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**ORIGINAL ARTICLE**

# Factors for In-hospital Mortality after Percutaneous Coronary Intervention in Patients with ACS

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## ABSTRACT

**Background:** Percutaneous coronary intervention (PCI) is a nonsurgical technique for treating obstructive coronary artery disease.
**Aim:** To assess the causes / factors leading to mortality after percutaneous coronary intervention
**Study design:** Cross sectional study
**Setting:** Department of Cardiology, Punjab institute of cardiology, Lahore.
**Duration:** Six months i.e. from1st July 2020 to 31st December 2020.
**Methods:** Medical records of 100 cases who dies after PCI for acute coronary syndrome were taken from record center. Medical record of patients aged 40 to 70 years, both genders underwent PCI and did not survived after PCI were included. Location of lesion, and severity of vessel disease, type of procedure and acute renal failure were considered as factors of mortality and were noted on proforma while analyzed in SPSS 20.
**Results:** The mean age of the patients was 54.20 ± 8.84 years. There were 42(42%) males and 58(58%) females. History of smoking was positive in 48 (48%) cases, diabetes in 51(51%) and hypertension in 55(55%) cases. Among the factors, old age (≥50 years) was observed in 64(64%) patients while 36(36%) had age <50 years. There were 39(39%) patients who underwent PCI under emergency situation and 61(61%) patients had PCI under elective circumstances. Acute renal failure was noticed in 37(37%) patients. There were more patients of right coronary artery disease i.e. 54(54%) who underwent PCI.
**Conclusion:** Out of all factors leading to mortality after PCI, older age at the time of PCI is the most common factor, followed by right coronary artery disease and multi-vessel disease.
**Keywords:** Mortality, PCI, angiography, cardiovascular complications

## INTRODUCTION

Coronary artery disease is a serious and most common presentation in an emergency setting, which leads to the higher rate of complications and death[1]. Percutaneous coronary intervention (PCI) is an interventional but non-surgical treatment to open the obstructive coronary arteries, which leads to the acute coronary syndrome[2]. PCI has grown into a successful nonsurgical method for treating patients with coronary artery disease, because to a mix of advanced technology, competent operators, and current medication treatment[3,4].

Over the last three decades, PCI has made tremendous progress in the treatment of obstructive coronary artery disease[5-7]. PCI has been demonstrated to enhance quality of life in patients with acute STEMI when performed electively in the right individuals. Because complication rates and rates of urgent surgery were high, PCI was initially done at clinical locations with surgical support. As physician expertise grew, methods improved, technological integration with coronary stents improved, and antiplatelet and anticoagulant regimes improved, the necessity for emergency surgery decreased significantly[8-10].

Furthermore, as technology advances and operator expertise grows, periprocedural adverse events have decreased steadily and consistently, resulting in good and similar results for coronary artery bypass surgery[11]. Death, myocardial infarction, stroke, and emergency repeat revascularization are examples of significant consequences, whereas transient ischemic attack, access-site problems, renal insufficiency, and adverse responses to radiographic contrast are examples of mild complications. Coronary perforation, tamponade, and arrhythmias are further potential consequences[12].

So we want to conduct this study to get the most important causes of mortality after PCI, in order to predict the modifiable factors to prevent and reduce the incidence of mortality after PCI in future. Based on the information regarding the pre-PCI factors would help to predict the risk of mortality after PCI and we would be able to plant PCI according to the history of the patients.

The objective of the study was to assess the causes / factors leading to mortality after percutaneous coronary intervention

## MATERIALS AND MEHTODS

This cross sectional (retrospective) study was conducted in the Department of Cardiology, Punjab institute of cardiology, Lahore for a period of six months i.e. from 1st July 2020 to 31st December 2020 after approval from Ethical Committee. Sample size of 100 cases was estimated by using 95% confidence level, 6.5% margin of error and percentage of emergency procedure i.e. 11.4% after PCI. Sampling Technique used was simple random sampling.

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**Inclusion criteria:** Medical record of patients aged 40 to 70 years, both genders underwent PCI and did not survived after PCI were included in the study.
**Exclusion criteria:** Patients having h/o previous PCI or CABG, converted to open surgery during PCI were not included in the study.
**Data Collection:** 100 medical records of patients who underwent PCI were selected for this study. Baseline data included age, gender, BMI, h/o smoking, diabetes, hypertension were noted. Location of lesion, and severity of vessel disease, type of procedure (emergency or elective), and acute renal failure (Serum creatinine level increased >50% than baseline within 24 hours of procedure) were considered as factors of mortality and were noted. All data was collected in a proforma.
**Data analysis:** Data was entered and analyze using SPSS 20. Factors were presented in frequency and percentage.

## RESULTS

The mean age of the patients was 54.20±8.84 years. There were 42(42%) males and 58(58%) females. There were 20(20%) patients who had normal BMI, 46(46%) were overweight while 34(34%) were obese. History of smoking was positive in 48(48%) cases, diabetes in 51(51%) and hypertension in 55(55%) cases (Table 1).

Table 1: Demographics of patients

| **N** | **100** |
|---|---|
| Mean | 54.20 ± 8.84 |
| **Gender** | |
| Male | 42 (42%) |
| Female | 58 (58%) |
| **Body Mass Index** | |
| Normal | 20 (20%) |
| Overweight | 46 (46%) |
| Obese | 34 (34%) |
| **Smoking** | |
| Yes | 48 (48%) |
| No | 52 (52%) |
| **Diabetes** | |
| Yes | 51 (51%) |
| No | 49 (49%) |
| **Hypertension** | |
| Yes | 55 (55%) |
| No | 45 (45%) |

Table 2: Factors leading to mortality after PCI

| **Factors** | **Frequency (%age)** |
|---|---|
| Old Age | |
| Yes | 64 (64%) |
| No | 36 (36%) |
| **Type of procedure** | |
| Emergency | 39 (39%) |
| Elective | 61 (61%) |
| **Acute renal failure** | |
| Yes | 37 (37%) |
| No | 63 (63%) |
| **Site of lesion** | |
| Right coronary artery | 54 (54%) |
| Left coronary artery | 46 (46%) |
| Multi-vessel disease | |
| Yes | 52 (52%) |
| No | 48 (48%) |

Among the factors, old age (≥50 years) was observed in 64 (64%) patients while 36(36%) had age <50 years. There were 39(39%) patients who underwent PCI under emergency situation and 61(61%) patients had PCI under elective circumstances. Acute renal failure was noticed in 37(37%) patients. There were more patients of right coronary artery disease i.e. 54(54%) who underwent PCI. There were 52(52%) patients who were diagnosed with multi-vessel disease (Table 2).

## DISCUSSION

In today's cardiovascular practice, PCI has become one of the most prevalent therapeutic procedures. Furthermore, as technology advances and operator expertise grows, periprocedural adverse events have decreased steadily and consistently, resulting in good and similar results for coronary artery bypass surgery. Despite this, there are differences between percutaneous and surgical revascularization, and as a result, societal guidelines have emphasized the importance of risk stratification, which typically takes clinical and angiographic characteristics into account, for the administration of the appropriate therapy[13].

In our study, we observed that among the factors, old age (≥50 years) was observed in 64(64%) patients while 36(36%) had age <50 years. There were 39(39%) patients who underwent PCI under emergency situation and 61(61%) patients had PCI under elective circumstances. Acute renal failure was noticed in 37(37%) patients. There were more patients of right coronary artery disease i.e. 54(54%) who underwent PCI. There were 52(52%) patients who were diagnosed with multi-vessel disease.

In a study, Mandeep Singh discovered that multi-vessel disease was associated with in-hospital mortality in 51 percent of patients, thrombus formation in 37.7%, left main coronary artery disease was present in 1.6% and emergency procedures were performed in 11.4% of patients who died after PCI during the index hospitalization[14].

Advanced machine learning algorithms successfully predict the occurrence of in-hospital mortality following PCI, according to Al Alref et al[11]. In addition to already established variables such as body mass index, pre-procedural serum creatinine, and several angiographic features related to lesion location and stenosis severity, they reported that several features not typically incorporated in risk scores, such as day of the week, demonstrate important prognostic value. In addition, several multi-ethnic studies have looked into the link between BMI and PCI results[15-17].

Despite the fact that few studies have found a rise in 1- and 5-year significant adverse cardiac events in obese patients,[18, 19] there is a widespread belief that obesity is a protective factor in patients having PCI, a phenomenon known as the "obesity paradox"[20]. In our analysis, however, there was no significant link between BMI and death among PCI patients. Despite this, most modern risk ratings for in-hospital mortality do not include body mass index[21].

In a study, conducted by Holroyd et al., found that there was significant differences present in the rate of short, medium and long-term mortality after PCI, which was significantly associated with the pre-PCI BMI of the

patients. The greater survival was observed in overweight patients (BMI 25 - 30 kg/m$^2$) or in obese patients (BMI >30 kg/m$^2$) as compared to the patient of normal BMI (18.5 - 24.9 kg/m$^2$)[16].

Our study found that 55.7% of patients had multi-vessel disease, whereas Sorajja et al found that 51.2% of patients had multi-vessel disease, which is virtually identical to our findings. Sex has been found as an effect modifier in a number of other research 21[22]. Although sex has been identified as an impact modifier in other research, we were unable to identify a significant treatment-by-sex interaction for mortality. These findings contrast from those of our study, in which we discovered a substantial link between mortality and gender (p-value: 0.01)[21].

## CONCLUSION

Out of all factors leading to mortality after PCI, older age at the time of PCI is the most common factor, followed by right coronary artery disease and multi-vessel disease. So in future, in older aged cases along with right coronary artery disease and multi-vessel disease should be considered as high risk patients and more careful preventive and management strategies should be adopted to reduce the post-PCI mortality rate and improve the outcome of PCI.

**Conflict of interest:** Nil

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