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Research Article

INTRADIALYTIC HYPOTENSION AMONG PATIENTS ON
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Abstract:

Aim: The aim was to govern the intradialytic hypotension frequency among patients on maintenance dialysis and its relationship with various risk factors.

Study design: A cross-sectional analytical study.

Place and duration: In the Nephrology Department of Jinnah Hospital Lahore for one year duration from March 2019 to March 2020.

Methods: The frequency of intradialytic hypotension was determined as a percentage. All statistical variables were recorded, such as weight, age, blood flow, dialysate temperature, standard deviation and mean. The relationship between qualitative risk factors and intradialytic hypotension was proportional and parallel using the Z test and Student's t-test for quantitative risk factors.

Results: In total sessions; Symptomatic intradialytic hypotension was reported as 5.4%. In the hypotensive group, diastolic, systolic, heart rate and blood pressure before dialysis were higher than in other groups with significant p values. In the hypotensive group, mean diastolic, systolic and low blood pressure were lower than in other groups. However, the average change in pulse rate between the two groups (normotensive group, $p = 0.8$ at -2.4 ± 11.1 and hypotensive group -2.1 ± 14.1) B.P. Cardiac events were also significantly higher in the hypotensive group.

Key words: intradialytic hypotension, hemodialysis, cardiovascular disease.

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INTRODUCTION:

Intradialytic hypotension (HDI) is a common clinical feature of hemodialysis (HD) due to poor biocompatibility of the dialysis membrane. In hemodialysis (HD) patients; Dialysis-induced hypotension remains an important problem. There are many factors that cause an irregular change in myocardial reserve in response to HD persuasion, cardiovascular stress and blood pressure control. Hemodialysis (HD) is associated with a significant decrease in the concentration of nitric oxide (NO) N (G) -monomethyl-L-arginine (L-NMMA), symmetrical dimethylarginine (SDMA) and asymmetric dimethylarginine (ADMA) in plasma. Intradialytic hypotension is defined as a 20 mmHg reduction in BP in symptoms associated with hemodialysis. If in hemodialysis patients systolic blood pressure is <100 mmHg before hemodialysis, the symptoms of hemodialysis associated with a change in systolic blood pressure of 10 mmHg or higher during hemodialysis are called interdialysis hypotension. If the B.P is above 100 mmHg, systolic blood pressure of 30 mmHg during HD or higher with similar symptoms is called intradialytic hypotension. Most of the subjects showed dizziness or nausea when there was a decrease in B.P. Cramps are closely related to other indications such as lack of alertness, vomiting and visual impairment. In some cases there were no symptoms. These features are currently BMI (especially in women), cardiovascular diseases and old age. In patients older than 65 years; Intradialytic hypotension is much more common than young patients (under 45 years of age). Symptomatic attacks of hypotension are particularly high in patients with low or normal BP at the beginning of dialysis and in patients with a significant increase in weight between dialysis. There are 2 types of intra-day hypotension. In the first type, there is a constant decrease in blood pressure, which constantly decreases during hemodialysis. In the second type, intentional sudden hypotension due to a sudden and sudden decrease in B.P with the arrival of a warning signal. The most common complication associated with hemodialysis is intravascular hypotension and multiple etiology. However, the relationship between intra-day hypotension and hypertension is

uncertain. We study the effect of B.P on dialysis hypertension and pre-dialysis with antihypertensive drugs. Excessive intra-day weight gain, diabetes, low left ventricular volume and low ejection fraction indicate risk factors for intra-day hypotension. Intracranial hypotension is associated with significant morbidity and mortality. The risk of seizures is associated with cardiac ischemia, stroke, vascular thrombosis and arrhythmia.

It is also associated with a rapid loss of kidney failure and reduces the ability of dialysis and degrades the quality of life due to repeated breaks. If we find the exact frequency and factors associated with HDI in dialysis patients, we can reduce the incidence of HDI in patients by recording a prescription for dialysis and writing risk factors. This improved their quality of life.

MATERIALS AND METHODS:

This is an analytical cross-sectional study of 100 patients taken from the nephrology department at the Jinnah Hospital Lahore for one year duration from March 2019 to March 2020 Non-probability convenience sampling. Hemodialysis data was analyzed using SPSS version 18.0. In all hemodialysis sessions lasting more than three months, the incidence of intradialytic hypotension was determined and recorded as a percentage. All numerical variables were recorded, such as age, weight, dialysate temperature, blood flow, mean and standard deviation. The relationship between qualitative risk factors and intradialytic hypotension was analyzed using the chi-square test and Student's t-test using quantitative risk factors.

RESULTS:

Total 1907 hemodialysis sessions were performed to 100 patients to identify hypotension and related risk factors. The average age of the population aged 51 ± 16 was examined. Men had 1086 (56.9%) and women 821 (43.1%) respectively. Diabetes and diabetic nephropathy supporting end-stage renal disease were 51.1% more frequent, obstructive nephropathy was 24.2%, and chronic glomerulonephritis hypertension was the second most common cause, the other 7.3% and 4.2% (Fig. 1).

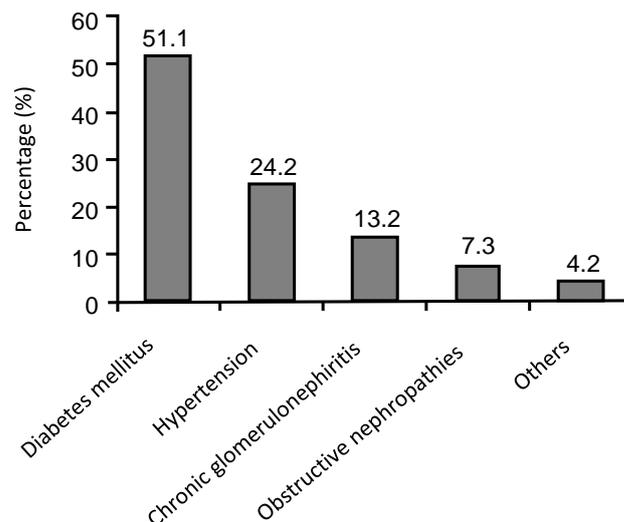


Figure 1 Distribution of hemodialysis sessions by a diagnosis of patients

When a few possible contributions to dialysis sessions, such as the use of dialysis equipment, were examined, only 23.5% of initial use and 76.5% of dialysate reuse were used. In 5.4% of subjects, symptomatic hypotension occurred in three sessions. Into groups I and II, all dialysis sessions were divided in which symptomatic hypotension happened, including dialysis sessions not related to symptomatic hypotension. The pulse data and B.P data were matched as shown in Table 1.

Table 1 Comparison of dialysis sessions with symptomatic hypotension with no symptomatic hypotension

Parameters	Group I (n=103)	Group II (n=1804)	p-value
	Mean \pm SD	Mean \pm SD	
Age (years)	48 \pm 6	51 \pm 15	0.07
Systolic blood pressure before dialysis (mmHg)	150 \pm 27	143 \pm 31	0.02
Diastolic blood pressure before dialysis (mmHg)	76 \pm 6	72 \pm 17	0.04
Mean blood pressure before dialysis (mmHg)	100 \pm 118	96 \pm 9	0.02
pulse rate before dialysis (min)	84 \pm 13	81 \pm 14	0.05
Lowest systolic blood pressure before dialysis (mmHg)	104 \pm 28	130 \pm 31	0.001
Lowest diastolic blood pressure before dialysis (mmHg)	56 \pm 16	67 \pm 16	0.001
Pulse at lowest BP (min)	86 \pm 15	84 \pm 15	0.1
Lowest mean BP (mmHg)	72 \pm 19	88 \pm 19	0.001
Change in systolic BP (mmHg)	46 \pm 22	13 \pm 28	0.001
Change in diastolic BP (mmHg)	20 \pm 15	6 \pm 16	0.001
Change in mean BP (mmHg)	29 \pm 15	8 \pm 18	0.001
Change in pulse (min)	-2.1 \pm 14.1	-2.4 \pm 11.1	0.8
Weight gain (kg)	2.2 \pm 0.7	2.1 \pm 0.9	0.03
net ultra-filtration (ml)	1519 \pm 750	1905 \pm 890	0.001
Ultra filtration rate (ml/hour)	978 \pm 636	636 \pm 367	0.001
Conductivity (m S/cm)	13.9 \pm 0.3	13.9 \pm 0.3	0.2
Dialysate temperature ($^{\circ}$ C)	37.1 \pm 0.2	37.1 \pm 0.2	0.8

The average pressure before dialysis, pulse rate, systolic and diastolic groups increased more than in group II. Significant, systolic, low and average blood pressure was lower in group I than in group II. However, between two groups; The mean change in pulse rate (-2.1 \pm 14.1 in group I and 2.4 \pm 11.1 in group II, p 0.8 in group II) did not change significantly with the decrease in BP given in Table 1. Mass dialysis was significantly higher in the first group, in the second group, in group II; net ultrafiltration was higher than in group I, i.e. greater ultrafiltration was achieved. The net ultrafiltration index in group II was lower without apparent intraday hypotension. The temperature and conductance of the dialysate were uncertain between the two groups as shown in Table 1. No statistically significant difference was observed in factors such as reuse of dialysis fluid,

onset of fever and intake of antihypertensive drugs. Dialysis and food intake between two groups. This is shown in Table 2.

Table 2 Comparison between hypotensive and non-hypotensive dialysis sessions

	Group I (n=103)	Group II (n=1804)	p-value
Reused dialyzers	77	1381	0.6
Anti-hypertensive medicine intake	24	573	0.07
Pyrexia during dialysis	1	72	0.18
Food intake during dialysis	100	1717	0.7
Cardiac events	4	20	0.04

DISCUSSION:

In this analysis, the overall incidence of intravascular hypotension was 5.4%, in parallel with the international index of 5.4%. The main analysis covered 44,000 dialysis in France and hypotension was found to be the most common symptom in 6.9% of patients. A detailed analysis with a higher rate of hypotension was observed in 8.5% of patients. The frequency of intradialysis hypotension is significantly reduced, probably due to the use of the latest dialysis equipment equipped with a sodium module, a UF profile module, trained dialysis personnel and bicarbonate dialysate. We found that in women with symptomatic antihypertensive group, women had a period of interdialysis hypotension ($p = 0.001$). Intradialytic weight gain is a known risk factor for intra-day hypotension. In our group I analyze I; During the hemodialysis session a significant mean p value was obtained at 2.2 ± 0.7 kg, group II 2.1 ± 0.9 kg and 0.03. In one study, the average weight gain of patients with hypotension during a hemodialysis session was 3.8 kg. According to Tang et al., Progressive sodium increase is associated with various side effects. Weight gain between dialysis was greater, but none of the patients had burst sequences such as pulmonary edema or congestive heart failure. 978 ± 636 ml / s, mean ultrafiltration rate in group I and 636 ± 367 ml / s in group II with a significant p -value of 0.001. In the study by Schroeder et al., The mean ultrafiltration index in patients with hypotension was 1471 ± 601 ml / s. The increased UF rate caused rapid withdrawal of fluid from the intravascular compartment, as a result of which fluid from the interstitial space began to move from the intravascular compartment. Although deprivation of fluid, reduction of cardiac output, narrowing of blood vessels, and ultimately causing changes in intradialytic hypotension resulting in hypovolemia, there was relatively small weight gain between dialysis and low ultrafiltration, cumulative ultrafiltration was greater in group II. This was probably due to small changes in blood pressure during the dialysis session. Cardiovascular events are the main cause of morbidity and mortality, which is closely related to intra-day hypotension during hemodialysis. In our study,

3.8% of sessions during dialysis had group I cardiac events. The mechanism of cardiac events was due to high UF leading to rapid absorption of intravascular fluid and hypovolemia, peripheral vasoconstriction and myocardial ischemia.

CONCLUSION:

It was found that hypotension during hemodialysis was not associated with the patient's autonomic function at rest. It is suggested that structural neural changes were not responsible for a significant reduction in systemic vascular resistance in intradialytic hypotension.

REFERENCES:

1. Halle, Marie Patrice, Djantio Hilaire, Kaze F. Francois, Teuwafeu Denis, Fouda Hermine, and Ashuntantang E. Gloria. "Intradialytic hypotension and associated factors among patients on maintenance hemodialysis: A single-center study in cameroon." *Saudi Journal of Kidney Diseases and Transplantation* 31, no. 1 (2020): 215.
2. Mc Causland, Finnian R., Jim A. Tumlin, Prabir Roy-Chaudhury, Bruce A. Koplan, Alexandru I. Costea, Vijay Kher, Don Williamson, Saurabh Pokhariyal, and David M. Charytan. "Intradialytic Hypotension and Cardiac Arrhythmias in Patients Undergoing Maintenance Hemodialysis: Results from the Monitoring in Dialysis Study." *Clinical Journal of the American Society of Nephrology* 15, no. 6 (2020): 805-812.
3. Choi, Mun Sun, Brandon Kistler, Gretchen N. Wiese, Elizabeth R. Stremke, Amy J. Wright, Ranjani N. Moorthi, Sharon M. Moe, and Kathleen M. Hill Gallant. "Pilot study of the effects of high-protein meals during hemodialysis on intradialytic hypotension in patients undergoing maintenance hemodialysis." *Journal of Renal Nutrition* 29, no. 2 (2019): 102-111.
4. Yeo, Seongyup, Ji In Moon, Jungho Shin, Jin Ho Hwang, Iksung Cho, and Su Hyun Kim. "Impacts of Coronary Artery Calcification on Intradialytic Blood Pressure Patterns in Patients Receiving Maintenance

- Hemodialysis." *Chonnam Medical Journal* 56, no. 1 (2020): 27-35.
5. Tsujimoto, Yasushi, Hiraku Tsujimoto, Yukihiko Nakata, Yuki Kataoka, Miho Kimachi, Sayaka Shimizu, Tatsuyoshi Ikenoue, Shingo Fukuma, Yosuke Yamamoto, and Shunichi Fukuhara. "Dialysate temperature reduction for intradialytic hypotension for people with chronic kidney disease requiring haemodialysis." *Cochrane Database of Systematic Reviews* 7 (2019).
 6. Rhee, So Yon, Jin Kyung Song, Suk Chul Hong, Jae Won Choi, Hee Jung Jeon, Dong Ho Shin, Eun Hee Ji et al. "Intradialytic exercise improves physical function and reduces intradialytic hypotension and depression in hemodialysis patients." *The Korean journal of internal medicine* 34, no. 3 (2019): 588.
 7. Kuipers, Johanna, Loes M. Verboom, Karin JR Ipema, Wolter Paans, Wim P. Krijnen, Carlo AJM Gaillard, Ralf Westerhuis, and Casper FM Franssen. "The prevalence of intradialytic hypotension in patients on conventional hemodialysis: A systematic review with meta-analysis." *American journal of nephrology* 49, no. 6 (2019): 497-506.
 8. Kuipers, Johanna, Jurjen K. Oosterhuis, Wolter Paans, Wim P. Krijnen, Carlo AJM Gaillard, Ralf Westerhuis, and Casper FM Franssen. "Association between quality of life and various aspects of intradialytic hypotension including patient-reported intradialytic symptom score." *BMC nephrology* 20, no. 1 (2019): 164.
 9. Matsuura, Ryo, Sumi Hidaka, Takayasu Ohtake, Yasuhiro Mochida, Kunihiro Ishioka, Kyoko Maesato, Machiko Oka, Hidekazu Moriya, and Shuzo Kobayashi. "Intradialytic hypotension is an important risk factor for critical limb ischemia in patients on hemodialysis." *BMC nephrology* 20, no. 1 (2019): 1-8.
 10. Tian, Maolu, Yan Zha, Shuwen Qie, Xin Lin, and Jing Yuan. "Association of Body Composition and Intradialytic Hypotension in Hemodialysis Patients." *Blood Purification* 49, no. 3 (2020): 334-340.
 11. Patel, H. V., R. A. Annigeri, P. C. Kowdle, B. S. Rao, R. Seshadri, S. Balasubramanian, and V. Vadamalai. "Bioimpedance spectroscopy-guided ultrafiltration normalizes hydration and reduces Intradialytic adverse events in hemodialysis patients." *Indian journal of nephrology* 29, no. 1 (2019): 1.
 12. Tugman, Matthew J., Julia H. Narendra, Quefeng Li, Yueting Wang, Alan L. Hinderliter, Steven M. Brunelli, and Jennifer E. Flythe. "Ultrafiltration-profiled hemodialysis to reduce dialysis-related cardiovascular stress: Study protocol for a randomized controlled trial." *Contemporary clinical trials communications* 15 (2019): 100415.
 13. Correa, Simon, Xavier E. Guerra-Torres, Sushrut S. Waikar, and Finnian R. Mc Causland. "SO087 RISK OF INTRADIALYTIC HYPOTENSION BY DAY OF THE WEEK IN MAINTENANCE HEMODIALYSIS." *Nephrology Dialysis Transplantation* 35, no. Supplement_3 (2020): gfaa139-SO087.
 14. SIVASANKARI, MUNUSAMY, VARADHARAJAN JAYAPRAKASH, ELAYAPERUMAL INDHUMATHI, DHAKSHINAMOORTHY JAGADESWARAN, ANGRAJE SRIVATSA, and MATCHA JAYAKUMAR. "The Effect of Dialysate Temperature on Urea Reduction Ratio among Patients Undergoing Maintenance Haemodialysis: A Case Control Study." *Journal of Clinical & Diagnostic Research* 13, no. 2 (2019).
 15. Fotiadou, Eleni, Panagiotis I. Georgianos, Michail Chourdakis, Pantelis E. Zebekakis, and Vassilios Liakopoulos. "Eating during the Hemodialysis Session: A Practice Improving Nutritional Status or a Risk Factor for Intradialytic Hypotension and Reduced Dialysis Adequacy?." *Nutrients* 12, no. 6 (2020): 1703.