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RELATIONSHIP OF CONTROLLED HYPERTENSIVE WITH DEGREE OF HYPERTENSIVE RETINOPATHY ON SPECIAL EYE HOSPITAL IN SOUTH SUMATERA DURING 2019-2022

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ABSTRACT

Hypertension is defined as an increase in systolic blood pressure >140 mmhg and diastolic pressure >90 mmhg. Based on Riskedas's data 2018, prevalence of hypertension in Indonesia was 34,11%. Patient with uncontrolled blood pressure were at high risk of damage organs such as retina of eye which can cause hypertensive retinopathy. The extent and severity of retinopathy can divided into four degree according to Keith Wagener Barker Classification System. The severity of degree retinopathy hypertensive can be prevented by controlling blood pressure. The purpose of this research was to determine the relationship between blood pressure and degree of hypertensive retinopathy at special eye hospital in south sumatera during 2019-2022. This methods of research is analytical observational using a cross sectional design. From total sampling methods, 21 samples were obtained who met inclusion criteria. The highest people who is suffered uncontrolled blood pressure in grade III hypertensive retinopathy was 9 people (56,3%) and people who had controlled blood pressure in grade I hypertensive retinopathy was 3 people (60.0%) . There is a relationship between controlled blood pressure control and the degree of retinopathy hypertensive at eye's hospital with p value (0.034%)

Keywords : Uncontrolled blood pressure, controlled blood pressure, Hypertensive retinopathy

1. INTRODUCTION

Definition of hypertension is systolic blood pressure (SBP) values more than 140 mmhg, and diastolic blood pressure more than 90 mmhg (1). Hypertension is major health problem because of high prevalence in worldwide. About 7,6 million or 12,8% death/years occur in worldwide because of high blood pressure. In last thirty years ago people, 30-70 years with hypertension has increased from 650 million to 1.28 billion. (2) It is estimated that numbers will increase to 1,56 billion with hypertension in 2025. (2) In Indonesia , prevalence of hypertension has increased drastically from 25.8% in 2013 to34,1% in 2018 (3)

High blood pressure affects not only the hearts, kidneys, brain and large arteries but also the eyes. A prolonged duration of high blood pressure can be associated with a breakdown of inner blood retinal barrier with extravasation of plasma and RBCs.The pathophysiological changes in eyes, resulting in retinal circulation referred to as hypertensive retinopathy. The initial response is vasospasm, chronic arteriosclerotic changes such as intimal thickening, media wall hyperplasia, and hyaline degeneration. Ketih et al suggest the severity of retinal microvasculature changes affect the mortality and divided into four classification system for retinopathy hypertensive. The 3 years survival rate was 70% for patient with grade I hypertensive retinopathy compared to 6% for patient with grade 4 retinopathy. The recognition hypertensive retinopathy is important in cardiovascular risk stratification of hypertensive individuals. In the national health

examination survey, individuals with retinal arteriol narrowing were two to six times more likely to have a preexisting coronary heart disease than those without retinal arteriol narrowing after adjusting the systemic hypertension, diabetes adn serum cholesterol levels. (4,5) The most commonly used grade scale of retinal vasculature based in Keith Wageners System .

Grade	
I	Slight narrowing,sclerosis, and tortousity of retinal arterioles
II	Definite narrowing, focal constriction, sclerosis of retinal arterioles, and arteriovenous nicking
III	Retinal hemorrhages, exudates, and cotton wool spots
IV	Severe grade III and papilledema

In this system, the sign of moderate retinopathy can be identified by blot or flame shaped hemorrhages, hard exudates, microaneurysm, cotton wool spots or a combination of all the changes, and severe retinopathy can show all of these retinopathy signs as well as optic disc swelling. (4)

In Malignant hypertensive retinopathy can be found cystoid macular edema, lipid deposit, and arteriolar changes. Clinical changes from hypertensive choroidopathy are directly related to the release of endogenous vasocontrictor agent (eg. angiotensin II, epinephrine,vasopressin) during systemic hypertension. Angiographically, there is delayed, patchy choroidal filling, is followed by late leakage from choroidal vessel into subretinal space(5)

The purpose of this research was to determined the relationship between controlled blood pressure and the degree of retinopathy hypertensive in eyes's hospital of south Sumatera

2. METHOD

The type of research is analytical observational with cross sectional design. The study was conducted at eyes's hospital in 2019-2022. The population of this study were patient with hypertensive retinopathy, with a total sample of 21 respondents. The independent variables is controlled hypertensive, and dependent variable is degree of hypertensive retinopathy. Instrument data collection using a questionnaire. Analysis of research data is univariate and bivariate using chisquare test

3. RESULT

Frequency distribution of age based on degree of hypertensive retinopathy

	Degree I	Degree II	Degree III	Degree IV	Total
< 50 years old N	2	1	4	0	7
%	28,6%	14,3%	57,1%	0%	100%
>50 years Old N	2	0	6	6	14
%	14,3%	0,0%	42,9%	42,9%	100%
Total N	4	1	10	6	21
%	19.0%	4,8%	47,6%	28,6%	100%

Distribution of age <50 years old with 2 subjects with hypertensive retinopathy grade I (28,6%), 1 subject with hypertensive retinopathy grade II (14,3%) and 4 subject with hypertensive retinopathy grade III (57,1%) and no subject with hypertensive retinopathy grade IV

Frequency distribution of gender based on degree of hypertensive retinopathy

		Degree I	Degree II	Degree III	Degree IV	Total
M	N	2	0	4	4	10
	%	20%	0%	40 %	40%	100%
F	N	2	1	6	2	11
	%	18,2%	9,1 %	54,5%	18,2%	100%
Total	N	4	1	10	6	21
	%	19,0%	4,8%	47,6%	28,6%	100%

Distribution of gender, from 21 subject of male , 2 male subject with degree I hypertensive retinopathy(20%), no subject with degree II of hypertensive retinopathy, 4 subject with degree III of hypertensive retinopathy (40%), and 4 subject with degree IV hypertensive retinopathy (40%). From female subject, 2 subjects with degree I of hypertensive retinopathy (18,2%), 1 subject with degree II of hypertensive retinopathy (9,1%), and 6 subject with degree III of hypertensive retinopathy (54,5%), and 2 subject with degree IV of hypertensive retinopathy (18,2 %).

Frequency of history blood pressure based on degree of hypertensive retinopathy

	Degree I	Degree II	Degree III	Degree IV	Total
History(-) %	2 14,3%	0 0%	6 42,9%	6 42,9%	14 100%
History (+) %	2 28,6%	1 14,3%	4 57,1%	0 0%	7 100%
Total	4 19,0%	1 4,8%	10 47,6%	6 28,6%	21 100%

Distribution history of hypertension, 2 subject with history hypertensive with degree I of hypertensive retinopathy (14,3%), no subject with degree II of hypertensive retinopathy, 6 subject with degree III (42,9%), and 6 subject with degree IV (42,9%). Subject with no history hypertensive, 2 subject with degree I of retinopathy 28,6%, 1 subject with degree II (14,3%) and 4 subject with degree III (57,1%), and no subject with degree IV

Frequency blood pressure based on degree of hypertensive retinopathy

	Degree I	Degree II	Degree III	Degree IV	Total
Controlled %	3 60%	1 20%	1 20%	0 0%	5 100%
Uncontrolled %	1 6,3%	0 0%	9 56,3%	6 37,5%	16 100%
Total %	4 19%	1 4,8%	10 47,6%	6 28,6%	21 100%

Distribution of blood pressure, subject with controlled blood pressure, 3 subject with degree I hypertensive retinopathy(60%), 1 subject with degree II (20,0%), 1 subject with degree III (20%) dan no subject with degree IV. Subject with uncontrolled blood pressure, 1 subject with degree I hypertensive retinopathy, and no sample with degree II, 10 subject with degree III (56,3%), and 6 subject with degree IV (37,5%)

Analysis Bivariate

	Degree I	Degree II	Degree III	Degree IV
Controlled blood pressure	3 (60%)	1 (20%)	1 (20%)	0 (0%)
Uncontrolled blood pressure	1 (6,3%)	0 (0%)	9 (56,3%)	6 (37,5%)

P values 0,034

Based on bivariate analysis with kolmogrov smirnov, subjects with controlled blood pressure with degree hypertensive retinopathy, p values 0,034 (<0,05). The conclusion, there is relationship between controlled blood pressure with degree retinopathy hypertensive. The ratio prevalens values 28,000 with confidence interval 1,988-349,405. This research using correlation test, with 2-tailed value is 0.0004 and correlation coefficient is

1,00 with positive correlation.

4. DISCUSSION

Based on univariate analysis, age of < 50 years old with 7 subject (33,3%) dan age >50 years old with 14 subject (66,7%) with intervals 21-75 years old. One of the risk factor of hypertension is age, that could not be modified. According to data from the Prospective Urban Rural Epidemiology (PURE) , the highest number of hypertension are ranged from 35-70 years old. Nuraeni says that increasing aged, can cause changes in arteries that are more wider and stiffness progressively, so the capacity of blood diminished through the blood vessel. The stiffness of arteries wall can occur due to accumulation of collagen in the muscle layer so the blood vessel narrow gradually and stiffness. In addition, age can also narrowing the arterioles in the retina.(6) In this research, it was found that the highest degree of hypertensive retinopathy was grade III and IV (42,9%) and age > 50 years old, and decreased at age <50 years old. According to Yastina, atherosclerosis risk in communities (ARIC) in 1993-1995 on 9.300 participant aged ranged from 50-71 years old, it was found the narrowing of retinal arterioles was closely related to the blood pressure (7)

Distribution subject with gender was 10 subject (47,6%) male, and 11 subjects female (52,4%). This is different from the prospective Urban Rural Epidemiology (PURE), the incidence of retinopathy hypertensive is more in male than females. (6) Meanwhile, according to Nuraeni, the prevalence of men and women is the same because lifestyles such as smoking, stress, and obesity can cause progressivity of hypertension. In this research , symptoms in male and female grade I and II are blurry vision, pain in the eye, and degree III and IV are blurry vision, headache, and decrease of vision. There is no difference between male and female. According to sylvestris, symptom in degree III and IV are decrease and blurry vision because of diminished vascularisation such as narrowing of retinal arteriole, and bleeding from nerve fibres and outer plexiform tunica, exudation and cotton wool patches, lipid star in macula. (8).

In this research, based on history of hypertensive was found 14 subjects with degree III and IV retinopathy hypertensive, meanwhile only 7 subjects with no history hypertension with degree III and IV retinopathy hypertensive. The subject who had history of hypertension, the symptom of retinopathy hypertensive was a progression of hypertension, even though subject received routine medication such as amlodypine. Tiens says that people who have history hypertension is still increasing even though they are receiving antihypertensive drugs are more likely to experience, retinopathy hypertensive (9)

Based on this research, it shows 5 subjects with controlled blood pressure (23,8%) and 16 subjects with uncontrolled blood pressure (76,2%) . Subjects with controlled blood pressure, retinopathy hypertensive, mostly found in degree I, 3 subjects (60%) and no subject found with controlled blood pressure in grade IV. Subjects with uncontrolled blood pressure mostly found in degree III, 9 subjects (56,3%) and highest in degree IV. According to yestina, narrowing the arteriole of the retinal has correlation with blood pressure, especially in patients who get antihypertensive drugs or not. In degree I retinopathy hypertensive, retinal has no experienced severe

abnormalities, in funduscopy there are no severe abnormalities, except narrowing arteriol of retinal. Meanwhile patient with uncontrolled blood pressure, with degree III retinopathy hypertensive, on funduscopy was found bleeding and cotton wool spots. In addition patiens with degree Iv retinopathy hypertensive were also found. This is indicate that there has been a progression of hypertensive from uncontrolled more dangerous compared than controlled blood pressure.(7) According to sylvestris if there has been changes in the fundus due to atherosclerosis, then this condition can no longer be treated.(8)

This study used 2x2 table, using alternative test, namely the kolmogrov smirnov test. In kolmogrov smirnov the significance value is 0,05.The value obtained is 0.034, which can be conclude, there is a relationship between controlled blood pressure and the degree of retinopathy hypertensive.

5. CONCLUSION

From this research, can be concluded that the most retinopathy hypertensive were aged >50 years old, and the highest at grade III retinopathy hypertensive. The largest number of retinopathy hypertensive were women, with the highest degree III retinopathy hypertensive. Subject with history hypertension 14 subject with the highest degree being grade IV. Mostly found 16 subjects with uncontrolled blood pressure more than subjects with controlled blood pressure. There is a relationship between controlled blood pressure and degree of retinopathy hypertensive ($P<0.034$). Uncontrolled blood pressure is risk factor for the severity of retinopathy hypertensive (95% CI 1.9-349.4) and controlled blood pressure is closely related to the occurence of retinopathy hypertensive, with positive correlation

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