The prognostic role of stiffness index determined by finger photoplethysmography in chronic kidney disease

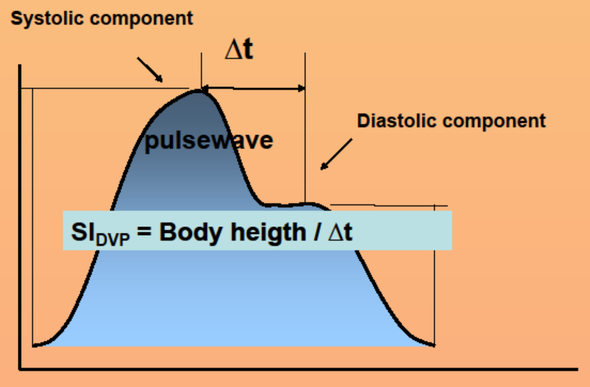
Balázs Sági[1], István Késői[2] , Tibor Vas[1], Tibor Kovács[1], István Wittmann[1], Judit Nagy [1]

[1] University of Pécs, 2nd Department of Internal Medicine and Nephrological Center
[2] Health Center of Komló, Internal Medicine Department

INTRODUCTION: Arterial stiffness has a prognostic role in chronic cardiovascular diseases. Pulse wave velocity (PWV) determined by the carotid-femoral pulse detection is accepted as a gold standard method. Further diagnostic procedures are in use to assess the arterial stiffness including the finger photoplethysmography. The prognostic role of this method is unknown chronic renal diseases.

PATIENTS and METHOD: One hundred and three IgA nephropathy patients with chronic kidney disease stage 1-4 were investigated and followed (67 male, 36 female, 45±11 years). End stage renal disease was an exclusion criterion. The stiffness index was determined by the volume alteration of the digital artery during the cardiac cycle. This merit showed a strong correlation with the PWV investigated by other methods in earlier studies. The average following time was 67 (6-107) months. The patients were divided into two groups according to the stiffness index; the cut-off point was 10 m/s. The combined end point was total mortality, any cardiovascular event including stroke, myocardial infarction or cardiovascular procedure and achieving the end stage renal disease including renal replacement therapy.

In our previous cross-sectional study we found correlation between the worsening renal function and the increased arterial stiffness in chronic kidney disease, but the method prognostic role remains unclear.



AIM OF THE STUDY: The goal of our investigation was to determine the prognostic significance of the arterial stiffness measured by the photoplethysmographic method in a homogenous group of chronic kidney disease patients.

- 103 IgAN patients (67 male, 36 female, mean age :45±11 years)
- CKD 1-4 stadium (eGFR ≥ 15 ml/min)
- Average follow up time: 67 months (6-107 months)

Clinical characteristics

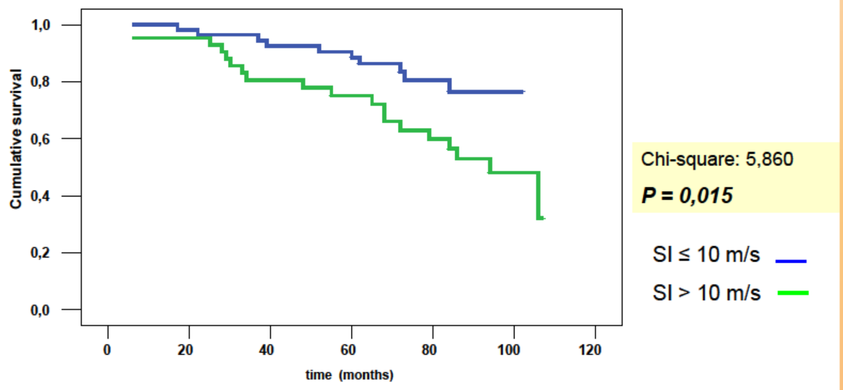
	SI ≤ 10 m/s N = 60	SI > 10 m/s N = 43	
Age	40±11	51±8	P<0,001
Gender (female/male%)	39 (65%)	28 (65%)	P=0,99
eGFR (ml/min)	96±35	76±28	P=0,003
Hypertonsion (n)	38 (63%)	39 (91%)	P=0,002
CH metabolism disorder (n)	13 (22%)	17 (40%)	P=0,049
Dylipidemia (n)	23 (38%)	26 (61%)	P=0,027
Obesity (BMI>30 kg/m^2)(n)	14 (23%)	14 (32%)	P=0,299

CONCLUSION: Stiffness index determined by finger photoplethysmography is an eligible parameter to assess the prognosis in chronic kidney disease. In IgA-nephropathy increased stiffness index seems to be a good prognostic tool for identification of highest-risk patients.

RESULTS: The patients with increased stiffness index (>10 m/s) had significantly more end point events (19/43 vs. 10/60, Chi-square: 5.860, P=0.015 by Mantel-Cox log-rank test). Every 1 m/s increase in stiffnes index resulted in a 17 % gain in the occurrence of the combined end point.

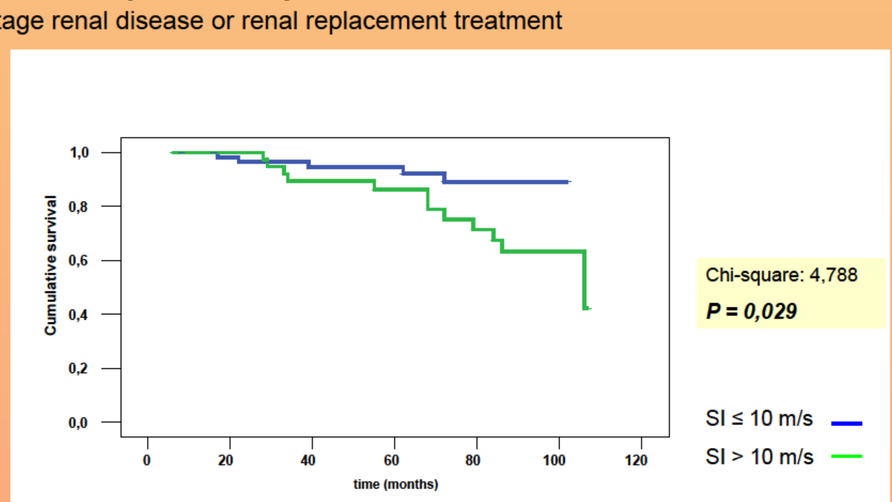
Primer combined end points* Kaplan-Meier curves based on stiffness index

*any cardiovascular event (stroke, AMI, revascularisation), death, end-stage renal disease reach



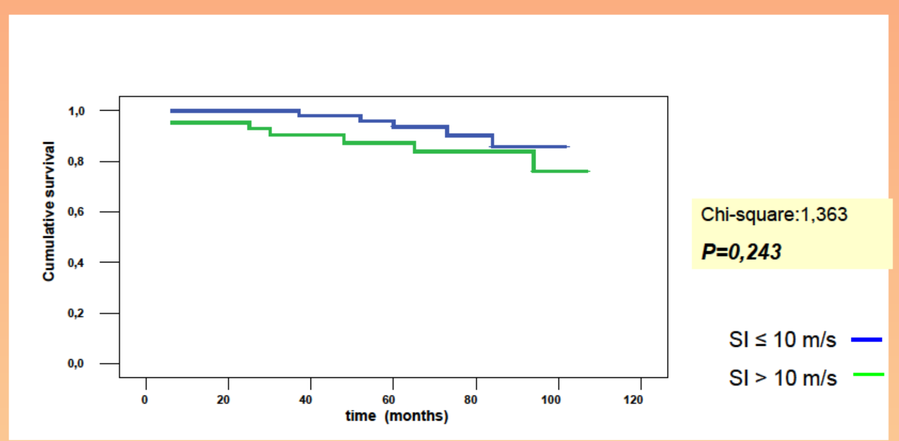
Secunder end points * Kaplan-Meier curves based on stiffness index

*end-stage renal disease or renal replacement treatment



Secunder end points ** Kaplan-Meier curves based on stiffness index

**cardiovascular events (death, AMI, revascularisation, stroke) and any cause of death



Cox regression analysis: Primer end point related parameters

Parameters	RR (95% CI)	P value
SI$_{DVP}$	1,17 (1,01-1,37)	**0,039**
Age	1,04 (0,98-1,10)	0,232
Dyslipidaemia	1,37 (0,56-3,35)	0,496
Obesity	0,73 (0,30-1,79)	0,487
Hypertension	3,15 (0,04-2,68)	0,290
CH metabolism disorder	3,15 (1,27-7,75)	**0,013**
eGFR (ml/min)	1,03 (1,01-1,05)	**0,003**

Referece:
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Balázs Sági
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