Clinical Outcomes of Percutaneous Coronary Intervention in Octogenarians

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Key words: *Ischaemic heart disease, Octogenarians, Percutaneous coronary intervention.*

Abstract:

Background: *Octogenarians are high risk patients and largely under-represented in clinical trials. The use of evidence-based therapy is, therefore, lower in this age group, resulting in a reliance on non-evidence based decision making. The elderly usually have higher prevalence of co morbidities and more often experience complications during and after revascularization procedures.*

Methods: *212 patients with ischemic heart disease who underwent percutaneous coronary intervention (PCI) were divided into 2 groups according to age: ³80 years (n = 74) and < 80 years (n = 138). Baseline clinical characteristics, indications for coronary intervention, in hospital outcomes and 1 year outcome were obtained. Study endpoint was in hospital outcome (Renal impairment, MI, LVF, emergency revascularization, death) & 1 year follow up for myocardial infarction (MI), repeat revascularization and death.*

Results: *Procedural success (TIMI III) were high in both groups, but still lower in the elderly as compared to younger group (95% vs. 97%, p=0.65).The elderly had higher incidence of post PCI bleeding, contrast induced nephropathy (CIN), MI, left ventricular failure (LVF) and death (9.5% vs.6.1%, 8.2% vs.3.7%, 6.8% vs.5.8%, 9.5% vs. 5.1% and 5.4%vs.3.6%, p=0.07). Whereas emergency revascularization were higher in younger group (5.4% vs. 6.5%, p=0.07). At 1 year MI and death were higher in elderly group (9.5% vs.6.5%, 6.8% vs.6.5% p=0.66), whereas repeat revascularization were higher in younger group (6.8% vs.8%, p= 0.66).*

Conclusion: *Though immediate interventional procedure related complications are more in octogenarians, long term outcomes seem to be promising & comparable with younger counterparts.*

(Cardiovasc. j. 2018; 10(2): 121-125)

Introduction:

Population ageing is a major public health issue in developing countries. Aging is an independent major risk factor of ischemic heart disease. Coronary artery disease is a leading cause of mortality and morbidity in octogenarians.[1] Morbidity and mortality from ischemic heart disease are strongly associated with age, especially for people over 80 years old (octogenarians). Elderly patients usually have comorbidities such as chronic kidney disease, hypertension, and diabetes mellitus.[2,3] They are more likely to have tortuous vasculature, arterial calcification, and complex coronary lesions.[4,5] Hence, PCI for the elderly is always challenging.

In-hospital mortality in octogenarians after PCI was reported to be up to 4.1% in 2007.[5] The rates were 3.8% in the National Cardiovascular Network data (1994-1997) and 3.8% in the American College of Cardiology/National Cardiovascular Data Registry (1998-2000),[6] indicating a 4-fold increase in risk. PCI environments such as expert cardiac catheterization laboratories, transradial access, and drug-eluting stent are generally believed to be able to improve the outcome of PCI in this patient group.[7,8] However, the safety and efficacy of PCI in octogenarians remain controversial.[9,10] Therefore, the objective of this study was to observe the clinical outcomes of multivessel coronary intervention in octogenarians hospitalized for Ischemic heart disease and compared to that with younger counterparts.

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Methods:

From January 2014 to December 2016 we included 212 patients purposively with ACS and underwent PCI in Department of Cardiology of National Institute of Cardiovascular Diseases. Study populations were divided into 2 groups according to age; ≥ 80 years (n = 74) were in group I and < 80 years (n = 138) were in group II. Baseline clinical characteristics including age, sex, risk factors of coronary artery diseases (Hypertension, Diabetes Mellitus, Dyslipidaemia and Smoking), indications for coronary intervention (Chronic stable angina, unstable angina, Non STEMI, STEMI), Angiographic findings, in hospital outcomes and 1 year outcome were evaluated. All patients received a heparin bolus (5000–10000 IU). Routine antiplatelets treatment included long term Aspirin, and Clopidogrel for at least one year or preferably life long. Study endpoints were in-hospital outcome (Vascular site complication, CIN, MI, LVF, emergency revascularization and Death) & 1 year follow up for MI, Repeat revascularization and Death. Data obtained from the study were analyzed and significance of differences were estimated by using statistical methods. Variables were analyzed by chi-square test and t-test where applicable. P value P<0.05 were considered as significant. Statistical analyses were performed with SPSS, version 16.0 (SPSS Inc).

Results and discussion:

Among the study population (Table I) Age ≥ 80 years were 74 and <80 years were 138.Mean age was 83.65±4.53 yrs for group I and 56.44±9.67 years for group II. There was significantly higher male among octogenarians (86.5% vs.73.9%,p=0.03). Among the risk factors Diabetes mellitus and dyslipidemia were significantly higher in octogenarians (62.2%vs.37.7%,p=0.001) whereas Current smoking were significantly higher in younger group 41.9% vs.63.0%,p= 0.003).

Among the study population STEMI, NSTEMI, UA and CSA were 12 (16.2%) vs. 24 (17.4%), 40 (54.1%) vs. 32 (23.2%), 12 (16.2%) vs. 44 (31.9%) and 10 (13.5%) vs. 38 (27.5%) respectively. NSTEMI were significantly higher among octogenarians whereas STEMI, UA, CSA were significantly higher in younger group (p= 0.001) may be due to development of collateral vessels in octogenarians. Echocardiographic findings showed left ventricular ejection fraction (LVEF) were significantly higher in octogenarians (16.2% vs. 6.5%, p= 0.024) may be due to NSTEMI cases

Table-I

Baseline characteristics of study population (n=212).

Variables	Age ≥ 80 years(n= 74)	Age < 80 years(n=138)	*p* value
Mean age, y	83.65±4.53	56.44±9.67	
Male	64 (86.5%)	102 (73.9%)	0.03
Hypertension	45 (60.8%)	69 (50.6%)	0.132
Diabetes mellitus	46 (62.2%)	52 (37.7%)	0.001
Dyslipidemia	42 (56.8%)	73 (52.9%)	0.31
Current smoking	31 (41.9%)	87 (63.0%)	0.003
Diagnosis			
STEMI	12 (16.2%)	24 (17.4%)	<0.001
NSTEMI	40 (54.1%)	32 (23.2%)	
UA	12 (16.2%)	44 (31.9%)	
CSA	10 (13.5%)	38 (27.5%)	
Echocardiographic finding			
LV EF <50%	12 (16.2%)	9 (6.5%)	0.024

were more at octogenarians whereas STEMI cases were more in younger group.

Coronary angiogram of study population (Table II) showed TVD (36.1% vs. 26.1%) and LMD (9.5% vs. 2.9%) were more in octogenarians whereas SVD and DVD were more in younger group though the differences were not statistically significant (p=0.70). On the other hand ostial (16.2% vs. 2.9%, p=0.007) and calcified (31.1% vs. 14.5%, 0.004) lesions were significantly higher in octogenarians.

Study of in-hospital outcomes (Table III) showed vascular site complication was significantly higher in octogenarians (9.5% vs. 6.1%, p= 0.031).Post PCI MI(6.8% vs.5.8%), LVF (9.5% vs. 5.1%), CIN (8.2% vs.3.6%) and death (5.4% vs. 3.6%) were insignificantly (p= 0.07)higher in octogenarians whereas post PCI TIMI III flow (95.6% vs.97.3%) and emergency revas-cularization were higher in younger group. 1 year follow up (Table IV) showed MI (9.5% vs. 6.5%), and death were higher in octogenarians whereas repeat revascularization (6.8% vs. 8%) were higher in younger group but the differences were statistically insignificant (p=0.66).

Table-II

Angiographic findings of study population

Variables	Age ≥ 80 years(n= 74)	Age < 80 years(n=138)	*p* value
SVD	21 (28.4%)	50 (36.2%)	0.70
DVD	19 (25.4%)	48 (34.8%)	
TVD	27 (36.1%)	36 (26.1%)	
LM	7 (9.5%)	4 (2.9%)	
Lesion Characteristics			
Ostial	12 (16.2%)	7 (5.1%)	0.007
Calcified	23 (31.1%)	20 (14.5%)	0.004

Table-III

In-hospital outcome of study population (n=212).

Variables	Age ≥ 80 years(n= 74)	Age < 80 years(n=138)	*p* value
Vascular site complication	10 (9.5%)	7 (6.1%)	0.031
Post PCI MI	5(6.8%)	8 (5.8%)	0.07
Post PCI LVF	7 (9.5%)	7 (5.1%)	
Emergency revascularization	4 (5.4%)	9 (6.5%)	
Death	4 (5.4%)	5 (3.6%)	
Contrast nephropathy	8 (8.2%)	5 (3.6%)	
TIMI III flow	73 (95.6%)	137(97.3%)	

Table-IV

1 year follow up of study population

Variables	Age ≥ 80 years(n= 74)	Age < 80 years(n=138)	*p* value
MI	7 (9.5%)	9 (6.5%)	0.66
Revascularization	5 (6.8%)	11 (8%)	
Death	5 (6.8)	9(6.5)	

Discussion:

Some previous studies have compared the outcomes of PCI in patients with different ages and found that adverse events are increased with age and severity of the disease.[11,12] Therefore, physicians are often reluctant to treat elderly patients aggressively. Elderly patients are usually referred late for revascularization. In addition, PCI in octogenarians is often performed to relieve symptoms rather than for complete revascularization, although they have more extensive coronary disease than their younger counterparts.[13] In addition, the elderly do not receive proper diagnosis or treatment in a timely manner for a number of reasons, including economic conditions.[14] Therefore, coronary disease in the elderly is more progressive, and the prognosis of PCI in the elderly is usually poor than that in their younger counterparts.

Our results revealed that Octogenarians undergoing PCI are mostly hypertensive male, usually present with NSTEMI and poor LV function. They face more bleeding and vascular site complications during PCI, usually have more LM and TVD with more ostial and calcified lesion in compare with younger group. Though procedural success is similar with younger group they face more post PCI bleeding, CIN, LVF, MI. Repeat Revascularization was higher in younger group. At 1 year follow up MI & repeat revascularization were slightly higher in octogenarians whereas repeat revascularization was higher in younger group. The clinical and procedural characteristics were not significantly different between the two groups. The incidence of major complications that would increase the mortality was not significantly different between the two groups. Despite of the high risk factor with old age, previous reports on invasive treatment in the elderly with coronary artery disease have shown that PCI results in the elderly are not inferior compared to PCI in younger patients.[15]

The APPROACH (Alberta Provincial Project for Outcomes Assessment in Coronary Heart Disease) Registry has demonstrated long-term survival benefit in octogenarians with coronary artery disease who are treated with either surgical or Percutaneous revascularization compared to those who are treated with medical therapy.[16]Thrombolysis in Myocardial infarction (TIMI) trial has also demonstrated that invasive strategy can provide early symptom relief and better quality of life compared to those who receive optimal medical treatment. In patients aged >80 years with IHD, early PCI has been shown to be able to achieve better outcomes than medical treatment alone.[17-19] In the era of drug eluting stent (DES), Hassani et al.[20] have demonstrated a low mortality rate in octogenarians with stable angina (4.1%) at 6 months.

However, mortality rates in acute coronary syndrome patients (15%) and ST elevation in myocardial infarction patients (31%) remained significantly high.[21] Meanwhile, several studies have shown that mortality and incidence of major complications after PCI in octogenarians with IHD are not higher than those in their younger counterparts.[22]

Conclusion:

Octogenarians undergoing PCI face more bleeding and vascular site complications during PCI, usually have more LM and TVD with more ostial and calcified lesion in compare with younger group. Though procedural success is similar with younger group they face more post PCI bleeding, CIN, LVF, MI. Repeat Revascularization was higher in younger group. At 1 year follow up MI & repeat revascularization were slightly higher in octogenarians whereas repeat revas-cularization was higher in younger group. Though immediate interventional procedure related complications are more in octogenarians, long term outcomes seem to be promising & comparable with younger counterparts.

Conflict of Interest - None.

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