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Myocardial Infarction in Young versus Older Adults: An Analysis of Differences in Proportion, Risk Factors, Clinical Demographics, Angiographic Findings and in-Hospital Outcomes

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Abstract

Background: Coronary heart disease (CHD) remains a major cause of death worldwide. This study looked at the proportions, demographics, risk profile, angiographic data and in-hospital outcomes of young versus older myocardial infarction (MI) patients presenting to a community teaching hospital in Melbourne, Australia.

Methods: This was a retrospective study of patients presenting prospectively, with acute MI between August 2013 and July 2014, who demonstrated coronary stenosis ≥ 50% on invasive coronary angiography in at least one epicardial coronary artery. Patients were divided into two groups by age; those who were aged 55 years or younger and those who were older.

Results: Data were available for 368 patients and of these 119 (32.3%) were ≤ 55 years of age. The younger cohort was more likely to be male (88.2% vs. 77.5%, p = 0.014), have family history of premature CHD (42% vs. 8.8%, p < 0.001) and be current smokers (63% vs. 26.5%, p < 0.001). They were less likely to have multivessel angiographic disease (48.7% vs. 69.9%, p < 0.001). Younger patients had better in-hospital outcomes (major adverse cardiovascular events 0.8% vs. 6.8%, p = 0.013).

Conclusions: Approximately a third of patients with acute MI admitted to a tertiary Australian hospital, covering a low socioeconomic population, over a 12- month period were aged ≤ 55 years. This younger cohort was more likely to be male, have a family history of premature CHD and be current smokers but was less likely to have multivessel disease. In addition the younger cohort had better in-hospital outcomes.

Keywords

Young, Age, Myocardial infarction, Coronary heart disease, Risk factor, Coronary angiography

Introduction

Coronary heart disease (CHD) is the largest cause of death worldwide and accounted for the deaths of more than 7 million people in 2012 [1]. Traditionally CHD is viewed as a disease of older adults. There is increasing evidence, however, to suggest a significant proportion of those presenting with CHD and myocardial infarction (MI) are young [2,3]. The potential consequences of MI at a young age may have a significant impact on future health and wellbeing due to possible higher psychological and socioeconomic implications. These challenges are often faced not only by the patient but also their family members and dependents. Previous studies have highlighted important differences in clinical risk factors and demographics of young patients presenting with MI compared to older adults where young was defined as age of less than or equal to 45 years [4,5]. Others have demonstrated differences in angiographic findings with less extensive disease found in younger patients [6,7]. In-hospital outcomes in patients presenting with MI at a young age also appear to be better [8]. There is, however, a relative scarcity of data examining MI in the young from an Australian demographic. This is particularly the case in the western suburbs of Melbourne which has relatively low socioeconomic status [9]. Hence, we retrospectively examined data for patients presenting to our tertiary cardiac unit with acute MI to ascertain what proportion was young. Our aim was to also identify any differences in risk factors, demographics, angiographic findings and in-hospital outcomes between young and older patients.

Methods

Patient selection

We undertook a retrospective analysis of all patients presenting to Western Health, Melbourne, Victoria, Australia, between August 2013 and July 2014 with acute MI and at least 50% stenosis demonstrated in at least one epicardial coronary artery via diagnostic coronary angiography. Patients less than 18 years of age and those presenting with spontaneous coronary artery dissection or stent thrombosis were excluded. This was to ensure capture of patients presenting with primary coronary atherosclerosis. The patients were divided into two sub-groups by age; those who were aged 55 years or younger and those who were older. There is disparity in the literature on the definition of young with respect to premature CHD and MI. The term young varies from ≤ 40 [10-12] to ≤ 55 years of age [13]. Others have suggested 45 years as a cut off when defining young with

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respect to MI [4,14,15]. As there is no universally accepted age cut-off we have elected to investigate the higher age cut-off.

The patients were identified from the local cardiac catheterisation database. All procedures were performed at Western Health, which is a tertiary cardiac referral centre for a large area in Melbourne, Australia and surrounding rural areas. Coronary angiography was performed by our experienced interventional cardiologists in a General Electric Inova cathlab. The degree of coronary stenosis was visually determined. Ad-hoc percutaneous coronary intervention (PCI) was performed to the culprit lesion based on the discretion of the performing cardiologist. Written consent was obtained from every patient and the local human research ethics committee approved the study.

Definitions

Acute MI was defined by evidence of myocardial necrosis in a clinical setting consistent with acute myocardial ischemia [16]. Evidence of myocardial necrosis was confirmed by detection of a rise and/or fall of cardiac troponin (Siemens TnI-Ultra, on a Centaur XP analyser) with at least one value above the 99th percentile upper reference limit and with at least one of the following: symptoms of ischemia, new or presumed new significant ST-segment–T wave changes or new left bundle branch block, development of pathological Q waves in the electrocardiogram (ECG), presence of severe coronary stenosis or identification of an intracoronary thrombus by coronary angiography [16]. ST-elevation myocardial infarction (STEMI) was defined if there was at least 0.2 mV new ST elevation at the J point in contiguous precordial leads or 0.1 mV elevation in other contiguous leads on ECG [16]. Non ST-elevation myocardial infarction (NSTEMI) was diagnosed when the criteria of acute MI were fulfilled without the presence of at least one of the features of STEMI [16].

Previous MI was defined if there was prior medical record entry clearly stating history of MI. Previous PCI was defined if there was a history of previous coronary angioplasty with or without stent insertion. Family history of premature CHD was defined as history of MI, PCI or coronary artery bypass grafting (CABG) in a first-degree relative if they were ≤ 55 years of age and male or ≤ 65 years of age and female. Ex-smoking was defined as having quit at least 30 days prior to inclusion. History of peripheral vascular disease and previous cerebrovascular accident (CVA) was recorded if it was clearly documented in the medical records.

In terms of outcomes data, in-hospital MI was determined if further ischaemic symptoms lasting more than 30 minutes occurred in association with new ECG changes, biomarker (troponin) rise or both. CVA was defined as a new focal neurologic deficit of presumed vascular cause persisting for more than 24 hours and without evidence of a nonvascular cause according to a neurologic imaging study. Death was defined as all-cause mortality and subdivided into two categories, 'cardiovascular' and 'non-cardiovascular'. Major adverse cardiovascular event (MACE) was defined as the combination of death, new MI, target vessel revascularisation (TVR) for in-hospital stent thrombosis and CVA.

Outcomes of interest

Particular outcomes of interest include the proportion of young patients presenting with acute MI and potential differences that exist in risk factors, demographics, angiographic findings and in-hospital outcomes between young and older patients.

Statistical analysis

Categorical variables were expressed as numbers and percentages, while continuous variables were expressed as mean and standard deviation. Comparison of categorical variables between young and older patient groups was performed using Chi-squared or Fisher's exact test. Continuous variables were compared using an unpaired t-test. Odds ratios (OR) were calculated using binary logistic regression. Statistical tests were performed using Minitab 17 Statistical Software (2010) and a 2 sided p value ≤ 0.05 was considered statistically significant. Data capture was complete with no identifiable missing information.

Results

Over the study period, 368 patients were admitted to our unit with acute MI who met the study criteria. Of these, 119/368 (32.3%) were ≤ 55 years of age and 249/368 (67.7%) were older. Demographic and risk factor profiles for the cohorts are shown in table 1. The majority of patients in both groups were male; noticeably there were a larger proportion of males in the younger cohort. The proportion of patients with family history of premature CHD was greater in those aged ≤ 55 years by a factor of almost five. The proportion of younger patients who were current smokers was more than twice that of the older cohort.

Clinical characteristics are shown in table 2. The mean peak serum troponin I and mean peak creatine kinase was higher in patients' ≤ 55 years of age. Patients aged > 55 years were more likely to have severe reduction of their left ventricular systolic function and were more likely to present in Killip class 4.

Angiographic characteristics are shown in table 3. Multivessel disease was identified in over two-thirds of patients > 55 years of age. On multivariate analysis being male and having dyslipidaemia were found to be independent predictors for multivessel disease in the younger cohort (Table 4). In the older cohort, type 2 diabetes mellitus was the only independent predictor for multivessel disease (Table 5).

Three hundred and thirteen patients proceeded to PCI. Of these,

Table 1: Patient demographics and clinical risk factors.

	Total cohort (n = 368)	Patients ≤ 55 years of age (n = 119)	Patients > 55 years of age (n = 249)	p*
Mean age (years ± SD)	61.1 ± 12.8	46.7 ± 5.7	68.1 ± 8.9	< 0.001
Mean BMI (kg/m^2 ± SD)	28.6 ± 5.2	29.0 ± 5.0	28.4 ± 5.2	0.262
Male, n (%)	298 (81.0%)	105 (88.2%)	193 (77.5%)	0.014
Previous MI, n (%)	93 (25.3%)	12 (10.1%)	81 (32.5%)	< 0.001
Previous PCI, n (%)	61 (16.6%)	13 (10.9%)	48 (19.3%)	0.044
Previous CABG, n (%)	29 (7.9%)	0 (0%)	29 (11.7%)	< 0.001
Family history of premature CHD, n (%)	72 (19.6%)	50 (42.0%)	22 (8.8%)	< 0.001
Type 1 diabetes mellitus, n (%)	6 (1.6%)	3 (2.5%)	3 (1.2%)	0.351
Type 2 diabetes mellitus, n (%)	114 (31.0%)	25 (21.0%)	89 (35.7%)	0.004
Hypertension, n (%)	223 (60.6%)	59 (49.6%)	164 (65.9%)	0.003
Dyslipidaemia, n (%)	202 (54.9%)	73 (61.3%)	129 (51.8%)	0.085
Smoking current, n (%)	141 (38.3%)	75 (63.0%)	66 (26.5%)	< 0.001
Smoking ex, n (%)	75 (20.4%)	9 (7.6%)	66 (26.5%)	< 0.001
PVD, n (%)	13 (3.5%)	2 (1.7%)	11 (4.4%)	0.183
CVA, n (%)	16 (4.4%)	4 (3.4%)	12 (4.8%)	0.521

BMI = body mass index, MI=myocardial infarction, PCI = percutaneous coronary intervention, CABG = coronary artery bypass grafting, CHD = coronary heart disease, PVD = peripheral vascular disease, CVA = cerebrovascular accident.

*p is for comparison between patients ≤ 55 years of age and patients > 55 years of age.

Table 2: Patient clinical data.

	Total cohort (n = 368)	Patients ≤ 55 years of age (n = 119)	Patients > 55 years of age (n = 249)
STEMI, n (%)	190 (51.6%)	61 (51.3%)	129 (51.8%)
NSTEMI, n (%)	178 (48.4%)	58 (48.7%)	120 (48.2%)
Mean admission serum creatinine (micromol/L ± SD)	88.1 ± 74.7	83.2 ± 82.6	90.5 ± 70.6
Mean peak TNI (micrograms/L ± SD)	25.4 ± 21.3	30.2 ± 20.8	23.0 ± 21.1
Mean peak CK (units/L ± SD)	1219.9 ± 1565.7	1579.0 ± 1697.0	1043.0 ± 1469.0
ECG changes			
ECG ST elevation, n (%)	190 (51.6%)	69 (58.0%)	121 (48.6%)
ECG ST depression, n (%)	26 (7.1%)	4 (3.4%)	22 (8.8%)
ECG T wave inversion, n (%)	37 (10.1%)	22 (18.5%)	15 (6.0%)
ECG Q waves, n (%)	7 (1.9%)	5 (4.2%)	2 (0.8%)
ECG left bundle branch block, n (%)	12 (3.3%)	0 (0%)	12 (4.8%)
ECG no change, n (%)	96 (26.1%)	19 (16.0%)	77 (30.9%)
Arrhythmias			
AF, n (%)	23 (6.3%)	5 (4.2%)	18 (7.2%)
VT/VF, n (%)	34 (9.2%)	8 (6.7%)	26 (10.4%)
Heart block, n (%)	9 (2.5%)	1 (0.8%)	8 (3.2%)
No arrhythmia, n (%)	302 (82.1%)	105 (88.2%)	197 (79.1%)
Killip class			
Killip I, n (%)	321 (87.2%)	114 (95.8%)	207 (83.1%)
Killip II, n (%)	23 (6.3%)	4 (3.4%)	19 (7.6%)
Killip III n (%)	11 (3.0%)	1 (0.8%)	10 (4.0%)
Killip IV, n (%)	13 (3.5%)	0 (0%)	13 (5.2%)
LV systolic function			
LV Preserved, n (%)	168 (46.7%)	64 (54.2%)	104 (43.0%)
LV Mild, n (%)	99 (27.5%)	32 (27.1%)	67 (27.7%)
LV Moderate, n (%)	73 (20.3%)	20 (17.0%)	53 (21.9%)
LV Severe, n (%)	20 (5.6%)	2 (1.7%)	18 (7.4%)
Thrombolysis, n (%)	19 (5.2%)	8 (6.7%)	11 (4.4%)
Proceed to CABG, n (%)	20 (5.4%)	8 (6.7%)	12 (4.8%)

STEMI = ST-elevation myocardial infarction, NSTEMI = non ST-elevation myocardial infarction, L = litre, TNI = troponin I, CK = creatine kinase, ECG = electrocardiogram, AF = atrial fibrillation, VT/VF = ventricular tachycardia or ventricular fibrillation, Heart block = Mobitz II or complete heart block, LV Preserved = left ventricular systolic function preserved (left ventricular ejection fraction > 50%), LV Mild = mild reduction of left ventricular systolic function (left ventricular ejection fraction > 40% - 50%), LV Moderate = moderate reduction of left ventricular systolic function (left ventricular ejection fraction 35 - 40%), LV Severe = severe reduction of left ventricular systolic function (left ventricular ejection fraction < 35%), CABG = coronary artery bypass grafting.

Table 3: Angiographic characteristics.

	Total cohort (n = 368)	Patients ≤ 55 years of age (n = 119)	Patients > 55 years of age (n = 249)	p*
Radial access, n (%)	118 (32.1%)	53 (44.5%)	65 (26.1%)	< 0.001
Crossover, n (%)	2 (0.5%)	1 (0.8%)	1 (0.4%)	0.543
Number of diseased vessels				
1 vessel, n (%)	136 (37.0%)	61 (51.3%)	75 (30.1%)	< 0.001
2 vessels, n (%)	123 (33.4%)	36 (30.3%)	87 (34.9%)	
3 vessels, n (%)	109 (29.6%)	22 (18.5%)	87 (34.9%)	
Multivessel disease, n (%)	232 (63.0%)	58 (48.7%)	174 (69.9%)	< 0.001
PCI, n (%)	313 (85.1%)	103 (86.6%)	210 (84.3%)	0.577
GPIIbIIIa inhibitor, n (%)	100 (27.2%)	43 (36.1%)	57 (22.9%)	0.008
Bivalirudin, n (%)	5 (1.4%)	2 (1.7%)	3 (1.2%)	0.712
IABP, n (%)	2 (0.5%)	0 (0%)	2 (0.8%)	1

Crossover = arterial access crossover from radial to femoral or vice versa, PCI = percutaneous coronary intervention, GPIIbIIIa = glycoprotein IIb/IIIa, IABP = intra-aortic balloon pump. Multivessel disease = angiographic stenosis of at least 50% stenosis in at least two epicardial coronary arteries.

*p is for comparison between patients ≤ 55 years of age and patients > 55 years of age.

103/119 (86.6%) were from the young cohort and 210/249 (84.3%) were older (p = 0.641). In the patients who proceeded to PCI, the proportion of patients with culprit vessel occlusion was higher in the younger group (48/103 (46.6%) vs. 73/210 (34.8%), p = 0.043).

In-hospital clinical outcomes are shown in table 6. There were significantly more in-hospital deaths and MACE among patients > 55 years of age. All deaths were deemed to be secondary to a cardiac cause.

Discussion

We found that approximately one-third of all patients admitted to our institution with acute MI who has at least 50% angiographic stenosis demonstrated in at least one epicardial coronary were aged ≤ 55 years. This is unexpectedly high compared to the literature. Fournier *et al.* demonstrated only 4% of their patients admitted with MI were young although their cut off age for young patients was ≤ 40 years which is considerably less than our definition [6]. In addition, the younger cohort in our study had higher prevalence of diabetes mellitus, hypertension and dyslipidaemia compared to the young cohort in the study conducted by Fournier *et al.* [6]. Loughnan *et al.* reported approximately 20% of patients admitted with MI were below the age of 55 years [3]. The high proportion of young patients found in our study could possibly be explained by the fact that we only included patients proceeding onto coronary angiography. This potentially may have excluded older patients in whom coronary angiography may have been contraindicated due to comorbidities. Another potential explanation for the discrepancy is the low socioeconomic status of the cohort in our study.

Table 4: Predictors of angiographic multivessel disease in patient's ≤ 55 years of age.

		Univariable		Multivariable*	
Risk factor	Patients with outcome	Odd ratio (95% CI)	p	Odd ratio (95% CI)	p
Male					
No	1	Ref	-	Ref	-
Yes	57	15.44 (1.95, 122.32)	0.010	14.57 (1.66, 128.04)	0.016
Previous MI					
No	53	Ref	-	Ref	-
Yes	5	0.73 (0.22, 2.44)	0.606	1.04 (0.18, 6.13)	0.961
Family history of premature CHD					
No	29	Ref	-	Ref	-
Yes	29	1.90 (0.91, 3.98)	0.087	1.37 (0.58, 3.21)	0.473
Type 1 diabetes mellitus					
No	56	Ref	-	Ref	-
Yes	2	2.14 (0.19, 24.29)	0.538	2.68 (0.17, 43.18)	0.488
Type 2 diabetes mellitus					
No	44	Ref	-	Ref	-
Yes	14	1.45 (0.60, 3.51)	0.415	1.34 (0.46, 3.94)	0.592
Hypertension					
No	28	Ref	-	Ref	-
Yes	30	1.18 (0.58, 2.43)	0.648	0.71 (0.28, 1.80)	0.468
Dyslipidaemia					
No	14	Ref	-	Ref	-
Yes	44	3.47 (1.58, 7.59)	0.002	3.64 (1.43, 9.22)	0.007
Smoking current					
No	19	Ref	-	Ref	-
Yes	39	1.43 (0.67, 3.01)	0.354	2.16 (0.79, 5.92)	0.136
Smoking ex					
No	53	Ref	-	Ref	-
Yes	5	1.34 (0.34, 5.27)	0.671	1.65 (0.32, 8.44)	0.545

CI = confidence interval, Ref = reference class, MI = myocardial infarction, CHD = coronary heart disease.

*Multivariable analysis is adjusted for age, body mass index, sex, previous MI, previous percutaneous coronary intervention, family history of premature CHD, type 1 diabetes mellitus, type 2 diabetes mellitus, hypertension, dyslipidaemia, smoking current and ex.

Table 5: Predictors of angiographic multivessel disease in patients > 55 years of age.

		Univariable		Multivariable*	
Risk factor	Patients with outcome	Odd ratio (95% CI)	p	Odd ratio (95% CI)	p
Male					
No	36	Ref	-	Ref	-
Yes	138	1.39 (0.74, 2.62)	0.301	1.50 (0.75, 3.01)	0.250
Previous MI					
No	116	Ref	-	Ref	-
Yes	58	1.13 (0.63, 2.03)	0.680	0.69 (0.27, 1.72)	0.425
Family history of premature CHD					
No	159	Ref	-	Ref	-
Yes	15	0.92 (0.36, 2.35)	0.856	0.61 (0.21, 1.76)	0.361
Type 2 diabetes mellitus					
No	102	Ref	-	Ref	-
Yes	72	2.41 (1.30, 4.47)	0.005	2.20 (1.14, 4.24)	0.019
Hypertension					
No	56	Ref	-	Ref	-
Yes	118	1.33 (0.76, 2.33)	0.323	1.18 (0.60, 2.32)	0.634
Dyslipidaemia					
No	81	Ref	-	Ref	-
Yes	93	1.24 (0.72, 2.14)	0.430	1.09 (0.58, 2.05)	0.798
Smoking current					
No	126	Ref	-	Ref	-
Yes	48	1.21 (0.65, 2.26)	0.557	1.66 (0.79, 3.52)	0.182
Smoking ex					
No	124	Ref	-	Ref	-
Yes	50	1.49 (0.78, 2.83)	0.226	1.95 (0.92, 4.15)	0.081

CI = confidence interval, Ref = reference class, MI = myocardial infarction, CHD = coronary heart disease.

*Multivariable analysis is adjusted for age, body mass index, sex, previous MI, previous percutaneous coronary intervention, family history of premature CHD, type 2 diabetes mellitus, hypertension, dyslipidaemia, smoking current and ex.

The finding of our study conforms with other studies that have shown young MI patients are more likely to be male, have a family history of premature CHD, be current smokers [4,5,7,8,17-19] and with evidence that they are less likely to have previous history of CHD, type 2 diabetes mellitus or hypertension [7,8,18,20]. We found a higher proportion of ex smokers among the older group, which is also supported by previous data [8]. The fact that approximately two-thirds of the younger patients were current smokers at the time of their presentation with MI is a major public health concern. The low socioeconomic environment of the catchment area of our hospital is a

Table 6: In-hospital clinical outcomes.

	Total cohort (n = 368)	Patients ≤ 55 years of age (n = 119)	Patients > 55 years of age (n = 249)	p*
Death, n (%)	13 (3.5%)	0 (0%)	13 (5.2%)	0.011
MI, n (%)	4 (1.1%)	1 (0.8%)	3 (1.2%)	0.752
TVR, n (%)	3 (0.8%)	1 (0.8%)	2 (0.8%)	1
CVA, n (%)	2 (0.5%)	0 (0%)	2 (0.8%)	1
MACE, n (%)	18 (4.9%)	1 (0.8%)	17 (6.8%)	0.013

MI = myocardial infarction, TVR = target vessel revascularisation, CVA = cerebrovascular accident, MACE = major adverse cardiovascular event.

*p is for comparison between patients ≤ 55 years of age and patients > 55 years of age.

likely major contributing factor for this finding [9]. Prior studies also describe an association between dyslipidaemia and young MI [18,19]. The rate of dyslipidaemia in our study was numerically higher in the younger group but this did not reach statistical significance. This may be due to under reporting, under diagnosis or under treatment of this particular condition in the younger group, which has been described in other studies [5].

There was no difference with respect to the proportion of patients presenting with STEMI in each group. Contemporary data suggests most young MI patients will present with NSTEMI but the proportion of patients presenting with STEMI appears to be rising [21]. The mean peak serum troponin I was higher in the younger group. This is an unexpected finding given previous reports of the presence of higher troponin levels in older patients [22]. Our finding may be partially explained by the fact that our laboratory only reports troponin values up to 50 micrograms/L. Hence, the older group may have had potentially higher troponin values that were not reported. Left ventricular systolic function was more likely to be severely impaired in the older group, which is supported by the literature [4,7]. Only older patients were found to be in Killip class IV and all of them presented due to out of hospital cardiac arrest. This was despite no statistical difference being found with respect to arrhythmia between the two groups.

As demonstrated previously in the literature, multivessel and three-vessel disease was found to be less frequent in the younger cohort [6,7]. This is likely due to a number of factors including age and comorbidities such as increased prevalence of hypertension and diabetes in the older cohort. Even though multivessel disease was less common in the young it was still found in approximately 50% of patients, which is considerably higher than in previous reports [6,7]. Our data agrees with previous reports that among the young, men are more likely to have multivessel disease as compared to women [7] but we were also able to show an association with dyslipidaemia. As illustrated in previous reports we found an association between type 2 diabetes mellitus and multivessel disease [23] but only in the older cohort. This is likely due to increasing susceptibility for multivessel disease with a longer exposure to type 2 diabetes mellitus [24].

Only a single patient in the younger cohort had MACE, which is in keeping with the literature [6]. This was due to a proximal edge dissection of a stented right coronary artery, which caused reinfarction and required further PCI. MACE in patients aged > 55 years was mainly driven by in-hospital deaths. These were all cardiac deaths and were only recorded among patients from the older cohort. The cause of this was likely to be multifactorial. Firstly only patients in the older group presented in Killip class IV, which is known to be associated with higher in-hospital mortality [25]. In addition, a higher proportion of patients in the older group exhibited severe left ventricular systolic dysfunction that has also been associated with increased in-hospital mortality [26]. In addition the older cohort had higher proportion of type 2 diabetes mellitus that is also known to increase in-hospital mortality [27]. Finally, there were likely other contributing comorbidities, which were not recorded as part of this study.

Study Limitations

Our study was a single centre, retrospective and observational analysis. This can be associated with selection bias and missing information. As highlighted already, our design of only including patients who proceeded onto coronary angiography may have potentially excluded more older patients. No follow up data was presented as this study was based only on in-hospital records. Telephone follow up could be a potential way to obtain short and long term outcome data in the future.

Conclusion

In this study covering a low socioeconomic Australian population, one-third of patients presenting with acute MI were young. These young patients were more likely to be male, have a family history of premature CHD and be current smokers. The rate of smoking among the young cohort exceeded 60%. Multivessel disease was discovered in approximately 50% of young MI patients but was more common in the older group. In-hospital outcomes in young MI patients were excellent with no deaths demonstrated and MACE rate of < 1%. This was in stark contrast to the older cohort that had an in-hospital mortality and MACE rate of approximately 5% and 7% respectively.

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Conflict of Interest

The authors report no relationships that could be construed as a conflict of interest.

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