

**FACTORS ASSOCIATED WITH INTRADIALYTIC HYPOTENSION IN CHRONIC RENAL FAILURE PATIENTS UNDERGOING HEMODIALYSIS THERAPY IN HEMODIALYSIS UNIT DR. ACHMAD MOCHTAR GENERAL HOSPITAL, BUKITINGGI**

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**Abstract**

Hypotension is a potential complication of hemodialysis. Hypotension is considered the most important risk factor for the development of cardiovascular complications that are main cause of morbidity and mortality in hemodialysis patients. Hypotension associated with excess mortality. Purposes of this study was to examine factors that related to the intradialytic hypotension in patients undergoing hemodialysis at Dr. Achmad Hemodialisa Mochtar General Hospital, Bukittinggi. This research is analytical correlation with cross sectional approach. Sample of this research were patients who underwent hemodialysis who met inclusion criteria. Sampling technique is purposive sampling with the number of samples as much as 39 respondents. Data Collection in this study used by observation sheets and other instruments, namely a sphygmomanometer to measure blood pressure and hemodialysis machine monitors to see the rate of ultrafiltration. Analysis of univariate and bivariate with Chi Square Test. Two variables analysis showed there was no correlation between intradialysis hypotension and age and gender ( $p$  value  $> 0.005$ ) and ultrafiltration rate intradialysis had no association with hypotension ( $p$  value  $< 0.05$ ). The study conclude that hemodialysis associated with hypotension remains one of the main complications of hemodialysis. In suggestions for future studies for the addition of other risk factors of hypotension intradialysis is a important challenge to the nephrologist.

**Keywords:** hypotension intradialytic, renal failure, hemodialysis

**BACKGROUND**

Hemodialysis is a therapy to replace the function of kidney in removing the waste products of metabolism and excess fluids and substances that are not needed by the body. At GKG hemodialysis, it should be done on a regular basis (usually 2x a week for 4-5 hours per therapies) to get a new kidney through a successful transplant operation. Clients do need chronic hemodialysis therapy because the therapy is required to maintain their life and work to control uremia (Smeltzer & Bare, 2004).

According to Indonesian Health Department, 2009, at the commemoration of World Kidney Day, said that there are about 70 thousand patients with chronic renal failure requiring dialysis therapy treatment until now, in Asia –Pacific themselves,

patients with GKG undergoing hemodialysis therapy increased from 5.5 % to 10 % per year (Roema, 2008). In 2008 the number of hemodialysis patients reached 2260 people. "The new hemodialysis patients in 2008 rose to 2260 people from 2148 people in 2007" (Indonesian Health Department, 2009). According to statistical data collected by PERNEFRI (Society of Nephrology Indonesia) the number of patients who undergo hemodialysis in the year 2011 was as many as 23.3% and in 2012 as much as 24.2% (PERNEFRI, 2013).

Hemodialysis action is currently progressing quite rapidly; though many patients experience medical problem while undergoing hemodialysis. The medical problem complication that often occurs in patients undergoing hemodialysis is

hemodynamic (Landry and Oliver, 2006). Blood pressure generally decreases while conducting ultrafiltration (UF) or withdrawal the fluids during hemodialysis. Intradialysis hypotension occurs in 20-30% of patients undergoing regular hemodialysis (Tatsuya et al., 2004). Based on research conducted Agustriadi 2009, on patients with regular hemodialysis performed in Denpasar, the incidence of intradialysis hypotension gains of 19.6% (Yenny, 2013).

Intradialysis hypotension is one of the most frequent complications of hemodialysis reached 20-30% of complications of hemodialysis. Intradialysis hypotension is still an important clinical problem because of symptoms such as nausea, and cramps, has a negative effect on the quality of hemodialysis patients (Ananda, 2013). Hypotension in patients with diabetic nephropathy and the elderly are often dangerous because it can trigger ischemic heart disease and heart rhythm disturbances (Sukandar, 2006). Additionally, intradialysis hypotension causes obstruction of the adequacy of dialysis dose (adequate dose of dialysis), where episodes of hypotension causes the effect compartment and generate  $Kt / V$  urea sub-optimal. On the episode of intradialysis hypotension, ultrafiltration must be stopped to prevent further decline in blood volume and blood volume will facilitate refill intravascular compartment. Slowing the rate of blood flow can be used in the treatment of intradialysis hypotension. (Ananda, 2013).

Research conducted by Hand (2013) on the analysis of the factors affecting intradialysis hypotension in patients with chronic renal failure undergoing hemodialysis state that as many as 23 (46 %) patients experienced intradialysis hypotension. Most respondents were in the age of 56-65 years as many as 24 patients (48 %). Most of them were male as many as 34 patients (68 %). Most of them did not use antihypertensive medication before hemodialysis, as many as 33 patients (66 %). Most of the increase in weight was as many as 19 patients (38 %). Most ultrafiltration (UFR) > 13 ml / kg / hr

for 23 (46 %). Suggestions for future research is that could be able to perform additional sampling and add some other risk factors toward intradialysis hypotension as additional factors like autonomic dysfunction, eating during hemodialysis (Hand, 2013).

Research conducted by Armiyati (2012) concerning Intradialysis hypotension and hypertension on patients with Chronic Kidney Disease (CKD) who were currently undergoing hemodialysis in RS PKU Muhammadiyah Yogyakarta showed that intradialysis hypotension was experienced by most patients at the first hour of hemodialysis that was equal to 16%. The frequency of patients experiencing hypotension increased for the next hour. Intradialysis hypotension was least experienced at the next four-hour that was 2% of patients. Based on the preliminary above, the researcher is interested in conducting research with the caption "Factors Associated With Intradialysis hypotension (IDH) On Clients with Chronic Renal Failure Undergoing Hemodialysis Therapy".

#### **METHODS**

This study uses an analytic-correlational design aimed to determine the factors associated with intradialysis hypotension in patients with chronic renal failure undergoing hemodialysis therapy. The study design used is cross sectional study approach as the measurement or observation will be carried out simultaneously (once). In accordance with the terminology, data collection is done at a time or a certain period and subjects observation performed only one time during the study (Budiarto, 2004). The target population in this study are patients with chronic renal failure undergoing hemodialysis therapy in hemodialysis unit at Dr. Achmad Mochtar Hospital Bukittinggi. To determine the sample in this study, researchers used purposive sampling technique.

The research instrument used in the collection of data for each variable is observation sheet; as well as other instruments used like sphygmomanometer to measure blood pressure and monitor

hemodialysis machines to see the ultrafiltration rate. The analysis used is univariate and bivariat. Univariate analysis explains and describes the characteristics of each study variable (Notoatmodjo , 2002). Bivariate analysis is used to examine the relationship / influence between the two variables that are independent variables (age, sex, ultrafiltration rate) and dependent variable (intradialysis hypotension). Based on data from the measuring results of the independent variables and the dependent variable, both are categorical data, and therefore chi-square test is chosen as the hypothesis test.

**RESULT**

1. Univariate Analysis

Univariate analysis was conducted to determine the frequency distribution of each variable research, analysis results univariate in this study are:

**Table. 1**  
**Respondents Frequency Distribution Based on Age at Hemodialysis Unit Hospital Dr. Achmad Mochtar Bukittinggi 2014**

No	Age	f	%
1	Dewasa Tua	33	84,6
2	Dewasa Muda	6	15,4
<b>Total</b>		<b>39</b>	<b>100</b>

**Table. 2**  
**Respondents Frequency Distribution Based on Gender at Hemodialysis Unit Hospital Dr. Achmad Mochtar Bukittinggi 2014**

No	Sex	f	%
1	Laki-laki	21	53,8
2	Perempuan	18	46,2
<b>Total</b>		<b>39</b>	<b>100</b>

**Table. 3**  
**Respondents Frequency Distribution Based on Ultrafiltration Rate at Hemodialysis Unit Hospital Dr. Achmad Mochtar Bukittinggi 2014**

No	Ultra filtraton Rate	f	%
1	< 10 ml/kg/jam	28	1,8
2	10 – 13 ml/kg/jam	8	0,5
3	>13 ml/kg/jam	3	7,7
<b>Total</b>		<b>39</b>	<b>100</b>

**Table. 4**  
**Respondents Frequency Distribution Based on Intradialysis Hypotension at Hemodialysis Unit Hospital Dr. Achmad Mochtar Bukittinggi 2014**

No	Intradialisis Hypotension	f	%
1	≥ 10 mmHg	9	23,1
2	<10 mmHg	30	76,9
<b>Total</b>		<b>39</b>	<b>100</b>

2. Bivariate Analysis

**Table 5**  
**Age relationships with Intradialisis hypotension in patients with Chronic Renal Failure Undergoing Hemodialysis Therapy in Hemodialysis Unit Hospital Dr. Achmad Mochtar 2014**

Age	Intradialisis Hiyptension				Total		P Value	OR
	≥ 10 mmHg		<10 mmHg					
	N	%	N	%	N	%		
Young Adults	1	2,6	5	12,8	6	15,4	0,685	0,625 (0,063 – 6,171)
Older Adults	8	20,5	2	64,1	3	84,6		
<b>Total</b>	<b>9</b>	<b>23,1</b>	<b>3</b>	<b>76,9</b>	<b>3</b>	<b>10</b>		

**Table. 6**  
**The relations between Gender and Intradialysis hypotension in patients with Chronic Renal Failure Undergoing Hemodialysis Therapy in Hemodialysis Unit Dr. Achmad Mochtar Hospital 2014**

Sex	Intradialysis Hypotension				Total		P Value	OR
	≥ 10 mmHg		<10 mmHg					
	N	%	N	%	N	%		
Male	7	17,9	14	35,9	21	53,8	0,101	4,000 ( 0,711 - 22,505)
Female	2	5,1	16	41,0	18	46,2		
<b>Total</b>	<b>9</b>	<b>23,1</b>	<b>30</b>	<b>76,9</b>	<b>39</b>	<b>100</b>		

**Table .7**  
**The Relations between Ultrafiltration Rate and Intradialysis Hypotension in Patients with Chronic Renal Failure undergoin Hemodialysis Therapy in Hemodialysis Unit Dr. Achmad Mochtar Hospital**

Ultrafiltration rate (UFR)	Intradialysis Hypotension				Total		Value
	≥ 10 mmHg		<10 mmHg				
	N	%	N	%	N	%	
< 10 ml/kg/jam	4	10,3	2	61,4	28	71,8	0,004
10-13 ml/kg/jam	2	5,1	6	15,4	8	20,5	
> 13 ml/kg/jam	3	7,7	0	0	3	7,7	
<b>Total</b>	<b>9</b>	<b>23,1</b>	<b>30</b>	<b>76,9</b>	<b>39</b>	<b>100</b>	

## DISCUSSION

### 1. Age

Results showed that patients who undergo hemodialysis therapy mostly adults aged 33 persons (84.6 %).

According to the study Handayani (2013), entitled "Analysis of factors affecting intradialysis hypotension in patients with chronic renal failure undergoing hemodialysis" obtained the results from a total of 50 respondents showed that most respondents who experienced intradialysis hypotension age is the age of 56-65 years as many as 16 patients (66.7 %).

According to the NKF KDOQI (2005), in another study , episode of hypotension appeared in 44% of dialysis patients aged ≥ 65 years and 32 % of patients with younger age. According to analysis, the patients who undergo hemodialysis in general are the ones with average age 59 years. This is not consistent with the theory that intradialysis hypotension in patients aged ≥ 65 years. In this study, intradialysis hypotension in patients aged < 65 years can be caused by other factors based on the theory according to Jeroen Kooman (2007) that the cause of intradialysis hypotension is multifactorial . So, intradialysis hypotension occurring in patients aged < 65 years of age can be affected by other factors such as diabetes, using antihypertensive drugs, the high rate of ultrafiltration, the short session hemodialysis, the predialysis systolic blood pressure < 100 mmHg, and others.

### 2. Gender

Results showed that patients who undergo hemodialysis therapy more than most of the male as many as 21 people (53.8 %).

According to research Pranoto (2010 ) entitled "The relationship between the duration of hemodialysis with intra- cerebral hemorrhage" is obtained from the total respondents 60 respondents which indicated that most respondents are male with 43 people (71.67 %) and less than half of the respondents is female, 17 people (28.33 %). It can be concluded that respondents who undergo hemodialysis are largely male.

Intradialysis hypotension in patients undergoing hemodialysis is not affected by gender. In general, blood pressure among patients has no clinically significant

difference. So, intradialysis hypotension that occurs in hemodialysis patients is not affected by the sex of the patient.

#### 1. Ultrafiltration Rate

Results showed that patients who undergo hemodialysis therapy mostly have ultrafiltration rate with the value of  $< 10 \text{ ml / kg / h}$  as 28 orang (71.8 %).

According to the study Handayani (2013), entitled "Analysis of factors affecting intradialysis hypotension in patients with chronic renal failure undergoing hemodialysis" obtained the results from the total respondents 50 respondents indicated that most respondents have the ultrafiltration rate  $> 13 \text{ ml / kg / hour}$  for 23 (46 %) respondents. In this study it can be concluded that in general, patients undergoing hemodialysis have the ultrafiltration rate  $> 13 \text{ ml / kg / hour}$ . Patients with hemodialysis therapy have a high morbidity and mortality that may be associated with hemodynamic effects as fast ultrafiltration. Flyte et al, examined the effects on mortality and UF rate of cardiovascular disease (CVD). UF rate is divided into 3 categories:  $< 10 \text{ / ml / h / kg}$ ,  $10-13 \text{ ml / h / kg}$ , and  $> 13 \text{ ml / h / kg}$ . From this study, it was found that UF is faster in patients with HD associated with a greater risk for all-cause mortality and mortality due to CVD (Flythe et al., 2011).

At the time of hemodialysis done, ultrafiltration is to withdraw excess fluid in the blood, the amount of ultrafiltration is done which depends on the weight gain (BB) patients between hemodialysis time and targets dry BB patients (K / DOQI, 2006).

#### CONCLUSION

Based on the analysis and discussion of the results of research conducted on 39 respondents in Hemodialysis Unit at Dr. Achmad Mochtar Hospital Bukittinggi 2014, it can be concluded as follows:

- a) Most of the respondents who undergo hemodialysis in the hemodialysis unit are an older age.
- b) More than half of respondents who undergo hemodialysis in the hemodialysis unit are male.

- c) More than half of respondents who undergo hemodialysis in the hemodialysis unit has ultrafiltration rate with the value of  $< 10 \text{ ml / kg / hour}$ .
- d) More than half of respondents who undergo hemodialysis in the hemodialysis unit not experiencing intradialysis hypotension.
- e) There is no significant relationship ( $p = 0.685$ ) between age and intradialysis hypotension in patients with chronic renal failure undergoing hemodialysis therapy in hemodialysis units.
- f) There is no significant relationship ( $p = 0.101$ ) between the sex with intradialysis hypotension in patients with chronic renal failure undergoing hemodialysis therapy in hemodialysis units.
- g) There is a significant relationship ( $p = 0.004$ ) between the ultrafiltration rate with intradialysis hypotension in patients with chronic renal failure undergoing hemodialysis therapy in hemodialysis units.

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