63 mmHg, p=0,02 in Wilcoxon test).

6-minute walk test (6MWT)

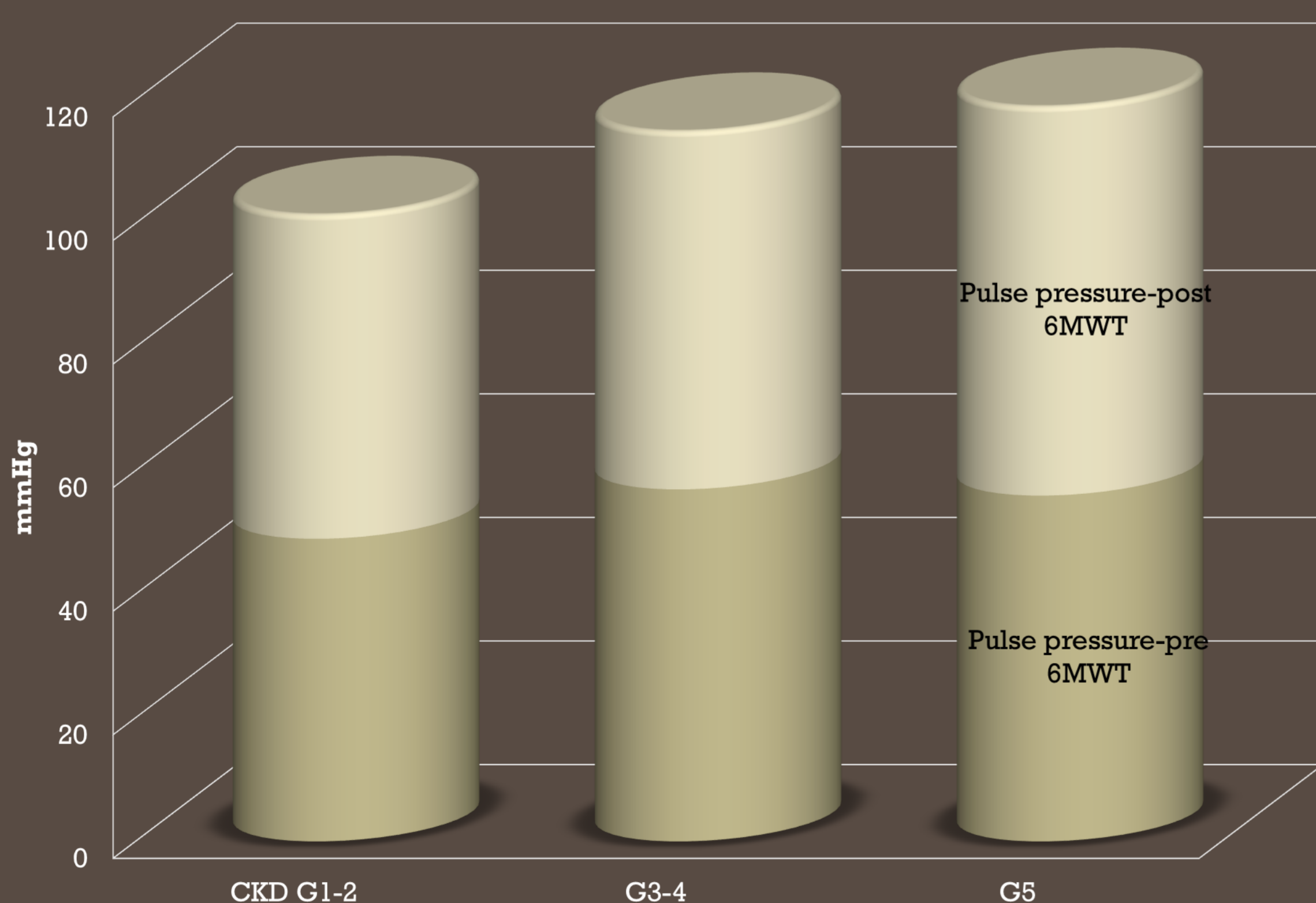
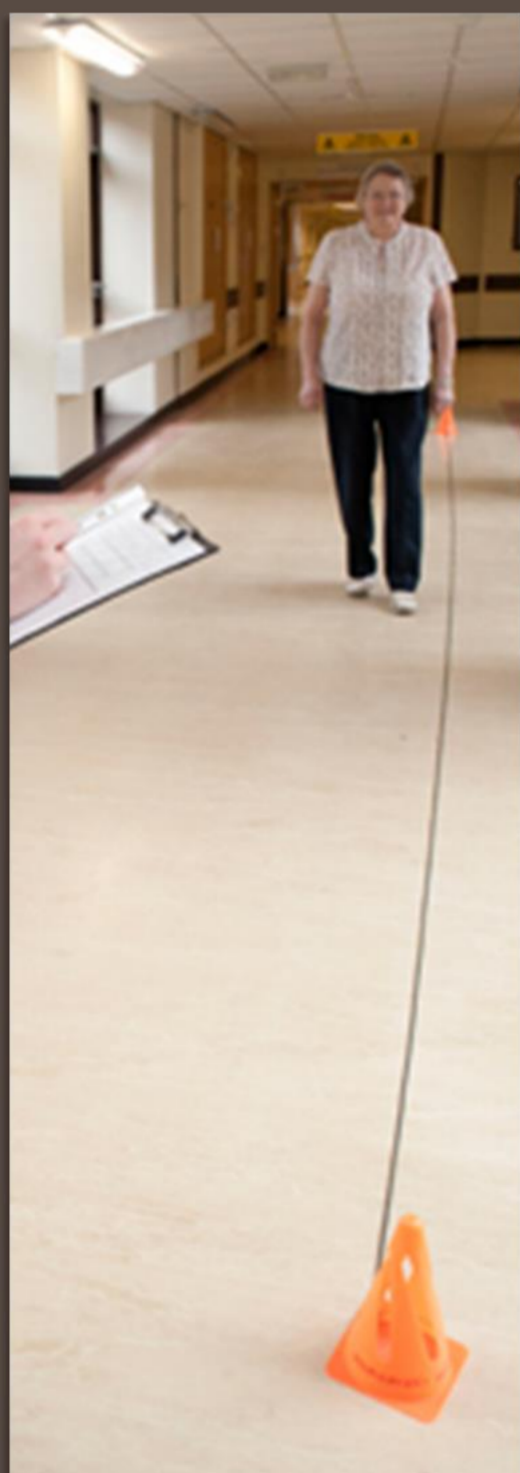


TABLE 1

| | G1-2CKD n=25 | G3-4CKD n=20 | G5CKD n=22 | Pvalue |
|---------------------|----------------------|----------------------|---------------------|----------|
| Age | 55 [IQR 44-63] | 56 [IQR 47-67] | 56 [IQR 40-64] | >0,05 |
| Gender | M 11 | M 9 | M 9 | >0,05 |
| BMI | 26,2 [IQR 23-28] | 24 [IQR 21,5-26] | 25,4 [IQR 22,1-28] | >0,05 |
| eGFR | 74 [IQR 66-80] | 30 [IQR 24-42] | 8 [IQR 6-10] | <0,01*** |
| Albumin | 4 [IQR 3,3-4,3] | 3,75 [IQR 2,7-4,1] | 3,9 [IQR 3,8-4,2] | >0,05 |
| Hemoglobin | 13,2 [IQR 12,2-14,2] | 11,8 [IQR 10,6-12,5] | 10,5 [IQR 9,6-11,5] | <0,05* |
| Sys BP-pre | 130 [IQR 123-136] | 139 [IQR 130-150] | 142 [IQR 120-151] | <0,05* |
| Dia BP-pre | 80 [IQR 80-90] | 82 [IQR 75-90] | 86 [IQR 75-100] | <0,05* |
| Pulse pressure-pre | 49 [IQR 44-50] | 57 [IQR 50-60] | 56 [IQR 50-60] | <0,05* |
| HR-pre | 78,5 [IQR 71-90] | 93 [IQR 84-98] | 83 [IQR 72-93] | <0,05** |
| Sys BP-post | 132,5 [IQR 120-145] | 142 [IQR 140-150] | 147 [IQR 130-160] | <0,05*** |
| Dia BP-post | 82 [IQR 80-91] | 88 [IQR 83-90] | 80 [IQR 75-90] | >0,05 |
| Pulse pressure-post | 52,5 [IQR 40-60] | 58 [IQR 47-60] | 63 [IQR 47-60] | <0,05* |
| HR-post | 92 [IQR 79-102] | 100 [IQR 90-123] | 94 [IQR 76-105] | >0,05 |
| SpO2 pre | 98 [IQR 98-99] | 98 [IQR 97-98] | 98 [IQR 96-98] | >0,05 |
| SpO2 post | 98 [IQR 97-98] | 98 [IQR 97-98] | 97 [IQR 95-98] | >0,05 |
| Dyspnea post (Borg) | 0 [IQR 0-1] | 1 [IQR 0-1,5] | 1 [IQR 0-2] | >0,05 |
| Fatigue post(Borg) | 2,5 [IQR 0-5] | 1,5 [IQR 0-4] | 2 [IQR 1-5] | >0,05 |
| distance (m) | 406 [IQR 365-434] | 385 [IQR 358-432] | 379 [IQR 330-427] | <0,05* |

*G1-2CKD vs G5CKD, **G1-2CKD vs G3-4CKD, ***G1-2CKD vs G3-4CKD vs G5CKD

Conclusion:

In CKD patients beside distance walked also pulse pressure after 6MWT should be noticed as easy to measure indicator of vascular auto-regulation. This parameter (related to arterial stiffness) should be monitored during and after physical therapy program.

