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Analysis of Risk Factors Contrast Induced Nephrophaty in Coronary Artery Disease Patients Obtained Percutaneous Coronary Intervention at Wahidin Sudirohusodo Hospital in Makassar, South Sulawesi

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Abstract

Incidence of Contras incident Induced Nephropathy (CIN) after percutaneous coronary intervention (PCI) is a determinant factor of Acute Kidney Injury (AKI). Risk factors evidence can strengthen the prevention of CIN before PCI intervention performed. This study aimed to identify risk factors for the incidence of CIN in Coronary Artery Disease (CAD) patients obtained PCI. Evidence of the risk factors can strengthen the prevention of CIN before PCI intervention performed. This study aimed to identify risk factors for the incidence of CIN in patients with CAD obtained PCI.

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It was a quantitative research with retrospective design, population were coronary artery disease (CAD) patients and sample size were 25 patients. Bivariate analysis using Fisher exact statitistical test showed that variable associated significantly with the incidence of CIN only diabetes mellitus (OR = 21.000, P = 0.007, 95% CI = 1922-299392) while the variable gender, age, smoking, acute myocardial infarction and hypertension did not have a significant relationship (p> 0.05). Predictor for incindence CIN based on binary regression analysis was diabetes mellitus (PR = 21.000, P = 0.007, 95% CI = 1922-299392) while variable gender, age, smoking, acute myocardial infarction and hypertension did not have a significant relationship (p> 0.05). Result of this study reinforces the need prevention for patients with risk factors before PCI intervention especially diabetes mellitus.

Keywords: Contras Induced Nephrophaty; Percutaneous Coronary Intervention; Diabetes Mellitus.

1. Introduction

Administration of contrast agents in coronary artery disease patients when percutaneous coronary intervention (PCI) is a risk factor for the occurrence of contrast induced nephrophaty (CIN), patient characteristics such as age and history of disease is also risk factor for the occurrence of CIN [1-3]. Incidence of CIN may develop to acute kidney injury and was significantly associated with morbidity of hospitalized patients [4].

Some studies revealed that CIN incidence in women increased morbidity and mortality. Age, gender and incidence of diabetes mellitus are predictor of the incidence of CIN after PCI [5-7]. The aging and cardiovascular disease itself is also a determinant of CIN [8]. Diabetes mellitus is a predisposing factor for CIN via several mechanisms such as an increase in the tubules transport activity and formation of reactive oxygen species [9]. Increased Risk of CIN and bad prognostic in patients with diabetes mellitus type 2 Become a consideration for preparing prevention before administration of contrast agents [10, 11].

Knowledge of risk factors can be useful for the prevention and treatment of CIN incidence. Provision of contrast media should be postponed in patients with congestive heart failure until haemodynamic status can be resolved and delayed 24 hours for patients with myocardial infarction. Important consideration also for patients who have risk factors to be considered in getting hypo-osmolar contrast media [12].

Research about CIN in Makassar, South Sulawesi is infrequent, so this study aims to identify risk factors for the incidence of CIN in patients with cardiovascular obtained PCI in wahidinsudirohusodo hospital in Makassar, South Sulawesi.

2. Material and Methods

This study was retrospective that investigated variables suspected could be a predictor for cardiovascular CIN in patients undergoing PCI at Wahidin Sudirohusodo hospital, Makassar, South Sulawesi. Risk factor variables was obtained from medical records of patients. The population were all Coronory Artery Disease (CAD) patients which assigned PCI, sample size were 25 patients obtained by accidental sampling.

Serum creatinine patients were examined 24-48 hours after PCI then categorized into two groups; patients

experienced CIN and patients did not experience CIN. This criterion was based on increasing of serum creatinine > 0.5 mg /dl or 25% improvement from baseline in 24-48 hours after PCI. It was according to Kidney Disease Improving Global Outcomes (KDIGO) of the year 2012.

Using bivariate statistical analysis with Fisher Exact test followed by a multivariate analysis, binary logistic regression. Data then displayed with table contained frequency and percent along with odds ratio (OR) value, probability value(p) and confidence interval (CI) of 95%, declared significant if the p value ≤0.05.

3. Result

Bivariate analysis showed variable associated significantly with incidence of CIN only diabetes mellitus (PR = 21.000, P = 0.007, 95% CI = 1922-299.392) while variables gender, age, smoking, acute myocardial infarction and hypertension did not have a significant relationship (p≥0.05) (Table 1). Variables met the criteria (p <0.25), namely age, smoking habits and history of diabetes mellitus included in multivariate analysis (Table 2).

Table 1: Risk of Cotrast Induced Nephrophaty

		Incidence of Contras Induced Nephrophaty						
		Yes (n=10)		**No (n=15)**		**OR**	**P**	**95% CI**
		n	**%**	**n**	**%**			
Gender	Female	1	4.00	1	4.00			
	Male	9	36.00	14	56.00	1.556	0.650*	0.086-28.145
Age (year)	<60	5	20.00	13	52.00	6.500	0.075*	0.937-45.106
	≥60	5	20.00	2	8.00			
Smoking	Yes	3	12.00	2	8.00	0.359	0.248*	0.048-2.689
	No	7	28.00	13	52.00			
Miocard Infarc Acute	Yes	2	8.00	6	24.00	0.583	0.402*	0.058-2.414
	No	8	52.00	9	32.00			
Congestive Heart Failure	Yes	2	8.00	2	8.00	1.625	0.532*	0.190-13.933
	No	8	32.00	13	52.00			
Diabetes Mellitus	**Yes**	**6**	**24.00**	**`1**	**4.00**	**21.000**	**0.007***	**1.922-**
	No	**4**	**16.00**	**14**	**56.00**			**229.392**
Hypertension	Yes	8	32.00	12	48.00	1.000	0.687*	0.135-7.932
	No	3	8.00	2	12.00			

* Fisher Exact Tesr

n=number, OR=Odd Ratio,P=probability, CI=confidence interval

Binary logistic regression analysis in table 2 showed that variable was being significant predictors for incidence of CIN after PCI was history of diabetes mellitus (OR = 4.199, P = 0040.95% CI=1.125-202.026) while age

and smoking habits were not predictor of CIN incidence (p> 0.05).

Table 2: Multivariate Regression Analysis

Variable	OR	P	95%CI
Age	1.184	0.277	0.361-35.106
Smoking	0.002	0.969	0.053-16.848
Diabetes Mellitus	4.199	0.040[a]	1.125-202.026[a]

OR=Odd Ratio,P=probability, CI=confidence interval

[a]significant (p≤0.05)

4. Discussion

Study results revealed that variables associated significantly and be a predictor for incidence of CIN only diabetes mellitus disease. Patients who had insulin resistance and diabetes mellitus were more susceptible to CIN compared with non-diabetic patients both PCI and non PCI, [13, 14]. Kidneys of diabetic patients are particularly vulnerable to hypoxia and oxidative stress after administration of contrast agent, hypoxia induced formation of reactive oxygen species (ROS) and it has an important role in the pathogenesis of CIN [9]. ROS could lead to injury of vascular endothelial tubules directly and as a trigger of renal parenchymal hypoxia induced endothelial dysfunction and dysregulation of tubular transport [15]. Giving contras media (CM) increase production of ROS and renal oxidative stress which mediates damage cell membrane and induced apoptosis and necrosis [16]. Administration low or iso-osmolar contrast media, hydration pre- and post-contrast hydration with 1500 ml of 0.9% saline solution infusion (N-acetylcysteine (NAC) associated with sodium bicarbonate (Na2HCO3) infusion) could be alternative for patients with history of diabetes mellitus or renal dysfunction [17-21].

This study was consistent with the results of global finding that diabetes mellitus was predictor for inceidence of CIN. It provided recommendations for medical services, especially in Makassar, South Sulawesi, Indonesia that patients with a history of diabetes mellitus would need precaution before PCI. Further research should explore predictor variables for CIN with larger sample size and more variable in order to provide prevention recommendations for patients undergoing PCI.

5. Conclusion

History of diabetes mellitus was predictor variable for patients with coronary artery disease (CAD) undergoing PCI, it reinforces requirement for prevention in patients with risk factors before PCI intervention.

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Competing Interest

The authors declare that they have no competing interests.

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