

Acute myocardial infarction in young Bangladeshi migrant workers in Singapore: A case series

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Abstract

Ischemic Heart Disease (IHD) is the leading cause of death worldwide. Studies have shown increased incidence of IHD in migrant worker populations. In Singapore, about 24% of the population comprises migrant workers. Yet there is limited research on IHD and Acute Myocardial Infarction (AMI) within this patient group. This case series will present two cases of AMI in young Bangladeshi migrant workers (<35 years old). Both patients presented to the emergency department for ST elevation myocardial infarction. They had no known past medical history, but subsequent cardiovascular risk factor screening revealed hyperlipidaemia. These two cases highlight the possibility of a disproportionately high disease case load of AMI in the young migrant worker population, and is medically noteworthy given the rarity of AMI in the younger population. Further research is needed to determine the prevalence of AMI in young migrant workers and to evaluate common risk factors present for early screening and mitigation of cardiovascular risk factors.

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Introduction

Ischemic Heart Disease (IHD) is the leading cause of death worldwide, and third leading cause of death in Singapore [1,2]. Although IHD typically affects older patients, it is increasingly garnering attention amongst younger patients [3]. The incidence rate of Acute Myocardial Infarction (AMI) in Singapore was 217.2 per 100,000 population in 2021. Of which, 1.6% of patients were below 40 years old [4]. Although younger patients with AMI may have better prognosis and lower inpatient mortality, it can still lead to significant morbidity [5-8].

Singapore has a population of 5.92 million people as of June 2023, with about 24% being migrant worker population [9]. Several studies have shown increased incidence of coronary artery disease in migrant worker populations, particularly those of South Asian descent [10-12]. However, research on IHD and

AMI among migrant workers in Singapore has been limited. Most studies classify the incidence of AMI in Singapore by ethnicity (Chinese, Malay, Indian) with only one study done with a small population in western Singapore showing the rates of MI in migrant workers to be about 17.5% of all cases [4,13-15]. Considering about 24% of the Singapore population is migrant workers, there is a lack of research looking at the prevalence and age of AMI in this population.

Between July 2023 – 2024, Khoo Teck Puat Hospital's Emergency Department saw thirteen Bangladeshi migrant workers with STEMI, including two who were under 35 years old. Multiple studies have used age <35 years old to classify patients presenting with AMI as young/ very young with the prevalence being about 0.7%-3% [16-19]. This case series will present two cases of AMI in young Bangladeshi migrant workers (<35 years old). Through these cases, we aim to highlight the predisposing

risk factors for these patients and advocate for early screening of this at-risk population.

Case presentations

Case 1

A 29-year-old Bangladeshi male who is a non-smoker with no known past medical history presented to the emergency department with a central squeezing-type chest pain associated with dyspnoea and diaphoresis. In the ambulance, the patient was treated with aspirin 300 mg by paramedics after ECG showed ST elevations over the lateral leads. On arrival to the emergency department, repeat ECG showed widespread ST elevations over leads I, II, V1-6 with reciprocal ST depressions in leads III and aVf. He received a second antiplatelet, ticagrelor 180 mg prior to coronary angiogram, which revealed single vessel disease of left anterior descending artery. The patient underwent Percutaneous Intervention (PCI) with insertion of a drug eluting stent. Prior to this, he had been having chest pain for approximately three days that worsened on the day of admission. He has no family history of cardiac disease. Cardiovascular risk factor screening subsequently revealed hyperlipidaemia. Low density lipoprotein (LDL-cholesterol): 4.01 mmol/L (high) (Desirable < 3.3 mmol/L), High Density Lipoprotein (HDL-cholesterol): 1.22 mmol/L (normal) (Desirable: 1-1.5 mmol/L), Triglyceride (TG): 2.11 mmol/L (normal) (Desirable <2.2 mmol/L), Total Cholesterol (TC): 5.48 mmol/L (high) (Desirable: <5.2mmol/L). He has no hypertension or diabetes mellitus (HbA1c: 5.8%). BMI: 23.8 kg/m². The patient was subsequently discharged with dual antiplatelet therapy, atorvastatin, and given a cardiology follow-up.

Case 2

A 33-year-old Bangladeshi with no known past medical history presented to the emergency department for chest pain of about 1 hour duration which radiated to his left arm, associated with vomiting. In the ambulance, he was treated with aspirin 300 mg and given Glyceryl Trinitrate (GTN). Upon arrival in the emergency department, an ECG was immediately performed which showed an anterior ST-Elevation Myocardial Infarction (STEMI). Two minutes later, the patient experienced ventricular fibrillation and was resuscitated according to Advanced Cardiac Life Support (ACLS) guidelines. Cardiopulmonary Resuscitation (CPR) was commenced, and he received a total of three defibrillation shocks and intravenous amiodarone treatment. The patient had a return of spontaneous circulation and was promptly intubated. He underwent coronary angiogram which showed double vessel disease with occlusion of the proximal Left Anterior Descending artery (LAD) and the Left Circumflex Artery (LCX). Subsequently, percutaneous transluminal coronary angioplasty was performed, with a total door-to-balloon time of 31 minutes, which is within the consensus guidelines of a door-to-balloon time of 90 minutes [20]. PCI to the proximal LAD lesion and aspiration of a left circumflex artery clot was performed, and he was extubated on the same day. This patient has risk factors of a family history of ischemic heart disease and a smoking history. Further investigations revealed hyperlipidaemia. LDL-cholesterol: 3.45 mmol/L (high) (Desirable <3.3 mmol/L), HDL-cholesterol: 0.86 mmol/L (low) (Desirable: 1-1.5 mmol/L), TG :1.36 mmol/L (normal) (Desirable: <2.2 mmol/L), TC: 4.63 mmol/L (normal) (Desirable: <5.2mmol/L). He has no hypertension or diabetes mellitus (HbA1c: 5.6%). The patient was subsequently discharged with dual antiplatelet therapy and statin.

Discussion

We present two cases of young Bangladeshi migrant workers with no known past medical history, presenting with a first onset STEMI. This is interesting given that AMI typically affects patients of an older age group. Studies in Bangladesh have showed increased prevalence of AMI within the country as well as increasing AMI in younger patients within the population [21-23]. The most common risk factors are that of smoking, hyperlipidaemia, family history of Ischemic Heart Disease (IHD), hypertension, male gender and diabetes mellitus [10,22-24]. Other risk factors also include that of diet and stress [22]. This issue is especially pronounced for migrant workers in Singapore, whose diet often consist mainly of polished white rice with a high glycemic index, processed and less nutritious food [25,26]. Increased consumption of simple carbohydrates such as white rice has been shown to increase lipogenesis, cause insulin resistance and worsen lipid metabolism increasing the risk of IHD. Processed food also often contains higher levels of salt which further increases the risk of hypertension and IHD [27-29]. Migrant workers also often face increased stress from both their work and living conditions [30,31]. Migrant workers often live in dormitories which is a shared living space with others and is often poor ventilated, affecting their rest and sleep [30]. They also have chronic stress from fear of financial stability and repatriation back to their home countries [30]. Increased stress levels have been associated with affecting the hypothalamic-pituitary-adrenal axis, increasing cortisol levels resulting in central obesity, worsening glucose and lipid metabolism [32]. Increased stress also increases the risk of hypertension and affects endothelial function and inflammatory response in the body which increases the risk of IHD [32-34]. These additional causes could also contribute to increasing the risk of AMI in younger migrant worker population in Singapore. While these two cases highlight an increased number of AMI encountered in this young population group, further research could be conducted to determine the prevalence of AMI in young migrant workers in Singapore.

Both patients presented in this case series had undiagnosed hyperlipidaemia, highlighting the critical need of early prevention. Multiple studies have shown south Asians including Bangladeshis have a genetic predisposition that can contribute to hyperlipidaemia and IHD [10,22,35]. South Asians have higher ApoB100 /Apo-I ratio (marker of dyslipidaemia) which increases risk of IHD [22,36]. South Asians also have a higher degree of visceral fat for any BMI compared to other populations [37]. This puts even those with a normal BMI at a higher risk for metabolic syndrome and IHD. This coupled with the poor diet described above consisting of simple carbohydrate intake and processed food will further worsen dyslipidaemia, result in insulin resistance and lead to increased risk of IHD. Early treatment of hyperlipidaemia has been shown to reduce AMI risk significantly [38-41]. In Singapore, screening for hypertension, hyperlipidaemia and diabetes is routinely recommended for individuals aged 40 and above, as well as for those who are aged below 40 with multiple risk factors related to family history and lifestyle. Migrant workers are mandated by the Ministry of Manpower to undergo a medical examination primary for four types of infectious diseases (tuberculosis, HIV, syphilis and malaria) prior to having their work permits issued. Further screening tests are done only if employers have specific concerns about an individual's health [42]. Given that the lifestyle conditions migrant workers face may differ from other population groups, further studies could evaluate common risk factors in young migrant

workers with AMI for consideration of early screening and mitigation of cardiovascular risk factors during the pre-employment phase.

Interestingly, these two patients also had low risk factors of AMI at presentation. The patient in case 1 had no risk factors prior to admission and the patient in case 2 had two risk factors – namely family history of IHD and smoking. In view of the manifestation of typical symptoms in these two patients, i.e. chest pain that is radiating to the arm, associated with vomiting and dyspnoea, an early ECG was done, and the diagnosis of AMI was promptly identified. However, it is possible that individuals at higher risk of Cardiovascular Disease (CVD) may also present with atypical chest pain. As a result, healthcare providers may overlook further evaluation due to the non-specific nature of the symptoms, or attribute it to mimickers of chest pain not of ischaemic origin (eg. gastroesophageal reflux disease or musculoskeletal pain). The HEART score for major cardiac events comprising of the history, ECG changes, age of patient, risk factors, and initial troponin level, combined with serial troponin evaluation, can be an effective tool for risk stratification in such cases [43,44]. For young Bangladeshi individuals with low to moderate risk based on the HEART score, clinicians may consider referring such patients for early cardiovascular risk factor screening or consider a CT coronary angiogram with calcium scoring for the early detection of CVD. While clinicians are generally more cautious to rule out AMI when patients are of an older age, have more risk factors and a significant past medical history [45–47], these two cases highlight the need for increased vigilance when assessing chest pain in this population group, even when they present with no known significant past medical history.

Conclusion

The two cases presented highlight the uncommon occurrence of AMI in the very young migrant worker population in Singapore and explore potential risk factors for each case. Further research could be considered to determine the prevalence of AMI in young migrant worker population and to further evaluate common risk factors present for early screening and mitigation. In the US, guidelines from American Heart Association (AHA) and National Cholesterol Education Program (NCEP), recommend screening for hyperlipidaemia as early as 20 years old [48,49]. Given the potential increased prevalence of AMI among the young migrant worker population in Singapore, early screening for cardiovascular risk factors could be considered in addition to the current mandatory employment health screenings in place which currently focus on infectious diseases. There could be policy in place to screen for hyperlipidemia, diabetes and hypertension in all migrant workers in their home country prior to employment in Singapore. Early screening and diagnosis in place can allow for early intervention and mitigation of risk factors for ischemic heart disease in this population.

Declarations

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