

Postpartum Rat Systolic Blood Pressure with Gynura Procumbens Leaf Extract

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Abstract: Introduction: Complications of postpartum hypertension can lead to retinal failure, kidney failure, stroke, pulmonary edema, damage to blood vessels in the heart, cerebrovascular sequela to cause death. The purpose of this study was to find out the picture of blood pressure of Wistar mice after the administration of Gynura procumbens extract. Material and Methods: This is a randomized controlled trial. The study subjects consisted of 20 female Wistar mice after giving birth which was divided into control groups and treatment groups. Induction of hypertension with a diet high in salt (NaCl 8%, 3ml/hr) and prednisone 3 gr/kgBB was given for 14 days. Negative control group intervention using aquades 3ml/hr, positive control group intervention using nifedipine 3 mg/kg bb, and intervention group using Gynura procumbens extract 10 mg/kg bb and nifedipine 3 mg/kg bb. Intervention is carried out for 14 days. Result: The results showed that there was a significant increase in systolic blood pressure after the induction of hypertension and there was a greater decrease in systolic blood pressure values after intervention in the intervention group when compared to the positive control group, namely systolic blood pressure. Conclusion: decreased systolic blood pressure after administration of Gynura procumbens and nifedipine was greater than that given nifedipine alone. Gynura procumbens can lower systolic blood pressure values in postpartum Wistar mice.

Keywords: gynura procumbens, hypertension, postpartum

1. Background

Maternal mortality in Yogyakarta in 2014 (40 people) decreased compared to 2013 (46 people). The decrease in maternal mortality was also significant in 2015 (29 people) but increased sharply in 2016 (39 people) and experienced a slight decrease in 2017 (34 people). The cause of maternal death was dominated by heart disease (10 cases), bleeding (5 cases), and hypertension (4 cases). Complications of postpartum hypertension can lead to retinal failure, kidney failure, stroke, pulmonary edema, damage to blood vessels in the heart, cerebrovascular sequela to cause death. Mothers with a history of postpartum hypertension or preeclampsia will experience a rise in sedentary blood pressure until the age of 12 weeks postpartum period where in this time period the risk of complications due to hypertension such as seizures (eclampsia), HELLP syndrome, even death is increasing.

There needs to be adequate treatment for the prevention of complications in the mother of the postpartum. Treatment of hypertension with pharmacology can be done by administering diuretics, beta-blockers, ace-inhibitors, and calcium blockers. The effects of antihypertensive drugs include fluid and sodium retention, hypokalemia, hypomagnesia, hypercalcemia, hyperuricemia, hyperglycemia, hyperlipidemia, and sexual dysfunction. Non-pharmacological therapies have been widely developed to overcome hypertension, such as spiritual therapy with dhikr, mind therapy with meditation, and herbal or plant extracts. Gynura procumbens leaves have antihypertensive activity by inhibiting the activity of the angiotensin-converting enzyme (ACE). Gynura procumbens leaves can be used as adjuvant therapy because they can block the influx of calcium ions.

2. Material and Methods

This type of research is experimental research with the design of pre-test post-test control group design to find out the picture of blood pressure after the administration of Gynura procumbens extract and compare blood pressure before and after treatment, comparing blood pressure control group and treatment.

The study subject was a Wistar rat (*Rattus norvegicus*) who had given birth. The number of mice used as subjects by the criteria of the World Health Organization (WHO), ten (10) mice in each treatment group. The study subjects were 20 Wistar mice, which were divided into two groups, namely the treatment group and the control group. Sample selection and grouping are done randomly. The inclusion criteria is a pregnant female Wistar rat, aged 2-3 months at the time of sample selection, weighing 200-300 grams. Exclusion criteria are Wistar rats get sick and or die.

Acclimatization of animals is carried out for 7 days to familiarize the animal to experimental conditions and is given standard food and sufficient drinks. Each sample group was given the same food. Induction of hypertension with saline solution NaCl 8%, 3 ml/day, and Prednisone 3 mg/kg bb for 14 days. Extraction of Gynura procumbens with maceration techniques.

The negative control group was given aquades of 3 ml/hr. The positive control was given nifedipine 3 mg/kg bb, the treatment group-administered Gynura procumbens extract 10 mg/kg bb, and nifedipine 3 mg/kg bb, intervention was carried out for 14 days. The treatment is done with a sonde technique to ensure that nothing is wasted or left. Measurements of systolic blood pressure were carried out before induction, after induction, and after treatment in all

groups with Coda ® and analyzed research data.

3. Result

The average systolic blood pressure score of the negative control group increased after hypertension induction and increased (4.24 %) after intervention. The average systolic blood pressure score of the positive control group increased after hypertension induction, and decreased (19.98 %) after intervention. The average systolic blood pressure score of the intervention group increased after the induction of hypertension, and decreased (24.74 %) after intervention.

Based on the data, there were significant differences between negative and positive control groups. From the results of the description above, the administration of prednisone 3mg/KgBB and NaCl 8% can increase blood pressure in postpartum Wistar mice through the mechanism of the renin-angiotensin-aldosterone system and fluid retention.

Table 1: Systolic Blood Pressure (TDS) Wistar Postpartum Rat with Gynura Procumbens

TDS	Group		
	Control (-) Mean ± SD	Control (+) Mean ± SD	Intervention Mean ± SD
Early TDS	116.9 ± 4.14	113.4 ± 3.71	115 ± 3.94
TDS after 14 days induction	196.8 ± 27.17	221.9 ± 24.18	217.7 ± 18.51
TDS after 14 days of intervention	201.7 ± 27.1	176.9 ± 14.94	163.6 ± 12.31

The positive control group managed to lower systolic blood pressure. In the positive control group was given nifedipine which is ace-inhibitor group, so it can be used as a comparison in ACE-inhibitor activity found in gynura procumbens. Nifedipine is used as a comparison is a hypertensive drug that works to inhibit the enzyme angiotensin I to angiotensin II (ACE-I) and inactivating bradykinin, a powerful vasodilator [5]. Mice given gynura pprocumbens at a dose of 10 mg/KgBB had an average decrease in systolic blood pressure of 54.1 mmHg (24.47%). The data showed that gynura procumbens doses of 10 mg/KgBB can lower systolic blood pressure values.

4. Discussion

Side effects of hypertension are increased heart attack, heart failure, stroke, and kidney damage[12]. Gynura procumbens have ACE-inhibitor activity. ACE-inhibitors can inhibit the work of Angiotensin-Converting Enzyme which has a role in the pathophysiology of hypertension. The average blood pressure drop is 5-6 mmHg for diastole and 10-12 mmHg for systolic. A decrease in blood pressure of 5-6 mmHg can reduce the risk of stroke by up to 40%, coronary heart disease by 15-20%, and reduce heart failure. Bovet et al. [13] study of volunteers showed that a decrease in blood pressure of 7 mmHg occurred after taking antihypertensive drugs 0-3 days per week, with an initial blood pressure of 158 mmHg. The consumption of the drug 6-7 days per week will lower blood pressure to 16 mmHg. The use of antihypertensive drugs against patients can reduce the risk of stroke by up to 18%, coronary heart disease by 16%, and

death from ruptured blood vessels by 21%.

Gynura procumbens have a blood pressure-lowering effect caused by the activity of ACE inhibitors contained in Gynura procumbens. ACE inhibitors will prevent Angiotensin-Converting Enzyme from converting Angiotensin I into Angiotensin II so that nothing causes an increase in blood pressure. As it is known that Angiotensin II plays a role in increasing blood pressure through the effects of fluid retention, sympathetic nerve stimulation, and increased secretion of ADH and Aldosterone.

5. Conclusion

The average systolic blood pressure score in the Wistar postpartum mice of the negative control group was higher than the positive control group, the average systolic blood pressure score of the positive control group was higher than the intervention group. Gynura procumbens extract can lower systolic blood pressure values. Further research is recommended regarding the comparison of effective doses of Gynura procumbens extract as an anti-hypertension.

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