Pak Heart J

FREQUENCY OF CONTRAST INDUCED NEPHROPATHY IN PATIENTS UNDERGOING PERCUTANEOUS CORONARY INTERVENTION

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Date Received: May 12, 2015
Date Revised: May 20, 2015
Date Accepted:May 30, 2015

Contribution
All the authors contributed significantly to the research that resulted in the submitted manuscript.

All authors declare no conflict of interest.

This article may be cited as: Ikramullah, Israr M, Ali U, Iqbal MA, Ahmad F, Awan ZA. Frequency of contrast induced nephropathy in patients undergoing percutaneous coronary intervention. PakHeartJ2015;48(3):130-133.

ABSTRACT

Objectives: To determine the frequency of contrast induced nephropathy (CIN) in patients undergoing percutaneous coronary intervention (PCI)

Methodology: This was descriptive cross sectional study performed at Cardiology Department Hayatabad Medical Complex Peshawar from 1st July 2014 to 31st Dcember 2014. Patients who were admitted for PCI, were included in the study. Sampling techniques was non probability consecutive. Contrast induced nephropathy was defined as increase in serum creatinin of 25% or more from the baseline value and/or an absolute increase of 0.5 mg/dl or more in serum creatinin from baseline value. Data was analyzed using SPSS version-15. All results were presented in the form of tables and graphs.

Results: A total of 177 patients, who were admitted in Cardiology Department Hayatabad Medical Complex Peshawar for PCI were included in the study. Mean Age of the study population was 60±5.71 years. Frequency of contrast induced nephropathy among 177 patients was analyzed and it was found that 18(10%) patients developed contrast induced nephropathy during hospital stay. There was no gender difference in the frequency of CIN but it was found that CIN was more common in advanced age group. Regarding patients clinical presentation it was found that CIN was more common in patients who presented with ACS than in patients with stable angina.

Conclusion: Contrast induced nephropathy is a common finding following PCI which is more common in patients with advance age and presenting with acute coronary syndrome.

Key Words: Percutaneous Coronary Intervention, Contrast Induced Nephropathy, Diabetes Mellitus

INTRODUCTION

Cardiovascular disease has a major impact on global health. According to the World Health Organization, an estimated 17.1 million people died of cardiovascular diseases worldwide in 2004, representing 29% of all deaths; approximately 23.6 million people are expected to die from these diseases in 2030.[1]

A large number of these patients require cardiac catheterization and percutaneous coronary intervention (PCI). This is particularly relevant to South Asian countries like Pakistan, which are facing cardiovascular disease epidemic.[2] These days more than 1,000,000 percutaneous coronary intervention procedures are performed annually worldwide.[3]

Contrast induced nephropathy (CIN) is a disorder characterized by the onset of acute renal failure within 24 to 72 hours after the administration of iodinated contrast medium and is generally self limiting though a few patients may require haemodialysis.[4,5] CIN is a common form of acquired acute renal failure after coronary angiography and percutaneous coronary intervention and this is associated with prolonged hospitalization and adverse clinical outcomes.[6]

The pathophysiology of contrast induced nephropathy is hypothesized to be a combination of ischemia due to vasoconstriction and direct toxicity to the renal tubules via reactive oxygen species.[7] The risk factors predicting contrast induced nephropathy consists of 5 patient related factors including creatinin clearance, diabetes mellitus, congestive heart failure, hypertension and peripheral vascular disease, along with 3 procedure-related factors including intra-aortic balloon pump usage, contrast volume > 260 ml and urgent/emergency procedure.[8]

This study will help to identify the severity of problem in our local set up and local population which will help to take measures for prevention of the problem and make strategies for timely management to minimize post PCI morbidities, mortalities, hospital stay and cost of treatment.

Table No 1: Age Distribution

AGE	FREQUENCY	CIN
20-30 years	4 (2%)	0
31-40 years	18 (10%)	1(5.5%)
41-50 years	35 (20%)	3(8.5%)
51-60 years	47 (27%)	5(10.6%)
61-70 years	55 (31%)	6(10.9%)
> 70 yeas	18 (10%)	3(16.6%)
Total	177 (100%)	18 (10%)

METHODOLOGY

This descriptive cross sectional study was performed at Hayatabad Medical Complex Peshawar from 1st July 2014 to 31st December 2014. Sampling techniques was non probability consecutive. All patients with both gender and age more than 18 years admitted to Cardiology department for percutaneous coronary intervention were included in the study. Patients with hospital stay less than 24 hours and acute renal impairment due to some other identifiable cause were excluded from the study. Contrast induced nephropathy was defined as increase in serum creatinine of 25% or more from the baseline value and/or an absolute increase of 0.5 mg/dl or more in serum creatinine from baseline value.

The study was conducted after approval from hospital ethical and research committee. After informed consent patient were enrolled in the study. All patients were subjected to detailed history. A detailed clinical examination was done in all patients to assess risk factors for contrast induced nephropathy. Baseline serum creatinine and creatinine clearance was performed and was repeated 24 to 48 hours after the procedure. All the procedure was performed by experienced cardiologist and after PCI all patients were managed in CCU and were observed for any complication. All the information was recorded in pre specified proforma. Data was analyzed using SPSS version-15. Frequency and percentage were calculated for categorical variables like gender and contrast induced nephropathy while Means ± SD was calculated for numerical variable like age. All results were presented in the form of tables and graphs

RESULTS

We studied 177 patients who were admitted for PCI in Cardiology Department Hayatabad Medical Complex Peshawar. Male patients were 115 (65%). Mean Age of the study population was 60 ± 5.71 years. Patients were categorized into various age groups (Table 1). Patients were also categorized on the basis of type of presentation whether stable angina, USA/NSTEMI or STEMI. Out of total patients, 35(20%) patients had stable CAD, 53(30%) patients had unstable CAD while 89(50%) patients had STEMI (Table 2).

Frequency of contrast induced nephropathy among 177

Table No 2: Type of Presentation

Diagnoses	Number of patients	Contrast Induced Nephropathy
Stable Cad	35 (20%)	3 (8.5%)
Unstable Cad / NSTEMI	53 (30%)	5 (9.4%)
STEMI	89 (50%)	10 (11.2%)
Total	177	18 (10%)

Table No 3: Frequency of Contrast Induced Nephropathy

Contrast Induced Nephropathy	Frequency	Percentage
Yes	18	10%
No	159	90%
Total	177	100%

patients was analyzed and it was found that 18 (10%) patients developed contrast induced nephropathy during hospital stay (Table 3). It was found that CIN was more common in advance age group. Regarding patients clinical presentation it was found that CIN was more common in patients who presented with ACS than in patients with stable angina.

DISCUSSION

Contrast induced nephropathy is a common form of acquired acute renal failure after coronary angiography and percutaneous coronary intervention and this is associated with prolonged hospitalization and adverse clinical outcomes. The current study is an attempt to find the severity of problem in our local set up. In our study 10 % patients develop CIN who underwent PCI. Although in literature the frequency of CIN is found to be 2-25 %, depending upon the underling risk factors for development of CIN.[9-11] But most studies have found similar results to our findings. Mehran R et al studied 8600 cases and found that 13 % patients developed CIN.[11] Weisbord and colleagues, also studied post PCI development of CIN and found 13.7 % cases with CIN which is very close to our findings.[12] Chen SL et al reported 6.5 % and Dangas G found 7% cases of CIN in patients underwent PCI.[13,14] In another study by Tsai TT et al, found 7.1 % frequency of CIN.[15] Result of this study was quiet similar to most of the studies, however the differences may be due to the fact that about 80% of our patients had ACS , which is usually a high risk factor for developing CIN.

We also found that patients with advance age were more prone to develop CIN. Patient with age group less than 40 years were having 5% and more than 70 years were having almost 16 % frequency of CIN. Similar findings of advance age are a risk factor for CIN was found by Chen SL et al[13] and Takagi T et al.[16]

We also found that patients with acute coronary syndrome like NSTEMI/USA and STEMI are more prone to develop CIN. ACS is documented risk factor for CIN and we found that CIN more frequent in ACS patients as compare to stable angina. A study conducted by Dangas G et al found that STEMI patient were more prone to develop CIN as compared to patient with stable angina.[14] They found 9 % case of CIN cases in STEMI which is similar to our findings of 11.2 %. Further more our this finding is also strongly supported by Mega JL et al, a study evaluated the epidemiology of CIN in over 8000 patients undergoing PCI (12% in STEMI), which was significantly higher compared with patients undergoing non-emergent catheterization (9.2% in unstable angina and NSTEMI patients and 4.5% undergoing elective PCI). Even in patients with baseline GFR >60, the incidence of CIN in the STEMI population was 9.2%. Such a high incidence of this complication invokes the need to define measures to decrease the occurrence of CIN in patients presenting with STEMI.

LIMITATIONS

Our study is having several limitation of small sample size, and we had few patients in age more than 70 years and less than 30 years, moreover most of our patients were of acute coronary syndrome. So large sample size including more patients with advance age and stable CAD will further improve the accuracy of our data. Moreover CIN is also dependent on underlying risk factors for CIN like dye type and quantity, comorbidities (Diabetes and Hypertension) and preexisting renal status. If these factors are taken in to account then data results will be more representative and accurate.

CONCLUSION

Contrast induced nephropathy is a common finding following PCI which is more common in patients with advance age and presenting with acute coronary syndrome. So appropriate measures must be taken to reduce the frequency of this complication.

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