



ORIGINAL RESEARCH PAPER

Anaesthesiology

SUCCESSFUL PRESERVATION OF RENAL FUNCTION IN OFF- PUMP CABG WITH PRE-EXISTING RENAL DYSFUNCTION.-SINGLE CENTRE RETROSPECTIVE ANALYTIC STUDY OF PROTECTIVE METHODS.

KEY WORDS: Renal dysfunction, off pump CABG, Sr.creatinine

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ABSTRACT	Objectives : Our aim is to preserve renal function following OPCAB with pre-existing renal dysfunction.
	Methods:- 59 adult patients with pre-existing renal dysfunction i.e. Sr. Cretinine >1.5mg/dl undergoing Off Pump CABG were considered eligible for participation into the statistical analysis. We tested different end points, exchanged Sr. Creatinine concentration with creatinine clearance and added intraoperative variables.
	Design : Single centre retrospective observational study.
	Result- There was significant reduction in post operative renal failure.Only two patients out of 59 patients required dialysis and succumbed to death.Rest all 57 patients discharged without any morbidity.There was no differences in lengths of stay in the ICU and Hospital .
	Conclusion-: The result of this study suggested that patients with pre-existing renal impairment have safe outcome with OPCAB. Aggressive maintainance of urine output by IV fluids,correcting Acid-Base disorder,loop diuretics and ionotropic support to maintain MAP are mainstay of protective methods.

Introduction-

Renal dysfunction is well recognized complication following coronary artery surgery. Off-pump CABG has been shown to minimize renal injury in such patients comparing to on pump CABG. Acute, kidney injury in Off-pumpCABG is a consequence of Ischemia – Hypoxia – reperfusion injury, manipulative abnormal position of heart during grafting and low cardiac output state. The purpose of this study was to study the factors which preserve the already impaired renal function and prevent the morbidity in the form of renal failure and requiring dialysis and improving the survival of such patients. Acute kidney injury is a clinical syndrome broadly defined as an abrupt decline in renal function, which occurs over a period of hours to days and results in retention of nitrogen products and metabolic waste.[1] Although its initial clinical manifestation is usually oliguria, The diagnosis of acute kidney injury is revealed from a recent increase in serum creatinine and/or urea, or a reduction in urine output.[2]

Risk factors for acute kidney injury include older age, male gender and diabetes mellitus.(3) However, the most important risk factor is the pre-existing chronic kidney disease.(4) This, in turn, is a predictor of acute kidney injury in the postoperative period.(5)

Material and Method –

Methods:-Total 59 adult patients with pre-existing renal dysfunction i.e. Sr. Cretinine >1.5mg/dl undergoing Offpump CABG were considered eligible for participation into the statistical analysis. We tested different end points, exchanged Sr. Creatinine concentration with creatinine clearance pre operatively,post operatively and at the time of discharge , and added intraoperative variables.

- Exclusion criteria-**
- 1.Pre-op requirement of dialysis
 2. Exposure to dye (cath study) within 30days

Objectives : Our aim is to know status of renal function following Off pumpCABG with pre-existing renal dysfunction.

Design : Single centre retrospective observational study from 2012-2015.

Setting : MGM Medical College and Hospital, Aurangabad, MH

We enrolled 59 patients above 18 yrs.Male patients were 57 and two patients were female.average BMI was 23-26 % Incidence of Diabetes Mellitus was 43% and hypertension 49 %.45 %patients had Ejection fraction above 50 %.12 % patients had Ejection Fraction of 40-50 %.3.5 % havd poor LV function.We monitored intraoperative clinicalparameters like urine output,mean arterial blood pressure,ABG Analysis with protocolled intervals and corrections done accordingly to maitained urine output.

Statistical Analysis:

The collected data was compiled in EXCEL sheet and Master sheet was prepared. For analysis of this data SPSS (Statistical Software for social Sciences) software version 20th was used. Qualitative data was represented in form frequencies & percentages. Quantitative data was represented in form of mean & SD. To check significance difference between pre and post treatment of different parameters paired t-test was applied. Karl Pearson Correlation was also used to check relationship between different parameters. P-value was checked a 5 % level of significance.

Results –

1. **Mean pre-op creatinine and creatinine clearence which was increased in first 24-48 hrs comes to baseline at discharge.**
2. **In 45 patients serum creatinine level maintained [postop rise <0.3 mg] by keeping MAP-65-70 mm of Hg.with adequate hydration and continous good [>2 ml/kg/hr] good urine output.**
3. **Only two patients having preop sr.creat > 2.2 mg /dl with bil.medical renal disease.required dialysis and had 30 days mortality .**

Table 3: Mean Difference of pre and post :

		Mean Difference	t-value	P-value
Creatinine Clearence	Pre-operative vs Post-operative	4.03	4.27	P<0.0001 S

	Pre-operative vs At Discharge	1.61	1.99	P=0.051 NS
	Post-operative vs At Discharge	2.42	3.65	P=0.001 S
Creatinine	Pre-operative vs Post-operative	0.213	4.56	P<0.0001 S
	Pre-operative vs At Discharge	0.004	0.034	P=0.937 NS
	Post-operative vs At Discharge	0.215	2.91	P=0.005 S
MAP	Pre-grafting vs Post-grafting	16.26	10.21	P<0.0001 S

Table 2 : Comparison of sr. Creatinine , Creatinine Clearenc and MAP

		Mean	SD
Creatinine Clearence	Pre-operative	40.90	10.32
	Post-operative	36.86	7.92
	At Discharge	39.28	8.46
Creatinine	Pre-operative	1.66	0.178
	Post-operative	1.88	0.420
	At Discharge	1.66	0.39
MAP	Pre-Grafting	92.66	12.00
	At Grafting	76.40	8.32

Table 4 : Correlation between MAP and Post-operative Creatinine

	r-value	p-value
MAP vs Post-operative Creatinine	-0.474	P<0.0001 S
Urine output at grafting vs Post-operative Creatinine	0.540	P<0.0001 S
Total Urine output vs Post-operative Creatinine	0.518	P<0.0001 S

DISCUSSION- Acute changes in renal function after elective coronary bypass surgery are incompletely characterized and represent a challenging clinical problem.[6]On pump coronary artery bypass grafting has proved as predictor for post op renal dysfunction because of Cardiopulmonary bypass machine and due inflammatory reactions.[7]Off –pump coronary surgeries does not include the use of CPB machine and are devoid of its risk of inflammatory responses .Use of stabilizers for off pump coronary artery surgeries and positioning of heart during grafting manifest in haemodynamic instability and hypoxia and low cardiac output.More the duration of grafting vessels with compromised haemodynamics can lead to less urine output and post operative renal dysfunction.[8]clinical indicators of good perfusion are Mean blood pressure, Urine output and base excess.Optimum Mean arterial pressure even in grafting phase if maintained by use of ionotropes , adequate hydration results in persistant urine output.[9]In our study we have observed that in those patient Mean arterial pressure not well maintained inspite of use of ionotropes leads to poor urine output and increased creatinine levels postoperatively. We used loop diuretics to stimulate good urine output though many studies found them not useful [10]To start ionotropic support we choosen Dopamine [11];if there was no response to fluid .and.we found correlation of good intraoperative urine output with less rise in serum creatinine post operatively.Use of diuretics we not found any harm rather they were useful to maintain good urine output .In two patients we had no response in form of urine output to ionotropes or diuretics and they had very high increase in serum creatinine post operatively neede dialysis.

Off pump CABG Pts. With preexisting renal impairment will have lowest risk<2% if maintainance of-1.adequate hydration2. adequate cardiac output and urine output bu filling and ionotropic support if required.lasix,dopamine helps to maintain urine output. Intra grafting drop of urine output has predicted rise in post op rise in csr. Creatinine level. Immediate measures to be taken during this crucial intragrafting phase for good urine output.

Creatine clearence is more sensitive indicator of GFR than sr.creatine which we studied too ,and successfully maintained to

baseline.

AKI CLASSIFICATION used for clinical staging.[6]

: Definition and classification of AKI

1.1.1 We recommend using a uniform definition of AKI, based on urinary output and on changes in serum creatinine (SCr) level. It is important that both criteria are taken into account. (1C)

1.1.2 We recommend diagnosing and indicating the severity of AKI according to the criteria in the table below: (ungraded statement)

Stage 1: one of the following:

**Serum creatinine increased 1.5–1.9 times baseline
Serum creatinine increase >0.3mg/dl (26.5 µmol/l)
Urinary ouotput < 0.5ml/kg/h during a 6 hour block**

Stage 2: one of the following

**Serum creatinine increase 2.0–2.9 times baseline
Urinary output <0.5ml/kg/h during two 6 hour blocks**

Stage 3: one of the following:

**Serum creatinine increase >3 times baseline
Serum creatinine increases to >4.0mg/dl (353 µmol/l)
Initiation of renal replacement therapy
Urinary output <0.3ml/kg/h during more than 24 hours
Anuria for more than 12 hours**

In our study we observed that urine output is a very important clinical predictor for post operative kidney function assessed by serum creatinine and creatinine clearance.We should not accept urine output below 1ml/hr.Meticulous maintainance of urine output with the measures like maintainance of hydration,Mean arterial pressure,use of ionotropes and diuretics.

Conclusion-

Conclusion:- The result of this study suggested that patients with pre-existing renal impairment have safe outcome with OPCAB. Aggressive maintainance of urine output by IV fluids,correcting Acid-Base disorder,loop diuretics and ionotropic support to maintain MAP are mainstay of protective methods.

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