Correlation Between Total Ischemic Time with Creatinin Level and Urine Production in Kidney Transplant : A Single Centre Report

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Abstract

Background: Kidney transplantation is acknowledged as a major advance of modern medicine which provides high-quality life years to patients with irreversible kidney failure (end-stage renal disease, ESRD) worldwide. The first kidney transplantation in Semarang underwent at Telogorejo Hospital in 1985. Dr. Kariadi Hospital nowadays, kidney transplantation had done 28 times since January 2014 until September 2018. Kidney ischemic time is one of the important factor which can affect the outcome of kidney transplantation. The prolonged ischemic of the graft can be related with the effect transplantation. This study is aimed to evaluate the influence of total ischemic time with the outcome of kidney transplantation in Dr. Kariadi Hospital Semarang.

Material and Methods: This is an observasional, cross sectional study. The data was collected from medical record. The subject of this study were all patients who underwent kidney transplantation that recorded in medical record from January 2014 until December 2018 and the level of creatinin dan urin production before and after transplantation was documented. There are 28 patient who include in inclusion criteria. The results of the study will be tabulated and statistical calculations are performed using SPSS 23.0. The relationship is declared meaningful if p = 0.05 is obtained.

Result: From the analysis of the research that has been done using Pearson correlation test and hypothesis test Wilcoxon and it was found that there was a relationship between ischemic time and a decrease in creatinine level from r = -0.4489 with a value of p = 0.008. From the analysis of the research that has been done, there is a relationship between ischemic time and urine production after transplantation with a value of r = -0.562 and a value of p = 0.002.

Conclusion: From the results of this study there is a strong correlation between the length of total ischemic time with a decrease in creatinine and urine production which means that the longer ischemic time the lower the decrease in creatinine levels and the less urine production.

Keywords: Total ischemic time; Creatinin level; Urine production; Kidney transplantation

Introduction

The number of patients diagnosed with end-stage renal disease (ESRD) in indonesia is increasing annualy, showing similiar trend with global prevalence [1,2]. Kidney transplantation is acknowledged as a mayor advance of modern medicine which provides high-quality life years to patients with ERSD worldwide [2,3]. Patient who have kidney transplantation live 10 to 15 years more longer than patient who received dialysis [4].

Since 1985, there were several renal transplantations performed in Telogorejo Hospital and Dr. Kariadi General Hospital, Semarang. In Dr. Kariadi General Hospital Semarang, kidney transplantation had done 26 times since January 2014 until September 2018 [5]. The successful of kidney transplantation is depending on several factor [6,7]. Prolonged ischemic of the graft can be related with the effect transplantation. Ischemic can induced a danger cascade effect that can be worsened with the return of blood supply [8]. This injury can produce inflamatory and immune response that can potentially make delayed kidney function, increased alloimune reactivation, and develompent of progressive pathological change [9,10].

The aim of this study was to investigate the influence of total ischemic time with the outcome of kidney transplantation in Dr. Kariadi General Hospital Semarang.

Material and Methods

This is an observational, cross sectional study. The data was collected from medical record of patient who underwent kidney transplantation from January 2014 until December 2018 at Kariadi General Hospital Semarang.

The population in this study is patient with renal failure who had kidney transplantation in Dr. Kariadi General Hospital Semarang. The subject of this study were all patients who underwent kidney transplantation that recorded in medical record from Januari 2014 until December 2018 and the level of creatinin dan urin production before and after transplantation was documented. There are 28 patient who include in inclusion criteria. Descriptive data is presented in the form of tables and box-plots. The normality test use Shapiro Wilk. Then the data was analyzed using the Wilcoxon test. The results of the study will be tabulated and statistical calculations are performed using SPSS 23.0. The relationship is declared meaningful if p = 0.05 is obtained.

Result

Creatinine level

The results of research conducted on 28 study subjects found that before and after transplantation as many as 28 subjects had decreased creatinine (Figure 1). From the analysis carried out obtained creatinine average before transplant 7.9 ± 2.53, creatinine mean after surgery 5.2 ± 4.4, mean creatinine decrease 3.4 ± 1.1 mg/dL From the analysis of the research that has been done using Pearson correlation test and hypothesis test Wilcoxon and it was found that there was a relationship between ischemic time and a decrease in renal postin creatinine from r = -0.4489 with a value of p = 0.008 (Figure 2).
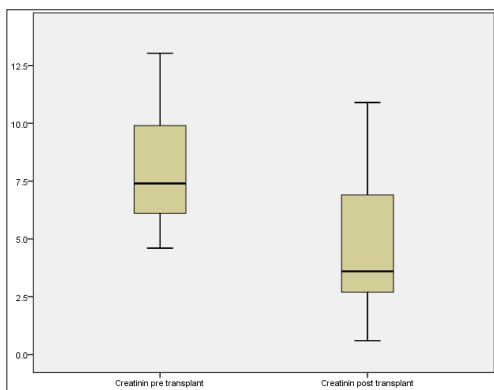

Figure 1: The decreased of creatinin level before and after transplant.

Urine production

The results of the study conducted on 28 research subjects found that the average urine production 2.5 hours post anastomosis was 294 ± 87 ml. From the analysis of the research that has been done, there is a relationship between ischemic time and post transplant urine production with a value of r = -0.562 and a value of p = 0.002 (Figure 3).
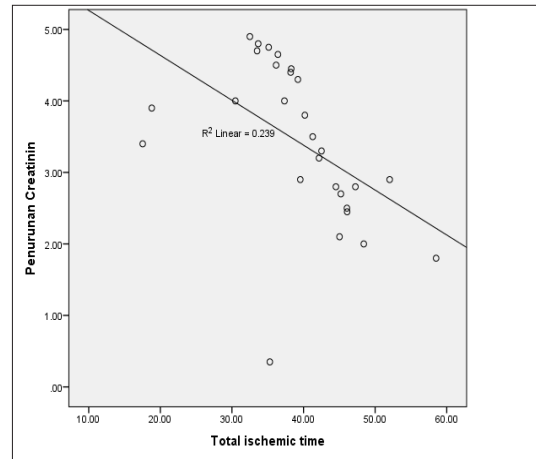

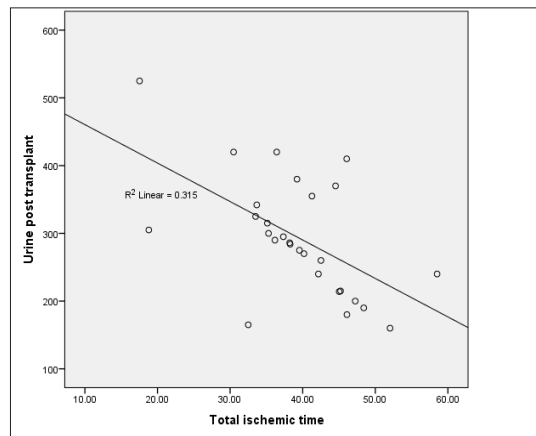**Figure 2:** The decreased of creatinine level compared with total ischemic time..

Figure 3: The decreased of urine production compared with total ischemic time..

Discussion

Chronic kidney disease (CKD) is a damage to the structure or function of the kidney lasting ≥ 3 months, with or without a decrease in glomerular filtration rate (GFR) [11]. The succesfull of kidney transplantation is depending on some factor such as ischemic time [6,7]. Total ischemic time is defined as the time of the donor renal artery interruption or aortic clamp, until the time of release the clamp on the renal artery in the recipient (in hours). Total ischemic time is a combination of cold ischemic ime (CIT) and warm ischemic time (WIT) [12,13]. polonged ischemic time is associated with increase of Delayed graft function (DGF) and longer length of stay which consequently increase the cost of transplantation [14,15].

Reperfusion after CIT activates the complex cascade, which ultimately contributes to apoptotic or necrosis cell death. This phenomenon is also known as Ishemic Reperfusion Injury (IRI) [8]. It is known that injuries caused by ischemia and reperfusion and to some extent also with cooling and rewarming give rise to cascades which ultimately leads to apoptosis, endothelial cell injury, and activation of the innate immune response resulting from organ dysfunction [10].

DGF occurred in 13.5% of recipients with a total ischemic time of 14 hours or longer than 10.9% of those with shorter ischemic time. This effect is greatest for those with donors aged 55 years or more. thus, appears that the consequences of a long ischemic time are mainly identifiable in the early posttransplant period as DGF and possibly an increased acute rejection rate. The effects of ischemic time on the long-term outcome of renal transplantation in the forms of impaired graft function and graft survival are less evident [10,16].

Conclusion

From the results of this study there is a strong correlation between the length of total ischemic time with decrease in creatinine levels and urine production which means that the longer ischemic time the lower the decrease in creatinine levels and then less urine production.

Acknowledgment

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