



ANTIHYPERTENSIVE TREATMENT IN PATIENTS WITH END-STAGE RENAL DISEASE

MENSURA AŠČERić^{1*}, NEDŽAD MULABEGOVIĆ², SABINA NUHBEGOVIĆ³,
ALMA NADAREVIĆ⁴, MUAMERA MUJČINAGIĆ-VRABAC⁵

1. Department of Pharmacology and Toxicology, University of Tuzla, Medical Faculty, Univerzitetska 1, 75000 Tuzla, Bosnia and Herzegovina
2. Department of Pharmacology and Toxicology, University of Sarajevo, Medical Faculty, Čekaluša 90, 71000 Sarajevo, Bosnia and Herzegovina
3. Department of Physiology, University of Tuzla, Medical Faculty, Univerzitetska 1, 75000 Tuzla, Bosnia and Herzegovina
4. Polyclinic for Pulmonary Diseases and TBC of Clinic of Health, Herljevića 23, 75000 Tuzla, Bosnia and Herzegovina
5. Family Practice of Clinic of Health, A. Herljevića 23, 75000 Tuzla, Bosnia and Herzegovina

* Corresponding author

ABSTRACT

Arterial hypertension is a common finding in patients with end stage renal disease (80% patients are hypertensive). Cardiovascular diseases are the main cause of death in haemodialysis. The present study was performed to assess' successful treatment in hypertensive chronic haemodialysis patients by ultra filtration only and ultra filtration combined with medics. We studied 80 hypertensive adult patients who had been on regular haemodialysis treatment for at least 12 months (average duration of 41 months). All subjects were divided in two different antihypertensive treatment groups including 40 subjects each. The first group of patients were treated with trandolapril and ultra filtration, and the second group of patients were only treated with ultra filtration (control group). Blood pressure measurements before and after HD sessions were performed for each patient. Blood pressure control was defined using World Health Organization criteria 140/90 mm Hg. Average systolic blood pressure levels, after haemodialysis, were in the first group of patients 146,33 +/- 9,7 mm Hg, and in the control group 157,86 +/- 10,33 mm Hg. Average diastolic blood pressure was 87,83 +/- 8,11 mm Hg in the first group of patients and, in the control group it was 91,03 +/- 10,67 mm Hg. There were significant differences between systolic blood pressure level in the first group of patients and the control group of patients as well as in diastolic blood pressure ($p < 0,05$). We conclude that an antihypertensive therapy by trandolapril is more effective than ultra filtration alone in hypertensive patients on chronic haemodialysis.

KEY WORDS: Hypertension, haemodialysis, ultra filtration, trandolapril

INTRODUCTION

Hypertension is the most important factor of morbidity and mortality in chronic haemodialysis patients, and a risk of getting sick is as great as treatment necessary. In more than 80% of these patients hypertension is caused by hypervolemia (1). Fast arterial blood pressure control can be gained by decreasing of volume of extra cellular liquid during haemodialysis. But, 5 – 60 % of patients remain hypertensive (2). To decrease mortality of dialysed patients, arterial blood pressure control is very important. The first step in hypertension treatment is diet with limited taking of salt (less than 6 g of NaCl daily) and liquids, homeostasis control by ultra filtration and gaining of appropriate dried weight (3). If we do not get appropriate blood pressure control in this way, it is necessary to use antihypertensive. Aim of this study was examination of blood pressure control efficiency only by treatment of ultra filtration and ultra filtration combined with angiotensin-converting-enzyme inhibitor trandolapril.

SUBJECTS AND METHODS

It was conducted prospective, randomised, open controlled clinic study what means application of Good Clinical Practice – GCP in two months duration. In research were included 80 hypertensive patients with end stage renal disease, divided in two groups by 40 patients. In the first group of patients antihypertensive treatments were applied ultra filtration and trandolapril, and in the second group ultra filtration only. The first group of patients were averaged age 53,53 +/- 10,28, 21 males (52,5 %) and 19 females (47,5 %). They were on chronic dialysis 41 +/- 26 months in average. The second group of patients were averaged age 53,5 +/- 15,42, 17 males (42,5 %) and 23 females (57,5 %). They were on chronic dialysis 37 +/- 32 months in average. Blood pressure was measured in half laying position and values are expressed by exact measured values. Changes on ECG in sense of hypertrophy of left ventricle were compared before and after the treatment.

ECG was recorded in 12 leads on SCILLER Cardidiviot AT-1 Switzerland. For ECG evaluation of hypertrophy of left ventricle were used criteria as follow:

- Sum of heights of R-wave in I lead and S-wave in III lead is exciding 26 mm.
- R-wave in V₅ or V₆ is exciding 26 mm.
- R-wave in aVL lead is higher than 12 mm (when the mean electrical axis is horizontal).
- R-wave in aVF lead is higher than 20 mm (when the mean electrical axis is vertical).

Dialysis machine uses biols: Frezenius F₅ – membrane surface 1.0 (polysulfon), F₆ HPS – membrane surface 1.30 (polysulfon). All the results are expressed by the mean value and with standard deviation (M +/- SD). Statistic data processing is set with Student's t-test (p<0,05).

RESULTS

The mean value of systolic arterial blood pressure in the group of patients treated with trandolapril + UF was 146,33 +/- 9,7 mm Hg and in the group treated only with UF was 157,86 +/- 10,33 mm Hg. Comparison of the mean values of systolic arterial blood pressure in both groups significant difference has been shown (p<0,05). The mean value of diastolic arterial blood pressure in the group of patients treated with trandolapril + UF was 87,83 +/- 8,11 mm Hg and in the group treated only with UF was 91,03 +/- 10,67 mm Hg. These values were different too (p<0,05) (Table 1). Changes on ECG that show hypertrophy of left ventricle were found in 21 patients treated with trandolapril + UF, and in the group treated only with UF in 15 patients. After 2 months treatment there was not any change on ECG in this meaning (Table 2).

DISCUSSION

Blood pressure control in patients with end stage renal disease depends on preserving of normal, or close to normal, volume of extra cellular liquid (4). If we

GROUPS	TRANDOLAPRIL + UF	UF	T-TEST
SYSTOLIC ARTERIAL BLOOD PRESSURE (mm Hg) M +/- SD	146,33 +/- 9,7	157,86 +/- 10,33	*
DIASTOLIC ARTERIAL BLOOD PRESSURE (mm Hg) M +/- SD	87,83 +/- 8,11	91,03 +/- 10,67	*

Ns P>0,05; * p<0,05

TABLE 1. Comparison of the mean values of systolic and diastolic arterial blood pressure

HYPERTROPHY OF LEFT VENTRICLE

GROUPS	YES	NO	Before treatment (mm) M+/-SD	After treatment (mm) M+/-SD	t-test
TRANDOLAPRIL+UF	21	19	42,1+/-9,2	40,5+/-8,4	ns
UF	15	25	45,7+/-7,7	47,2+/-8,6	ns
TOTAL	36	44			

Ns P>0,05; *p<0,05

TABLE 2. Comparison of the mean values of systolic and diastolic arterial blood pressure

can not attain adequate moving of liquid with dialysis, hypertension will be present and we treat it with antihypertensive. After 2 months of treatment values of systolic and diastolic blood pressure were different in the group treated with trandolapril + UF and in the group treated only with UF. Successful arterial blood pressure control other authors had (5) by hypertension treatment with trandolapril alone or combined with calcium canals blockators. In blood pressure control trandolapril was more effective in antiproteinuric effects in patients with primary nephropathy. In the group of patients treated with trandolapril + UF hypertrophy of left ventricle was registered in 21 patients. After treatment with trandolapril + UF, changes on ECG in the meaning of hypertrophy of left ventricle was not changed. It is understandable because the treatment had been conducted for 2 months and in that short period we can not expect significant morphology reducing of myocardium. Hypertrophy of left ventricle correlates with blood

pressure (6). In the last few years number of experimental and clinical reports about structural changing of left ventricle during antihypertensive treatment in uremic patients are increasing (ACE inhibitors first of all) (7, 8, 9, 10). Most authors agree that in spite using of medicine and dialysis, hypertrophy of left ventricle remains (11). Histology changes in myocardium have an important role, fibrosis first of all and decreasing of capillary density. Chronic anaemia also contributes to high prevalence of hypertrophy of left ventricle (12). Research shows that the thickness of left ventricle wall had been decreased in the patients with end stage renal disease by strong hypervolemia control what is more important than the decreasing of blood pressure. The guide was blood pressure and dimensions of heart. (13). We should have in mind that the hypertension is the main cause of cardiopathy in uremic patients. Blood pressure control in hypertensive patients leads to regression of hypertrophy of left ventricle (14).

CONCLUSION

Therapy with UF is more effective in decreasing of high arterial blood pressure in patients with ESRD than the UF alone.

ABBREVIATIONS

ESRD - End-stage renal disease
 UF – Ultrafiltration
 HD – Haemodialysis
 ECG – Electrocardiogram
 ACE – Angiotensin Converting Enzyme

REFERENCES

- (1) Charra B., Calemard E., Laurent G. Importance of treatment time and blood pressure control in achieving long-term survival on dialysis. *Am. J. Nephrol.* 1996; 16:35-44
- (2) Blumberg A., Nelp W.P., Hegstrom R.M. Extracellular volume in patients with chronic renal disease treated for hypertension by sodium restriction. *Lancet* 1967; 2:69-73.
- (3) Mazzuchi N., Carbonell E., Fernandez-Cean J. Importance of blood pressure in hemodialysis patient survival. *Kidney Int.* 2000; 21 (3): 2147-2154.
- (4) Scribner B. A personalized history of chronic hemodialysis. *Am. J. Kidney Dis.* 1990; 16: 511-519.
- (5) Silberg J.S., Barre P.E., Pshard S.S. Impact of left ventricular hypertrophy on survival in end stage renal disease. *Kidney Int.* 1989; 36: 286-290.
- (6) Graves S.C., Gamble G.D., Collins J.F. Determinant of the left ventricular hypertrophy and systolic dysfunction chronic renal failure. *Am. J. Kidney Dis.* 1994; 24: 768-776.
- (7) London G.M. The concept of ventricular vascular/coupling functional and structural alterations of the heart and arterial vessels go in parallel. *Nephrol. Dial. Transplant.* 1998; 13: 250-253.
- (8) Cannella G., Paoletti E., Delfino R. Regression of left ventricular hypertrophy in hypersensitive dialyzed uremic patients on long-term antihypertensive therapy. *Kidney Int.* 1993; 44: 881-886.
- (9) Rambašek M., Mall G., Kallmar S. Effect of converting enzyme inhibitors on cardiac changes in experimental uremia. *Kidney Int.* 1988; 34 (Suppl 25): 201-203.
- (10) Dyadyk A.I., Bgriy A.E., Lebed I.A. ACE inhibitors induce regression of left ventricular hypertrophy in hypersensitive patients with chronic renal failure. *Nephrol. Dial. Transplant.* 1997; 12: 945-951.
- (11) Folley R.N., Parfrey P.S., Harmett J.D. Clinical and echocardiographic disease in patients starting end-stage renal disease therapy. Prevalence, associations and prognosis. *Kidney Int.* 1995; 47: 186-192.
- (12) Silberg J.S., Barre P.E., Pshard S.S. Impact of left ventricular hypertrophy on survival in end stage renal disease. *Kidney Int.* 1989; 36: 286-290.
- (13) Ozkahya M., Ok E., Cirit M. Regression of left ventricular hypertrophy in haemodialysis patients by ultrafiltration and reduced salt intake without antihypertensive drugs. *Nephrol. Dial. Transplant.* 1998; 13: 1489-1493.
- (14) Locatelli F., Andruli S., Di Filippo S. Effect of on line conductivity plasma ultrafiltrate kinetic modeling on cardiovascular stability of hemodialysis patients. *Kidney Int.* 1998; 53: 1052-1060.