



# The Interplay Of Demographic Variables In Myocardial Infarction

Sahil G. Shaikh, Omkar N. Swami, Shahu v. Dhutmal, Deval K. Patil Mrs. Vidhya Kapse

Shivlingeshwar College Of Pharmacy (Pharm D) Almala. Tq. Ausa Dist. Latur.

## **Abstract**

The myocardial infarction is called as heart attack resulting from the interruption of myocardial blood flow and resultant ischemia and is a leading cause of death world wide. The myocardial infarction is the most common cause of and disability in the western and world wide is coronary artery disease. There are 32.4 million myocardial infarction and strokes world wide every year. This review article provides the information epidemiological data of myocardial infarction, variations of myocardial infarction in the elderly, variations of myocardial infarction in pregnant women and the information about the variations of myocardial infarction in the childrens.

## **Keywords**

Myocardial infarction, epidemiology, prevalence of myocardial infarction, incidence of myocardial infarction, variations of myocardial infarction in the elderly, variations of myocardial infarction in the pregnant women and variations of myocardial infarction in the childrens.

## **Introduction**

The Myocardial Infarction is called as Heart Attack resulting from the interruption of myocardial blood flow and resultant ischemia and is a leading cause of death world wide. Myocardial Infarction ia an a end result of either acute or chronic myocardial ischemia. The hypoxia in that ischemia results in a stasis of waste products of cellular metabolism in addition to the lack of oxygen delivery leading to the cellular damage above and beyond that from hypoxemia.

Myocardial infarction is classify according to heart affected which depends on majority the major coronary artery is left ventricular anterior, which is usually due to occlusion of the left anterior descending coronary artery. Left ventricular inferior and posterior which is usually due to right coronary artery. Left ventricular lateral which is usually due to circumflex coronary artery occlusion. (1,2)

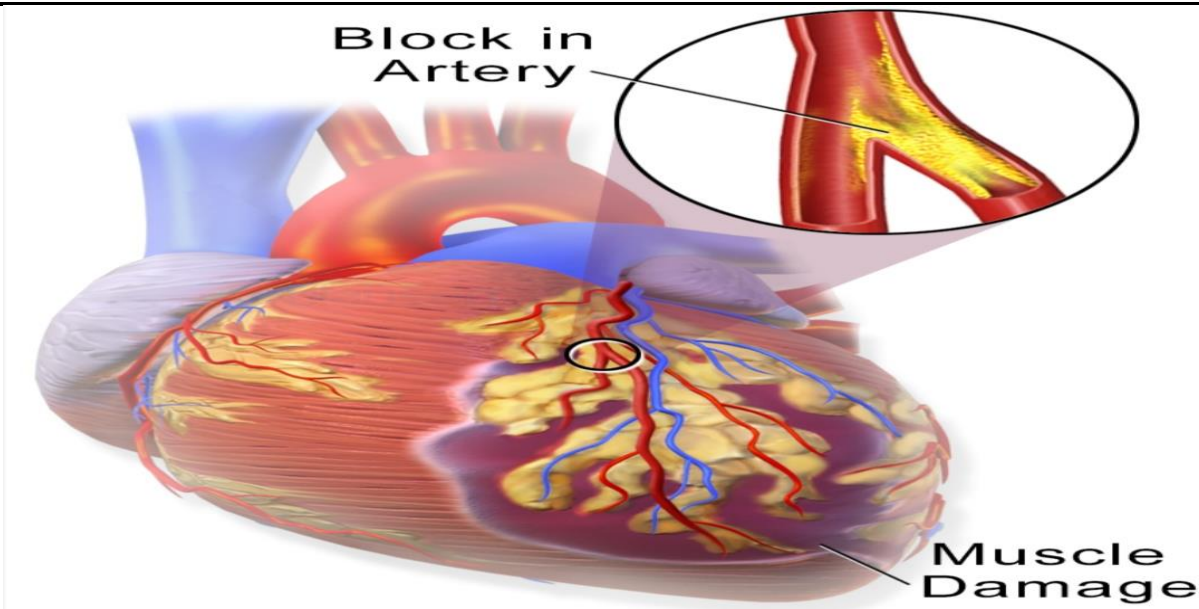


Figure 1: Myocardial Infraction

**Epidemiology**

In the myocardial infraction the most common cause of death and disability in the western world and worldwide is coronary artery disease. There are 32.4 million myocardial infraction and strokes worldwide every year. The patients with previous myocardial infraction are the highest risk group for further coronary events. Survivors of MI are at increased risk of recurrent infractions and have an annual death rate of 5% six times that in people of the same age who do not have coronary heart disease. The myocardial infraction are the leading cause of death in the industrialized nations of the world. In the united states, there are about 450000 deaths due to MIs each year. Nowdays , 95% of patients hospitalized with an MI will survive due to improvements in emergency response time and treatment techniques. The risk of having an MI increases with age but 50% of MIs in the united states occur in people under the age of 65 years old. The south asia study identified that eight established coronary risk factor – abnormal lipids, smoking, hypertension, diabetes, abdominal obesity, psychosocial factors, low fruit and vegetables consumption and lack of physical activity – accounted for 89% of the cases of acute myocardial infraction in india.(3)

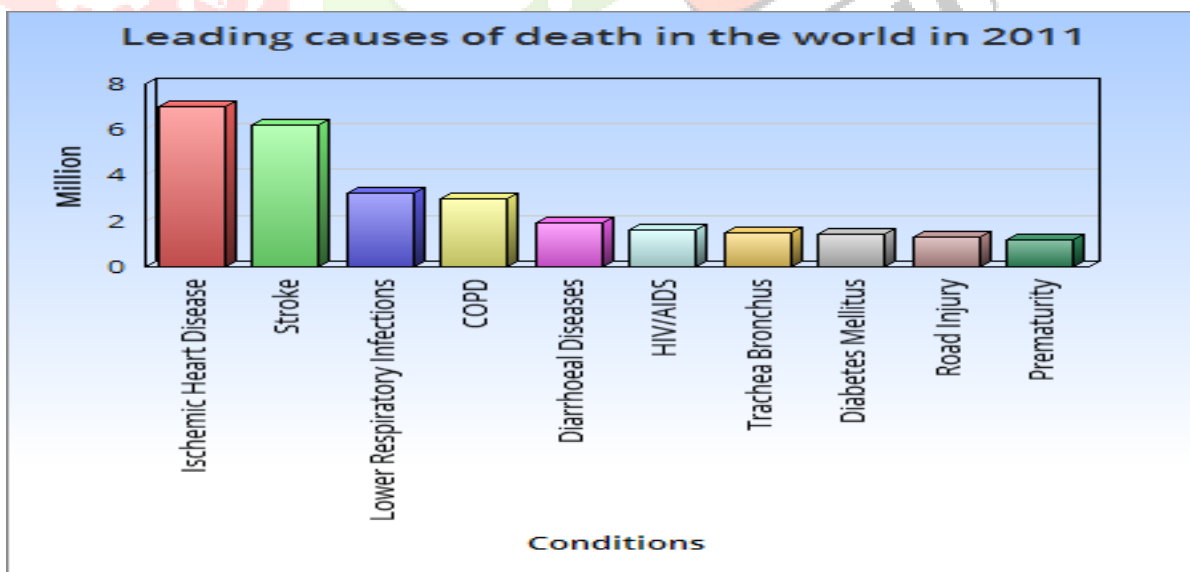


Figure 2: Epidemiological Data

### Prevalence of MI

According to 2024, based on the self reported national survey of the UK the prevalence of MI was reported as 640000 in men and 275000 in women this represents about 915000 people that have suffered an MI in the about three times higher than for women in the UK. The prevalence of age specific MI extends from 0.06% of men < 45 years of age to 2.46% of those > 75 years old. In contrast of these developed countries south Asian countries ( India, Pakistan, Sri Lanka, Banladesh and Nepal) have the highest prevalence of MI seen in youngsters than 45 years of age compared to those older than 60 years.(3–5)

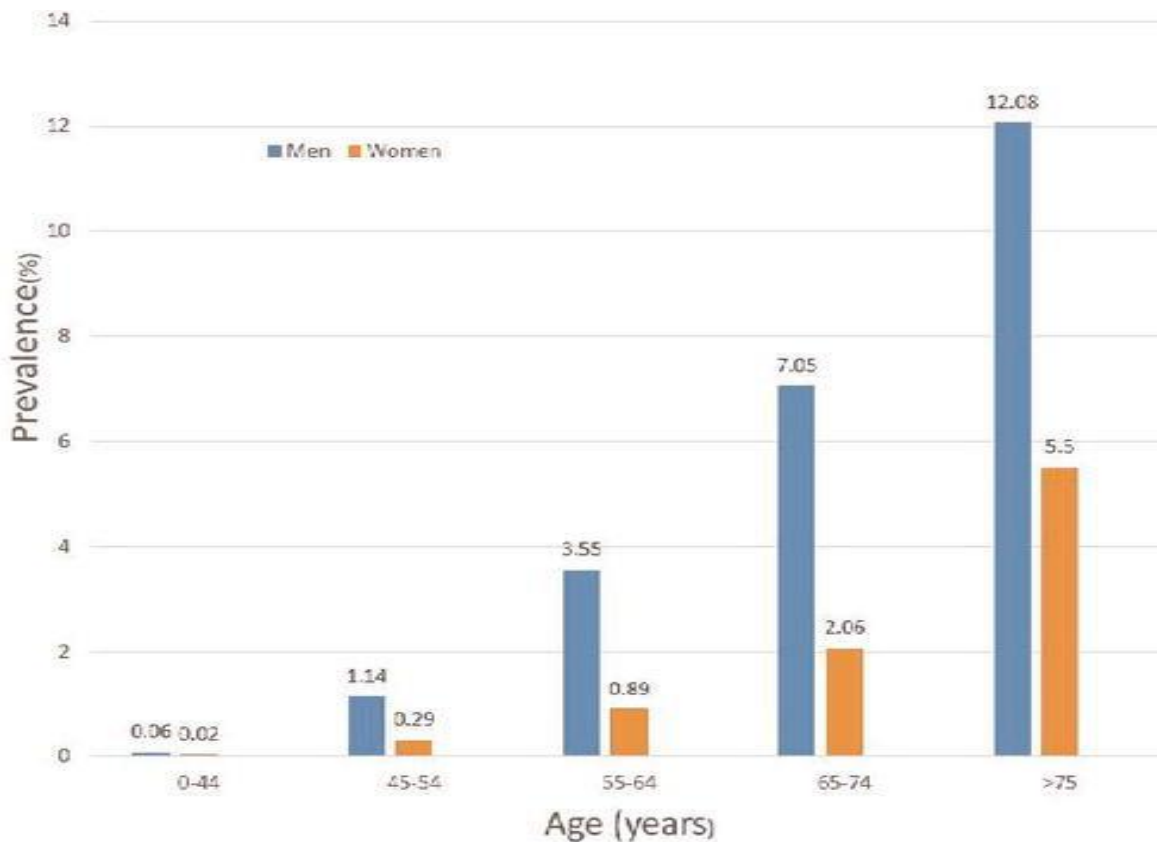


Figure 3: Prevalence Rate According To Age

### Incidence of MI

Prevalence of first MI and acute MI in patients who had a previous MI. The incidence of MI only reflects the former. The incidence of myocardial infraction has been declining in developed countries, including the USA and the UK.

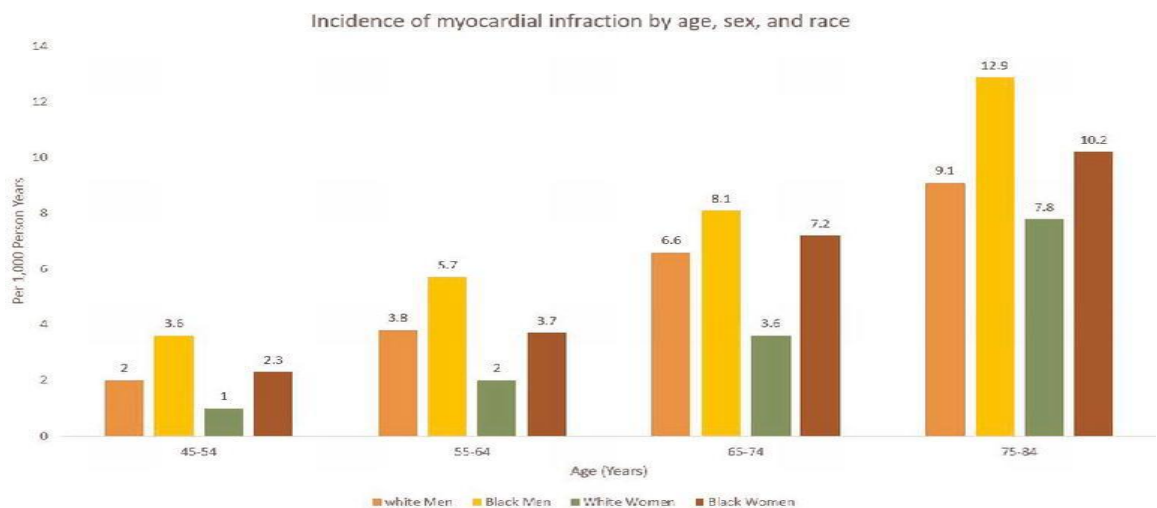


Figure 4: Incidence Rate According To Age And Sex

## **VARIATIONS OF MYOCARDIAL INFRACTION IN THE ELDERLY**

According to WHO statistics cardiovascular diseases are the main cause of high levels of morbidity disablement and mortality globally, causing negative effects in economics and social development. 31% of all deaths are caused by cardiovascular diseases. The majority of patients with AMI are elderly and senile individuals. According to WHO the range of elderly patients data classify- the age group of 60-75 years old, 75-90 years old. According to statistics the percentage of elderly people will reach 25% of total population by year 2025. This tendency proves that the ageing of the population will be observed in a future. In the year of 2014 the proportion of the elderly patient was 6 to 8% of total population. The number is increased in 2018 is 7 to 5% by the end of 2018. The demographic data the proportion of elderly people is expected to double by 2050. At the account of annual increase of the proportion of CVD and the aging of population there is a need to further investigate the problem of MI in worldwide(3-7).

### **Risk Factor Of AMI In Patient Over 60 Years Of Age**

The incidence and mortality from AMI among elderly and senile remains high. The patient age 65-79, 80-84, 85-88 and 90 year older have shown the one year mortality rate. According to the organ disfunction and low immunity the patient may large chances of the MI at the age of patients. The main risk factor is an presence of the comorbid condition of the patient at the elderly age. The main factor is an a hypertension is main caused the MI at this age of the patients(7,8).

### **Impact Of High Comorbidity On AMI**

The patients older than 65 years is usually accompanied by the comorbidities. The patients aged 65-76 years have a comorbidity rate of 62% patients older than 85 years have a 82% comorbidity rate. The most common comorbid pathologies in AMI patients arterial hypertension, hyperlipidemia, type-2 diabetes mellitus, chronic kidney disease, chronic heart failure are often is found. The recent study shows that the patient having myocardial infraction have high comorbidity rates, which is a predictor of the unfavourable outcomes of the disease. The most of the patients with myocardial infraction acquired to the more comorbidity with age. Those patients is increase the risk of death, stroke, prolonged hospitalization and the development of new myocardial infraction complications. The patients of advanced age with the combination of myocardial infraction and arterial hypertension have a 50% increased 5 year mortality rate, type 2 diabetes also constitutes to a worse outcomes(2,4).

## **VARIATIONS OF MYOCARDIAL INFRACTION IN PREGNANT WOMEN**

Pregnancy associated myocardial infraction (PAMI) is defined as the myocardial infraction during the pregnancy period. The pregnancy associated myocardial infraction is over the 20% of maternal cardiac deaths. The half of maternal deaths occur within the first day of delivery and 66% of deaths occur within the first week. The many of dramatic hemodynamic and physiological changes of pregnancy and the early postpartum period return to normal 6 to 12 weeks postpartum. The pregnancy associated hypercoagulability decreases by the 6 weeks and its normalized 12 weeks(2,4,8-10).

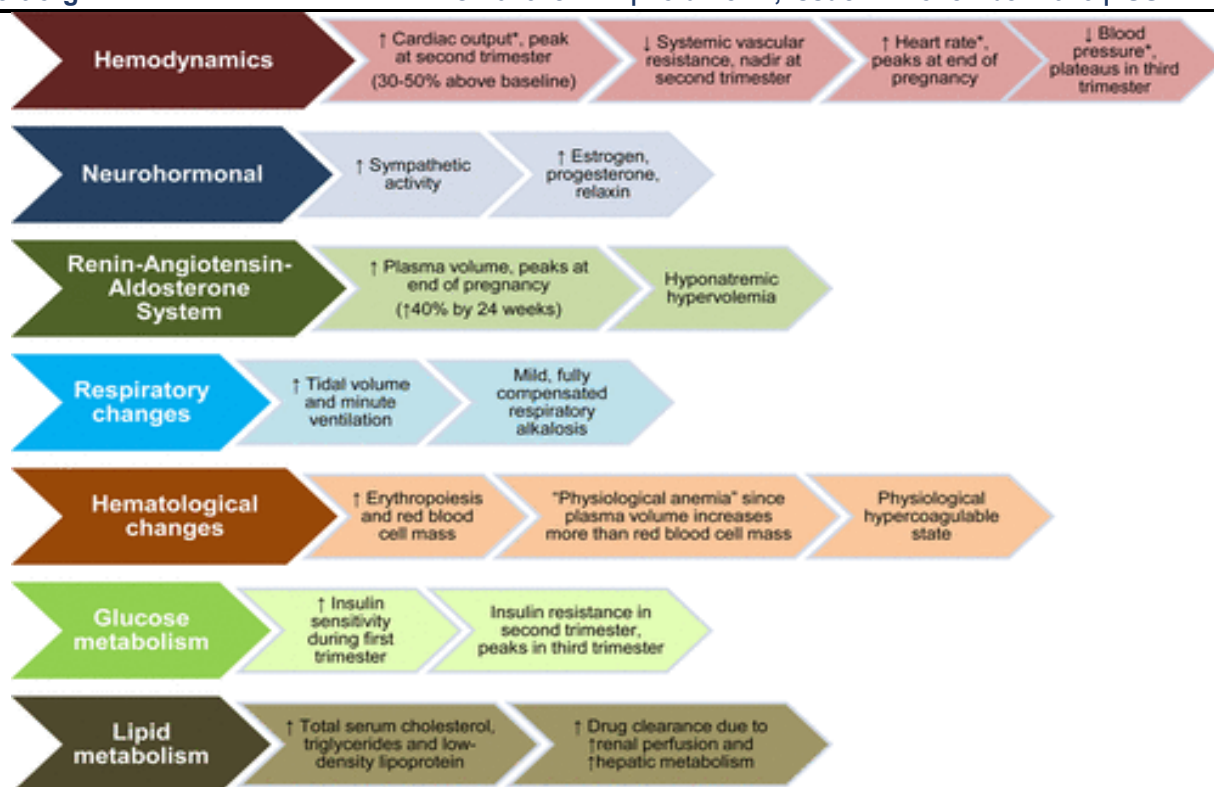


Figure 5 : Hemodynamic, Physiological And Metabolic Changes Of Pregnancy

### Causes Of Pregnancy Associated Myocardial Infraction

The causes of pregnancy associated myocardial infraction by either obstructive or non-obstructive lesions in the coronary arteries. The patients with MI coronary arteries are considered as having the MI with non-obstructive coronary arteries. The causes of MI with three non-obstructive coronary arteries overlap with causes of obstructive MI as discussed below and its include the coronary plaque disruption with thrombosis and the spontaneous thrombolysis(5).

### Incidence And Prevalence Of Pregnancy Associated Myocardial Infraction

Pregnancy associated myocardial infraction occurs in the 2.8 to 8.1 as per the 100000 deliveries which is the 4 fold higher than the MI occurrence among non- pregnant, reproductive aged womens. The incidence of the pregnancy associated myocardial infraction is increasing and may be relate to improved case detection and the greater numbers of older women with the comorbid factors becoming pregnant. The risk factor for pregnancy associated myocardial infarction is age > 35 years. The other risk factor include cigarette smoking, diabetes mellitus, hypertension and the hyperlipidemia, but these are the less common in women with pregnancy associated myocardial infraction comaperd to MI not associated with pregnancy. The high prevalence of nonatherosclerotic cause of pregnancy associated myocardial infraction such as spontaneous coronary artery dissection. The common risk factors include preeclampsia,

rates of pregnancy associated myocardial infraction likely its mediated by a higher prevalence of other coexistent risk factors.(9)



## Management Of Pregnancy Associated Myocardial Infraction

The treatment of pregnancy associated myocardial infraction is most important due to the high maternal and fetal mortality. The therapy focused on maternal outcomes will also increase fetal survival and thus the maternal condition should dictate in the clinical management. For the management of pregnancy associated myocardial infraction in a Multidisciplinary Pregnancy Heart Team consisting of expertise from the cardiology, maternal fetal medicine and also depending on the clinical situation the cardiothoracic, neonatology, surgery and the critical care may facilitate collective decision making. The standard of the care of the nonpregnant women with MI should be standard of care for the pregnant women. It may be include the heparin, aspirin, clopidogrel and nitrates. The aspirin is given to the full dose -**325mg** it may be used until 32 weeks gestation and **81mg** may be used any time during the gestation. The heparin is preferred anticoagulant because of it does not cross the placenta and safety during the pregnancy. The clopidogrel is preferred P2Y12 inhibitor in pregnancy and the more potent options should be avoided. Identifying the absence of safety data the glycoprotein IIb/IIIa inhibitors generally avoided. The beta blocker is considered as safe in pregnancy but use of angiotensin converting enzyme inhibitors and the angiotensin receptor blockers must be delayed until after delivery due to the risk to the fetus.(6)

Medication	Use during pregnancy?	Pregnancy Notes	Use during lactation?
Aldosterone antagonists	No.	Crosses the placenta, feminization of the male fetus.	Yes
ACE inhibitors/ARBs	No.	Contraindicated in pregnancy due to intrauterine growth restriction, decreased fetal renal function, lung hypoplasia, skeletal malformations, and oligohydramnios (Class X).	Enalapril or captopril are preferred, would NOT use ARBs.
Aspirin	Yes.	The 325 mg daily may be utilized until 32 weeks gestation due to concern for premature closure of the fetal ductus arteriosus. However, the 81mg formulation may be used at any time during gestation and does not require discontinuation prior to delivery. Higher doses (>180 mg) are associated with increased bleeding, birth defects, premature closure of patent ductus arteriosus, intrauterine growth restriction, birth defects, and fetal mortality.	Yes (81mg/day).
Beta-blockers	Yes.	Beta blockers such as metoprolol, labetalol, carvedilol are variably associated with fetal growth restriction (Class C). Nonselective beta-blockers can increase uterine activity. Atenolol crosses the placental and can cause fetal bradycardia, hypoglycemia, intrauterine growth restriction, birth defects, apnea (Class D).	Yes.
Bivalirudin	if needed.	Limited data and may cause maternal and fetal adverse effects.	Unknown.
Calcium Channel Blockers (CCB)	if needed.	All but diltiazem cross the placenta, but diltiazem is associated with adverse fetal effects in animal studies. Associated with pre-maturity, intrauterine growth restriction, fetal bradycardia. Useful for hypertension, ischemic symptoms (amlodipine) and atrial fibrillation when there are contraindications to beta-blockers but important to avoid hypotension.	Nifedipine considered safe, otherwise unknown as CCB transfer to milk.
Clopidogrel	Yes.	Clopidogrel (Class B) may be used during pregnancy but must be discontinued 5-7 days prior to delivery if neuraxial anesthesia is planned. Case reports and post marketing surveillance demonstrates increased bleeding risk at delivery without other noted risks.	Unknown.
Fibrinolytics	if needed.	Limited data. Unknown if it crosses the placenta with isolated case reports of use.	Unknown.
Glycoprotein IIb/IIIa inhibitors	if needed.	Limited information in pregnancy with isolated case reports of use.	Unknown.
Heparin/low-molecular weight heparin	Yes.	Does not cross the placenta. Well studied without significant risks, Class C for unfractionated heparin, Class B for enoxaparin.	Yes.
Isosorbide dinitrate	Yes.	Limited information in pregnancy with isolated case reports of safety (Class B).	Unknown.
Nitroglycerin	Yes.	Risk of hypotension and uterine and placental hypoperfusion (Class C).	Yes.
Direct-acting oral anticoagulants	No.	Crosses the placenta with potential for placental and fetal bleeding.	Unknown.
Statins	No.	Risk of congenital anomalies (Class X).	Unknown.
Warfarin	Yes.	Risk of embryopathy is reduced at doses ≤5 mg/day. If requiring higher doses, use heparin for first 12 weeks.	Yes.

Figure 6: Cardiac Medication And Safety During Pregnancy

## VARIATIONS OF MYOCARDIAL INFRACTION IN CHILDREN

Myocardial infraction is a clinical condition that is develops in association with a sudden reduction of the blood flow in coronary vessels supplying the heart. Myocardial infraction is a common in adults but is not common in children. The electrocardiographic, echocardiographic and enzymatic diagnostic criteria of MI have been well defined in adults, in children there are some difficulties are observed. In children there are various etiology for the MI is kawa-saki disease, inherited cardiomyopathy, trauma, coronary arteritis, myocarditis, etc. Kawa-saki disease is a self-limited acute vasculitis. The children age between 5 months and 5 years are especially sensitive. It is the most common cause of vasculitis and MI in children. Myocarditis is generally seen together

with in the peridiatics. It is also known as myopericarditis. The myopericarditis show the difference according to whether the effects of the clinical findings are focal. The diagnosis criteria is made from the determination of chest pain, ST elevation on ECG, the high level of troponin- I and the sound of pericardial friction. Pericardial friction is observed in 60% of pediatric patients. The wall movement show abnormalities on echo it sign to MI. In the ECG findings in myopericarditis are focal in 50%. (3,6,8-10)

### Electrocardiography In Paediatric Myocardial Infarction

The 12 lead ECG is an part of the evaluation of coronary artery disease. The ST segment and J point is the first finding of myocardial ischaemia. The comparison of the base line an elevation of 1-2 mm is seen in the J point and the ST segment in myocardial infarction. The presence of the PR segment depression is an ECG finding which is the valuable in the differentiation of the myopericarditis from MI in the favour of myopericarditis. The positive predictive value of PR depression is seen in chest and extremity derivation has been determined to be 96.7%. A long Q wave in V1 and V2 may be seen into the patient with left ventricle hypertrophy. The evaluation of anamnesis the physical examination and the laboratory findings together with the ECG findings is important for every patients. The paediatric patient the determination of the Q wave in just one deviation could even be sufficient to determine the myocardial infarction. The Q wave show infract of the myocardial wall higher R wave in V1 and V2 it may represent true posterior wall myocardial infarction. The ECG leads are may be placed on the upper part of the chest, the Q waves can be incorrectly shown in V5-6 that may be caused misinterpretation of an the integral part of the elevation of coronary artery disease. The elevation of the J point that joint the QRS and ST segment is the first finding of myocardial infarction. (1,5,7,10,11)

### BIBILOGRAPHY

1. Tomaiuolo R, Bellia C, Caruso A, Di Fiore R, Quaranta S, Noto D, et al. Prothrombotic gene variants as risk factors of acute myocardial infarction in young women. *J Transl Med.* 2012;10(1):1-5.
2. Zhong Z, Liu J, Li B, Li C, Liu Z, Yang M, et al. Serum lipid profiles in patients with acute myocardial infarction in Hakka population in southern China. *Lipids Health Dis.* 2017;16(1):1-9.
3. Bakalli A, Osmani B, Kamberi L, Pllana E. Acute myocardial infarction and pulmonary tuberculosis in a young female patient: a case report. *Cases J [Internet].* 2008;1(1):246. Available from: <https://doi.org/10.1186/1757-1626-1-246>
4. Fu H, Hua Q, Zhao Y. Study of risk factors and prognoses in female patients younger than 60 years old with acute myocardial infarction. *Crit Care [Internet].* 2008;12(2):P243. Available from: <https://doi.org/10.1186/cc6464>
5. Mather AN, Plein S, Ball SG, Greenwood JP. Assessment of myocardial infarct size and left ventricular function following acute myocardial infarction by cardiovascular magnetic resonance: A comparison of treatment with thrombolysis versus primary percutaneous coronary intervention. *J Cardiovasc Magn Reson [Internet].* 2010;12(1):P171. Available from: <https://doi.org/10.1186/1532-429X-12-S1-P171>
6. Abdukodirova NM, Tulaboeva GM, Sagatova XM, Talipova YS. Features of the Course of Myocardial Infarction in Older Persons Undergoing Covid-19. *Uzb Med J.* 2021;Special issue(3):45-9.
7. Salari N, Morddarvanjoghi F, Abdolmaleki A, Rasoulpoor S, Khaleghi AA, Hezarkhani LA, et al. The global prevalence of myocardial infarction: a systematic review and meta-analysis. *BMC Cardiovasc Disord [Internet].* 2023;23(1):206. Available from: <https://doi.org/10.1186/s12872-023-03231-w>
8. Eitel I, Desch S, Fuernau G, Gutberlet M, Schuler G, Thiele H. Gender differences in myocardial salvage and clinical outcome in patients with acute reperfused ST-elevation myocardial infarction. *J Cardiovasc Magn Reson [Internet].* 2011;13(1):O86. Available from: <https://doi.org/10.1186/1532-429X-13-S1-O86>
9. Loughnan ME, Nicholls N, Tapper NJ. Demographic, seasonal, and spatial differences in acute myocardial infarction admissions to hospital in Melbourne Australia. *Int J Health Geogr [Internet].* 2008;7(1):42. Available from: <https://doi.org/10.1186/1476-072X-7-42>
10. Tavares M, Pang P, Laribi S, Mebazaa A, Gheorghide M. Time course of dyspnea evolution in the emergency department: results from the URGENT dyspnea survey. *Crit Care.* 2009;13(Suppl 1):P1.

11. Costantini M, Oreto G, Albanese A, Ranieri A, De Fabrizio G, Sticchi Giovanni, et al. Presumptive myocarditis with ST-Elevation myocardial infarction presentation in young males as a new syndrome. Clinical significance and long term follow up. Cardiovasc Ultrasound [Internet]. 2011;9(1):1. Available from: <https://doi.org/10.1186/1476-7120-9-1>

