

Evaluation of the impact the food N_Acetylcystein on prevention of acute renal failure in patients with chronic renal failure undergoing coronary bypass surgery

*A. Ebadi¹, M. Deghani², M. Soltanzade³, A. Ghorban⁴, Sh. Nasionpour⁵, R. Akhondzadeh⁶, K. Behaien⁷, Sabori⁸

1,3- Associate Professor of Cardiac Anesthesiology, Department of Cardiac Anesthesiology, Golestan Hospital, Ahvaz Jundishapour University, Ahvaz, Iran.

2, 5, 6, 7-Assistant Professor of Anesthesiology, MD, Department of Cardiac Anesthesiology, Golestan Hospital, Ahvaz Jundishapour University, Ahvaz 4- Assistant Professor, Department of Nephrology 8-Resident of Anesthesiology MD

* Corresponding Author: Ebadi1959@ajums.ac.ir

Abstract: Acute renal failure (ARF) is a syndrome of sudden decrease in Glomerular filtration is the general definition of waste in the body leads to retention. This definition only includes a range of clinical situations. To encompass the full spectrum of the syndrome of acute kidney injury (AKI) has been proposed. The main objective of this study is whether the preventive use of NAC in preventing AKI after cardiac surgery in patients with chronic kidney disease are at the same time or not? So check the effect of oral N-acetylcysteine on the prevention of acute renal failure in patients with chronic renal failure undergoing coronary bypass surgery seem to be logical and useful. Results from this study can identify the possible side effects to NAC. Prove the effectiveness of oral NAC in the prevention of acute renal failure in patients with chronic renal failure undergoing coronary bypass surgery can study the use of NAC to the anesthesiologist and the surgeon can offer.

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1. Introduction

Acute Renal Failure cause postoperative complications such as prolonged hospitalization and death in patients (1). Beginning around the ARF kidney failure is indicative of poor prognosis. In most patients with severe renal involvement required hemodialysis, and mortality risk acute kidney Injury (AKI) is 50% (3). The incidence of AKI after cardiac surgery, AKI definition and characteristics of patients according to the 1-3% is variable (4). ARF levels in individuals with normal renal function after cardiac surgery is very low (<2%) and the complexity increases (5). In (CPB) Cardio Pulmonary By pas blood from the heart and lungs are driven. A severe inflammatory reaction with by putting CPB, due to cellular and humoral occurs. This reaction is very similar to what we see in the infection (6).

Patients who are undergoing heart surgery and the bypass are related to the CPB agents are added to its complexity. Systemic inflammatory response and low blood flow during CPB and Hypo perfusion may cause develop renal failure after cardiac surgery (7) (8) (9).

Starting CPB and enter crystalloid with blood into the body, hematocrit and *Oncotic* pressure drops and fluids are seeping out of the vessels and tissues are swollen and can Cause kidney dysfunction (9).

Acute renal failure after CPB (Cardio Pulmonary By pas) exist (10, 11) and is associated with increased mortality and increased hospital stay and ICU (12). Several risk factors for ARF after surgery were identified. It is important that older age, history of Congestive Heart Failure, diabetes, CPB long and contact with nephrotoxic drugs, such as: Contrast dye (13).

Magnitude and duration of acute and chronic injuries during surgery and the presence of risk factors determines the likelihood of impaired renal function around the action (14). Such as:

- A. *Those in serum creatinine over their preoperative $120 \frac{\mu\text{mol}}{\text{l}}$ (1.3 mg/dl)*
- B. *Insulin-dependent diabetes*
- C. *Older than 70 years of age*
- D. *Difficult in performance of the left heart*
- E. *Previous surgery on the heart or heart valves.*

These patients appear to be suitable for preventive interventions. A preventive intervention may be less direct Oxidative Stress. Because they are convinced that one of the important mechanisms of kidney damage is so Oxidative Stress (15).

Oxidative Stress by N-acetylcystein (NAC) is weak. NAC is an antioxidant that can directly delete types of

reactions of oxygen and Given that this matter can be based on renal dysfunction caused by the color of Radiology has a protective effect (16).

With the aging population and surgical advances, more elderly patients with accompanying than in the past the disease are undergoing cardiac surgery (17) so this situation is indicative of an increased incidence of AKI after surgery (18). While currently no treatment strategy for overcoming AKI is not available (19).

Seleak Adabag et al (2008) Showed preventive use of preoperative NAC does not prevent the occurrence of AKI after cardiac surgery. (35)

In this study, 102 patients with chronic kidney disease undergoing cardiac surgery were subjected to Random. They are 50 mg 400 NAC-orally twice daily and 52 received the placebo. *Creatinine* was higher in both groups and the maximum increase was in the fifth day after surgery. The authors concluded before giving prophylactic NAC surgery cannot significantly prevent the AKI after surgery.

Erminio Sisillo et al (2008) showed that NAC could not prevent the use of intravascular renal failure acute renal failure in patients with underlying heart surgery (36).

In this study, 254 chronic kidney diseases undergoing cardiac surgery were selected. 129 of them, NAC intravenous were treatment 1200mg and 125 received placebos. The authors concluded that intravenous NAC to patients with acute renal failure in patients undergoing cardiac surgery did not prevent.

Studies Michael Maase and colleagues (2007) showed that use of NAC in reducing the incidence of acute renal failure associated with CPB compared with placebo in high-risk patients undergoing cardiac surgery, is not more effective.

Therefore, this study hypothesized that preoperative use of the NAC, which prevents the occurrence of AKI after cardiac surgery in chronic kidney disease, whether or not to be?

So study the effect of oral acetyl-cysteine on the prevention of acute renal failure in patients with chronic renal failure undergoing coronary bypass surgery seem to be logical and useful.

2. Materials and Methods

Specific objectives of the project research :

- 1) *Determinate Serum Cr and GFR level in patients receiving N-Acety undergoing coronary bypass surgery before the operation.*
- 2) *The level of serum Cr and GFR in patients receiving N-Acety undergoing coronary bypass surgery after surgery is how?*
- 3) *Comparison of serum Cr and GFR in patients receiving N-Acety undergoing coronary bypass surgery before and after surgery are the same.*

- 4) *Serum levels of Cr and GFR, in patients receiving Placebo undergoing coronary bypass surgery before the operation is how?*
- 5) *Serum levels of Cr and GFR, in patients receiving Placebo undergoing coronary bypass surgery after the operation is how?*
- 6) *Comparison of serum Cr and GFR in patients receiving Placebo undergoing coronary bypass surgery before and after surgery are the same.*
- 7) *Comparison of serum Cr and GFR in patients receiving N-Acety and Placebo patients before and after surgery are the same.*

2.1. The Application

Results from this study can identify the possible side effects to NAC.

Prove the effectiveness of oral NAC in the prevention of acute renal failure in patients with chronic renal failure undergoing coronary bypass surgery can study the use of NAC to the anesthesiologist and the surgeon can offer.

After approval of the ethics committee of Ahwaz University of Medical Sciences and written consent from all patients, this study randomized double blind controlled Trayal in Golestan and Imam Hospital, Ahwaz, from May 2010 to May 2011 was performed.

All patients and classified according to the National Kidney Foundation defines chronic kidney disease, have had at least 2 or higher stage of nephropathy and diagnostic criteria for chronic kidney disease and there must be continued for at least 3 months. (GFR <90, Cr > 1.5)

These patients were excluded:

- I. *Peritoneal dialysis or had blood*
- II. *To have emergency surgery.*
- III. *Kidney transplant*
- IV. *Contrast agent had received a week ago.*

To control the amount and volume of distilled water through the tube was Mary.

Patients on arrival to the operating room intramuscular morphine 0.1 and 25 mg promethazine, Intramuscular received

Antibiotic prophylaxis with intravenous cefazolin 1.5 grams every 8 hours to 24 hours also received.

Then induction anesthetic drugs for patients with thiopental 2-3 mg kg fentanyl 3-5 ($\mu\text{g}/\text{kg}$) and Atracurium 0.5 (mg/ kg) and Midazolam 0.1 (mg kg) .

For patients EKG 5 Lady CVP = Central venous pressure, arterial line, Nasogastrec tube Rectal temperatures were set and monitored and the pump circular membrane oxygenator was used.

Prime with one liter of Ringer's solution 500 ml glucose 5% solution and a vial bicarbonate and 100 cc of 20% mannitol was given before aortic clamping.

Flow rate was adjusted so that the average pressure between 80-60 mmHg throughout surgery to maintain straw.

Before and during connection to CPB, before and 2 h after recovery from surgery, systolic, diastolic, mean arterial, heart rate, central venous pressure (CVP), arterial oxygen pressure (PaO₂), PH and arterial oxygen saturation (SaO₂), was measured and recorded.

Invasive blood pressure measurement according to the radial artery catheter placed in and benefiting from a transgenic model of transducers and monitoring devices (HP (Hewlett Packard took).

Measurement of arterial blood gases, PH PaO₂ and SaO₂ by measuring blood gases (model AVL Compact 3) were done. The rate of patients during surgery and the need for positive Inotrop drugs were evaluated for binding to the pump. If less than 90 mm Hg in systolic blood pressure during CPB apart from the fact that adrenaline diluted concentrations of drug Inotrop is a dose 0.01-0.1 µg / kg / min was used.

Ringer added to maintain a constant liquid level in the Venous Reserve was prescribed.

Hemodilution was to maintain a minimum level Hg 7g/dl done.

3. Results

- 1) Average age of study participants in the control group: 63.28(-⁺8.21) with a range of 41 to 74 years of age and group (intervention 62.041(-⁺8.62) Age range was 49 to 82 years. Analysis of the data means between the ages of the participants in the two groups did not show. ($P = 0.651$)
- 2) 20(%80) participants in the study group (control), male gender, and the remainder 5 (20%) were female. The gender of the participants in the combined intervention group 22 (88%) male and 3 (21%) were women. The gender of participants in each group were not significantly different from $X^2_{(1)} = 0.595, P = 0.702$
- 3) The average weight of participants in the control group 75.16(-⁺14.04) years, range 50 to 102 kg in weight and average weight of participants in the group (I), 70.80 (-⁺12.521) range weight was 45 to 96 kg. The weighted average participants in the two groups were not significant. ($P = 0.317$)
- 4) Average height of the participants in the group (0), 165.44 range from 150 to 180 cm and in group (I), 164.44 (a.09) the range was from 140 to 178 cm. Average height of participants in the study did not show significant differences with each other. ($P = 0.846$)

- 5) 15 (%40) of participants in the control group were diagnosed with hypertension in the intervention group, whereas 13 (52.0%) participants had a history of hypertension.
- 6) Hypertension risk status of the participants showed no significant difference between the two groups. ($P = 0.776, X^2_{(1)} = 0.325$)
- 7) Diabetes 11(44.0%) of participants in the control group and 10(40.0%) patients participants in the intervention group was observed. Diabetes among participants between the two groups showed no statistically significant difference. $P = 1.000, X^2_{(1)} = 0.082$

Table 1 shows the demographic information of participants in the study .

Table 1: Demographic data on study participants (S_a: Standard deviation, C: control, I: intervention group)

| max | Min | S _a | Average | | |
|--------|-------|----------------|---------|---|---------|
| 63.28 | 8.22 | 41.00 | 75.00 | C | Age |
| 62.04 | 8.62 | 49.00 | 84.00 | I | |
| 75.16 | 14.09 | 50.00 | 102.00 | C | Weight |
| 70.80 | 12.52 | 45.00 | 96.00 | I | |
| 165.44 | 7.49 | 150.00 | 180.00 | C | stature |
| 164.44 | 9.09 | 140.00 | 178.00 | I | |

4. Conclusion

Acute Renal Failure has postoperative complications in patients with prolonged hospitalization and death (1).

Kidney failure is a bad prognosis marker around the beginning of ARF. Its pathogenesis is unclear.

Probably a range of mechanisms including hemodynamic factors influence the release of inflammatory reactions nephrotoxic drugs vasoconstrictive factors and interference due to CPB and blood products is artificial membranes.

This study revealed that the drug N-acetylcysteine, patients had significantly better for patients as well as reduce creatinine but does not prove less acute renal failure.

Acute renal failure after cardiac surgery with a higher risk of serious complications including infection and prolonged hospitalization, increased mortality is associated with long and short term.

Use of N-acetylcysteine for prevention of acute renal failure in patients with recent heart surgery "has been evaluated, but conflicting results have been on.

In a study were shown no difference in the rate of acute renal failure after surgery (30% vs. 29% in control patients) was shown. In addition, the hospital mortality rate, instead of using N-acetylcysteine did not decrease. (3.4% vs. 2.7% in the control group)(35).

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Contact us:

Jundi Shapur University of Medical Sciences,
Golestan Hospital Cardiovascular Anesthesia,
Ahwaz, Khuzestan, IRAN,
Dr Ahmad Ebadi Telephone: 09161110099
Work Fax: 06113743017
E-mail: Ebadi1959@ajums.ac.ir

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