

Clinical characteristics of patients with intradialytic hypertension

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OBJECTIVES

Intradialytic hypertension with a prevalence of 15% among hemodialysis patients is with unknown pathophysiology, demographic, laboratory and clinical characteristic of patients, and its influence on long-lasting clinical effects (cardiovascular morbidity and mortality, rate of hospitalization). So, the aim of the study is to present the clinical, laboratory and demographic characteristics of patients with intradialytic hypertension in our dialysis center.

METHODS

Of total 110 hemodialysis patients, 17 patients (15,45%) were intradialytic hypertensive – started at a systolic pressure greater than 140 mm Hg or had an increase in systolic pressure more than 10 mm Hg during the session, and 17 patients were normotensive or had a drop in blood pressure during the dialysis. HD were performed 3 times per week with a duration of 4-5 hours, on machines with controlled ultrafiltration and high flux syntetic membrane (polyetersulfon) sterilized with gamma rays. It was used dialysate with standard electrolytes content (Na⁺ 138 mmol/L, K⁺ 2,0 mmol/L, Ca⁺⁺ 1,5 mmol/L, Mg +1,0 mmol/L, CH₃COO⁻ 3,0 mmol/L, Cl⁻ 110 mmol/l, HCO₃⁻ 35 mmol/L). Analysed demographic and clinical characteristics were: gender, age, BMI, dialysis vintage, vascular acces, cardiovascular comorbidity (cardiomyopathy, ischemic cardiac disease, peripheral artery disease, heart valve disease), number and type of antihypertensive drugs, a weekly dose of erythropoiesis - stimulating agent, standard monthly, three and six months laboratory analyzes, and sp Kt/V and PCR. Statistical analysis was performed with SPSS 17.0.

RESULTS

In the both groups were more men (IDH group 88,23%, control group 64,07%). IDH group was older (59,00+/- 7,64 versus 49.00+/- 13,91, p= 0,314) and with lower BMI (p = 0,246) compared to control group. Significantly lower serum sodium and higher sodium gradient had IDH patients (135,75+/-2,03 versus 137,33+/-1,97, p= 0,042; 2,25+/-1,98 versus 0,66+/-1,44, p=0,0267, respestively). In other laboratory analysis there was no statistically significant differences between two groups. IDH group had significantly higher interdialysis weight gain and less effective ultrafiltration individually at each dialysis session compared to the control group (2,23+/-0,866 versus 2,37+/-0,69, p=0,011; 3,87+/-1,26 versus 3,56+/-1.18, p=0,025, respectively). The systolic and mean arterial pressure after the HD were statistically higher in IDH group, receiving multiple antihypertensive drugs and have more cardiovascular diseases compared to patients without intradialytic hypertension.

Parameters	IDH group	Control group	95% CI	p
Pre-HD systolic pressure	145,50+/-14,13	133,87+/-11,65	-0,645 – 23,62	0,061
Post-HD systolic pressure	156,87+/-8,36	119,00+/-12,65	22,05 – 49,20	0,000*
Pre-HD diastolic pressure	87,37+/-9,03	83,50+/-7,55	-10,97 – 8,39	0,766
Post-HD diastolic pressure	90,12+/-7,16	77,37+/-11,70	--4,82 – 23,51	0,167
Pre-HD MAP	105,58+/-6,75	97,29+/-29	-5,60 – 11,53	0,448
Post-HD MAP	111,03+/-6,39	94,08+/-9,03	5,66 – 28,16	0,008*
IDWG	2,51+/-0,81	2,36+/-0,71	-1,39 - -0,241	0,011*
IDWG%	3,87+/-1,26	3,56+/-1.18	-2,30 - - 0,207	0,025*
UF	2,23+/-0,866	2,37+/-0,69	-1,52 - -0,262	0,011*
Sodium	135,75+/-2,03	137,33+/-1,97	-2,635 – 0,0582	0,042*
Sodium gradient	2,25+/-1,98	0,66+/-1,44	-0,537 – 1,761	0,0276*
Age	59,00+/-7,64	49,00+/-13,91	-4,39 – 12,86	0,314
BMI	23,12+/-3,22	25,96+/-5,06	-3,969 - -1,091	0,246

CONCLUSIONS

Older, lower BMI, border hyponatremia, higher sodium gradient, smaller ultrafiltration rate, higher cardiovascular morbidity and more use of antihypertensive drugs are the clinical characteristics of patients with intradialytic hypertension.

REFERENCES:

- Inrig K.J. Intradialytic hypertension: A less recognized cardiovascular complication of hemodialysis. *Am J Kidney Dis.* 2010; 55: 580-589.
- Locatelli F, Cavalli A and Tucci B. The growing problem of intradialytic hypertension. *Nat. Rev. Nephrol.* 2010; 6:41-48
- Inrig K.J, Patel UD, Toto RD et al. Association of blood pressure increases during hemodialysis with 2-year mortality in incident hemodialysis patients: a secondary analysis of the Dialysis Morbidity and Mortality Wave 2 Study. *Am J Kidney dis.* 2009; 54: 881-890
- Inrig KJ et al. Association of intradialytic blood pressure changes with hospitalization and mortality rates in prevalent ESRD patients. *Kidney Int.* 2007; 71: 454-461
- Mees D. Rise in blood pressure during hemodialysis ultrafiltration: a "paradoxical" phenomenon? *Int. J. Artif. Organs.* 1996; 19: 569-570
- Santos F.F.S. and Peixoto J. Aldo. Revisiting the dialysate sodium prescription as a tool for better blood pressure and interdialytic weight gain management in hemodialysis patients. *Clin J Am Soc Nephrol.* 2008; 3: 522-530
- Locatelli F, Di Filippo S, Manzoni C. Sodium kinetics during dialysis. *Semin Dial.* 1999; 12 (suppl1): S41-S44
- Flanigan MJ. Role of sodium in hemodialysis. *Kidney Int.* 2000; 76:S72-8.
- Mendoza JM, Sun S, Chertow MG et al. Dialysate sodium and sodium gradient in maintenance hemodialysis: a neglected sodium restriction approach? *Bogdanoska-Kostadinovska S, Eftimovska-Otovic N, Banskolieva – Babalj E et al. Prescription of individualized dialysate sodium in patients on chronic hemodialysis. MMP.* 2013;
- Jablonski KI, Gates PE, Pierce GL. Low dietary sodium intake is associated with enhanced vascular endothelial function in middle aged and older adults with elevated systolic blood pressure. *The Adv Cardiovasc Dis.* 2009; 3: 347-356
- Chou KJ, Lee PT, Chen CL et al. Physiological changes during hemodialysis in patients with intradialysis hypertension. *Kidney Int.* 2006; 69: 1833-1838
- Bazzato G, Coli U, Landini S et al. Prevention of intra and postdialytic hypertensive crises by captopril. *Contrib Nephrol.* 1984; 41: 292-298
- Muller P, Kazakov A, Jagoda P et al. ACE inhibition promotes upregulation of endothelial progenitor cells and neangiogenesis in cardiac pressure overload. *Cardiovasc Res.* 2009; 83: 106-114

