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Immediate results of percutaneous transluminal angioplasty in patients above 70 years

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Abstract---Background: Even in older patients, percutaneous transluminal coronary angioplasty (PTCA) is becoming a more widely acknowledged technique for revascularization. Because to its less intrusive nature, PTCA is a desirable option to coronary bypass surgery in this age category due to the increased frequency of postoperative mortality and treatment problems in older patients. Objective: Analyze the immediate and ongoing therapeutic efficacy of PTCA in individuals above 70 years. Methods: In the Hayatabad

Medical Complex hospital in Peshawar, 6830 patients had PCI between April 2021 and August 2022. Throughout the trial period, interventions were performed on 102 male patients who were above 70 years. Results: Among the 102 patients, Thirty-two patients (31.37% of the total) had left ventricular ejection fraction (LVEF) lower than 40%. One hundred percent of patients with single vessel disease (SVD), 94 % and 72 % of participants with double vessel disease and triple vessel disease (TVD), respectively had successful procedures. The rate of major adverse cardiac event (MACE) in hospitals was 9/102 (8.82%). The 1-month MACE incidence was 10.78% (n=11) while the one-year MACE incidence was 17.64% (n=18), correspondingly. A multivariate Cox proportional risks investigation suggests that cognitive impairment, LVEF, diabetes mellitus (DM), and low estimated glomerular filtration rate (eGFR) were all independently linked to an elevated threat of MACE [hazard ratio (HR) = 0 and 890, 95% confidence interval (CI) = 0.865 to 0.946, P value =.001, and HR = 6.791, CI = 1.875 to 17.769, P value =.002, and HR = 2.834, 95% CI = 1.142 to 7.646, P = .003, respectively]. Conclusion: Single as well as double vessel disease in older individuals can be effectively treated by coronary angioplasty. The outcomes for triple vessel disease are positive. The likelihood of long-term significant unfavorable cardiovascular problems is increased by poor LV function, obesity, and compromised kidney function.

Keywords---percutaneous transluminal, coronary angioplasty, cardiovascular problems, ischemic heart disease, coronary artery bypass graft.

Introduction

Whether a region of the world is advanced or emerging, like Pakistan, ischemic heart disease represents one of the top causes of mortality worldwide [1, 2]. Due to concerns of adverse outcomes and preconceived ideas that forceful interventional methodologies would be less valuable to the older adults than to other classes of people, combative interventional methodologies have not been given to the older adults at all, despite the fact that age-related increases in cardiovascular morbidity and death are well renowned [3]. In 2002, Norvic International Hospital became the first medical facility in Nepal to offer Percutaneous Transluminal Coronary Angioplasty (PTCA), a technique which was initially established in 1977 by Andreas Gruentzig in Switzerland [4]. Since that day, it has attracted attention in hospitals as a result that it is fewer intrusive, less risky, and involves fewer consequences than other surgical management like coronary artery bypass graft (CABG) [5].

The obstructed artery is opened during PTCA using a stent to maintain it accessible. Using a catheter including an inflating balloon at its base, this method is used to widen the region of artery obstruction [6]. A pre-procedure coronary angiography (CAG) is required to precisely locate and categories the obstruction before a PTCA can be carried out [7]. CAG is a less advanced procedure that

might be a desirable alternative to surgery. The older patient often seems to have more established heart disease and much more calcified lesions. The coronary arteries can occasionally be brittle and twisted [8]. Despite rising pre-procedural threat between patients receiving PCI, health outcomes for patients receiving PCI and CABG were comparable, according to a recent systematic literature review and retrospective studies to assess the medical results of people aged 80 years or more recently underwent coronary revascularization [9, 10]. We describe the immediate and ongoing therapeutic efficacy of PTCA in this prospective analysis in individuals under the age of ≥ 70 years.

Material and Methods

A total of 6830 patients had PCI in the Hayatabad Medical Complex hospital, Peshawar, between April 2021 and August 2022. Due to limited resources and the availability of full records, 102 male patients who meet the requirement of age greater than 70 years old were chosen. The patients underwent interventions throughout the trial time. Therapeutic approach, prior cardiovascular background, health risk profile, degree of cardiovascular problems, and left ventricular ejection fraction (LVEF) were examined as features. Whether participants were examined at the outpatient department or through a personal contact consultation, therapeutic follow-up were acquired. Current angina condition, previous myocardial infarctions followed the original angiography operation, heart surgery, and further angioplasty were all contained in the follow-up data.

Standard protocol and a remotely operated catheter device were used to accomplish PTCA. Major cardiovascular arteries with a dimension that was decreasing by around ≥ 70% underwent PTCA. Individuals with severe left ventricular dysfunction or prolonged complete blockage of one main coronary artery were eliminated. Nevertheless, PTCA was only tried on individuals who had a chronic complete blockage and positive angiographic features. Typically, we have tried to perform angioplasty of the all substantial stenosis single treatment. Nevertheless, PTCA was performed as many operations due to the individuals' fragile hemodynamic state or the extensive comparison injection in certain patients. Just the responsible lesion was expanded if the participant's status was hemodynamically problematic. Electrocardiographic alterations, CAG results, and regional wall motion abnormality on echocardiography were used to identify the culprit lesion. Aspirin was given orally to all patients in an initial dose of 300 mg, followed by 100 mg once daily. After the installation of the stent, 75 mg of clopidogrel was given daily for a minimum of 9 months following the initial 300 mg loading dosage. Heparin was usually administered for 5 days at 100 mg/kg body mass after a satisfactory PTCA.

Statistical Analysis

Constant variables are displayed as mean ± Standard Deviation (SD). In order to evaluate the determine MACE predictors following PCI, a multivariate Cox proportional hazard model was employed. The multivariate model had parameters that were patient-related. P-values under .05 were believed to be significant.

Limitations

102 male patients who meet the requirement of age greater than 70 years old were included in this study.

Results

Physiological and Angiographic Features

The Peshawar hospital Hayatabad Medical Complex treated 6,830 patients who had PCI in total. Throughout the trial period, interventions were performed on 102 male participants ≥ 70 years old. Table 1 displays the clinical features of patients. Among the 102 patients, 74 had multivessel disorder, 30 had cardiovascular problems involving three arteries, 44 had cardiovascular problems involving two vessels, and 59 had cardiovascular problems involving a single vessel disease (SVD). Thirty-two patients (31.37% of the total) had LVEF lower than 40%.

Initial Findings

Treatment was given to a total of 208 lesions. One hundred percent of patients with SVD, 94% and 72% of participants with double vessel disease and triple vessel disease (TVD) had successful procedures. We did not try to occlude all four coronaries. In 93 cases, PTCA and stenting was used as the revascularization method, whereas direct stenting was employed in three patients. Technical successful outcomes were achieved in 87 individuals, with SVD patients achieving the greatest success rate and TVD patients having the poorest. Proper revascularization was achieved in 100% of SVD patients. Nevertheless, 68 percent of participants with TVD and 92 % with TVD were able to completely revascularize due to prior total cardiac blockage or diffused disease in some other artery.

Common complication

The rate of MACE in hospitals was 9/102 (8.82%) (Figure 1). Those who had significant cardiovascular disease when they first appeared had the biggest infection rate. The average amount of days from the surgery to discharge was six (3–25). Those who had significant cardiovascular disease when they first appeared had the maximum infection rate. The average number of days from operation to release was seven (4–26).

Delayed Outcomes

In 96% of participants, follow-up data was gathered. A mean follow-up period of 15 ± 10 months was used (range 4 to 48 months). The 1-month MACE incidence was 10.78% (n=11) while the one-year MACE incidence was 17.64% (n=18), correspondingly (Figure 1). A multivariate Cox proportional risks investigation suggests that cognitive impairment LVEF, diabetes mellitus (DM) and low eGFR were all independently linked to an increased risk of MACE (HR = 0.890, CI = 0.865 to 0.946, P =.001, and HR = 6.791, 95% CI = 1.875 to 17.769, P =.002, and HR = 2.834, 95% CI = 1.142 to 7.646, P = .003) respectively (Table 2).

Table 1
Diagnostic and therapeutic baseline traits

Lifespan (yrs) (mean ±SD)	76 ±8
Body Mass Index (BMI)	23.2 ±2.5
History of (*n*, %)	
DM	48 (47.05%)
Hyperlipidemia	29 (28.43%)
Angina pectoris	97 (95.09%)
Myocardial infarction	18 (17.64%)
Stroke	9 (8.82%)
Cigarette smoking	13 (12.74%)
Hypertension	91 (89.21%)
Medications (*n*, %)	
Clopidogrel	9 (8.82%)
Aspirin	98 (96.07%)
β-blocker	91 (89.21%)
Digitalis	8 (7.84%)
ACEI/ARB	102 (100%)
Diuretics	84 (82.35%)
Statin	102 (100%)
Nitrates	89 (87.25%)
Calcium channel blockers	5 (4.90%)
eGFR (ml/min) (mean ±SD)	67.5 ± 13.9
LVEF mean (%) (mean ±SD)	47 ±8 (21–72)
<40%	32 (31.37%)
Fasting lipid values	
Total cholesterol (mg/dL) (mean ±SD)	189.3 ±26.7
HDL	43.8 ±7.8
LDL	121.3 ±26.7
Triglycerides	143.9 ±32.5
Coronary Calcium Score	
Level II	14 (13.72%)
Level III	81 (79.41)
Level IV	7 (6.86)

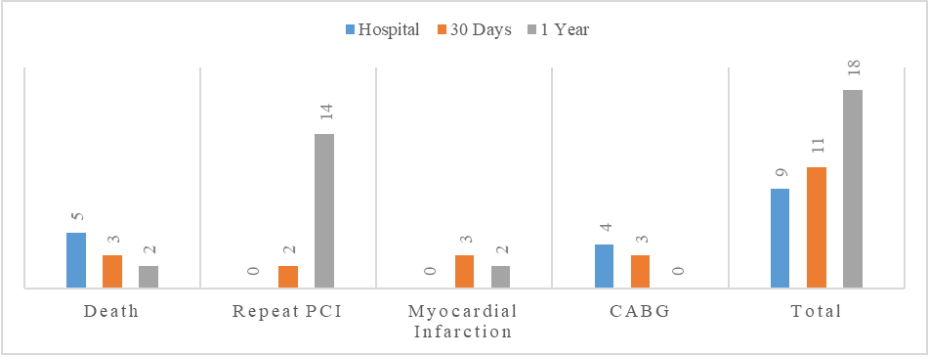

Figure 1. Major adverse cardiac events

Table 2
Following PCI, multivariate determinants of MACE

Determinants of MACE	HR	CI (95%)	P value
Expulsion proportion for LV	0.890	0.865–0.946	.001
DM	6.791	1.875–17.769	.002
eGFR	2.834	1.142–7.646	.003

Discussion

The world has been noticeably becoming older historically, and at the same time, therapy for senior people with cardiovascular disease has gotten more vigorous, particularly in emerging nations like China, Pakistan, etc [11]. This is due to developments in the medical care provided to older individuals as well as the lengthened life duration of these individuals. Medical intervention, though sometimes effective at treating the symptoms, is rarely well-tolerated [12]. The results of surgical therapy are only ineffective in some significant risk categories. After Andreas Gruentzig's initial use of PCI for coronary revascularization in Zurich in 1977, the procedure has been applied for this purpose for thirty years. These individuals are at a significant risk since their severe heart problems are more common than those in younger patients, according to existing evidence. The symptoms of older people are typically more intense. The older patients typically got partial revascularization in comparison to younger individuals. Nevertheless, if symptomatic alleviation is the main objective, total revascularization might not require. In elderly patients over the age of 70, coronary angioplasty may be conducted safely, and it offers good therapeutic benefit and positive long-term outcomes [13-15].

Our findings demonstrated that older individuals may undergo PTCA and stent procedures with great clinical success. Moreover, full revascularization still seems to be relatively common in individuals with multivessel illness. The most frequent causes of inadequate revascularization were widespread illness and long-term total partial occlusion. According to the studies, the therapeutic efficiency for patients in high-risk groups who have multivessel diseases and a poor LVEF ranges from 56 to 92 %, while the in-hospital fatality rate ranges from 0.8 to 19.5 percent [16]. These variations are most likely the result of patient stratification and the various communities that were researched. Current studies on PTCA in multivessel illness reveal that older individuals typically experience inadequate revascularization and a greater likelihood of serious cardiac consequences due to the existence of extensive cardiovascular problems and/or poor LVEF. Nonetheless, the usage of a stent might lower the frequency of complications [17].

According to Hussain *et al.*, PTCA combined stent implantation may be successfully completed in octogenarians with a greater incidence of clinical and angiographic effectiveness, a manageable frequency of incidence and death, and a positive brief (two-year) result [18]. Even more significant is the reality that neither patient experienced a cerebrovascular incident in this trial, despite the reality that extracardiac problems, which are common associated with surgical revascularization, were restricted. The outcomes of the follow-up appeared

positive. The long-term effects persisted in support of 90.19 percent of patients (n=92) in our research who achieved clinical effectiveness following PTCA. Death was quite modest (n=10, 9.81%), and individuals with TVD, poor ejection fraction, and inadequate revascularization were more frequently affected. According to Jeroudi *et al.,* (2016), health outcomes were 81 % after one year and 80 % after 3 years. Imburgia *et al.,* (2019), on the contrary hand, had the poorest late chances of success. The pre-PTCA initial clinical characteristics and the varying levels of revascularization achieved can underlie the differing long-term effects. According to some publications, individuals with PTCA-achieved partial revascularization exhibit more symptoms and require a coronary bypass operation at follow-up than individuals with full revascularization [19, 20]. At long-term follow-up, we detected decreased LV function, DM, and abnormal kidney activity as independent risk factors of adverse outcome. According to Bell *et al.* the extent of revascularization has no effect on the survival of people with multivessel illness; instead, it depends on the underlying clinical factors [21].

Conclusion

In older individuals with cardiovascular disease, PTCA is an acceptable treatment. The immediate and long-term outcomes for chosen individuals having single as well as double myocardial infarctions were excellent. However, the quick outcomes seemed less favorable in TVD patients. Nonetheless, the brief results for these TVD patients who underwent PTCA full revascularization were favorable. The incidence of long-term significant unfavorable cardiovascular problems is increased by decreased LV function, diabetes mellitus, and reduced kidney function.

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