

**Prevalence of post myocardial infarction complications in geriatric population**Atul Sadashiv Baviskar,<sup>1</sup> Aman Mubarak Naikwadi<sup>2\*</sup><sup>1</sup>MD General Medicine, Assistant Professor, Department of General Medicine, SMBT Institute of Medical College and Research Center, Nasik, Maharashtra<sup>2\*</sup>MD General Medicine, Associate Professor, Department of General Medicine, SMBT Institute of Medical College and Research Center, Nasik, Maharashtra

Received: 03-08-2020 / Revised: 05-10-2020 / Accepted: 24-10-2020

**Abstract**

**Background:** Myocardial infarction, also commonly referred as “heart attack,” is caused by reduced or complete cessation of blood flow to a part of the myocardium. It is one of the leading causes of high mortality rates in the developing countries. Myocardial Infarction has been associated with higher pervasiveness of functional impairments, including deficits in cognition, vision and hearing, along with reduced strength and grip, and sensory domains, in elderly than younger individuals. **Aim:** The current study was conducted to evaluate the complications associated with patients with myocardial infarction. **Methodology:** This study was conducted on 150 geriatric patients who attended the Out Patient Department of the Cardiology Clinic, SMBT Medical College, Nasik, Maharashtra between 2017-2019. All the patients were followed up for a period of 6 months and parameters like functional impairments, including deficits in cognition, vision and hearing, along with reduced strength and grip, and mortality were evaluated by a single expert.

**Results:** All the subjects were between the age group of 62 to 87 years. The present study comprised of 65 females and 85 males. 27 patients out of 150 were reported dead in 6 months follow up. 19 out of these 27 subjects were males, whereas, 08 were females. 122 out of 150 subjects reported with a fall history. 82 out of 150 subjects reported with weak grip strength. Only 13 individuals out of 150 reported with cognitive impairment. 49 out 150 reported with visual impairment. 81 out 150 reported with hearing impairment. **Conclusion:** Elderly patients tend to be plagued by multiple comorbidities, frailty, poly-pharmacy, depression and cognitive impairments. Future research is needed to understand where opportunities exist to improve care experience and outcomes for the vulnerable subsets of myocardial infarction.

**Keywords:** Chronic Heart Disease, Cognitive Impairment, Grip Strength, Hearing, Mortality, Myocardial Infarction.

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited.

**Introduction**

Myocardial infarction, also commonly referred as “heart attack,” is caused by reduced or complete cessation of blood flow to a part of the myocardium.<sup>1</sup> It may be characterized by formation of plaques in the interior walls of the arteries resulting in reduced blood flow to the heart which in turn results in injury to the heart muscles because of lack of oxygen supply.

Myocardial infarction or coronary artery disease is one of the leading causes of high mortality rates in the developing countries.<sup>2</sup>

The etiological factors accountable for the development of myocardial infarction may be multifactorial including coronary artery embolism, smoking, dyslipidemia, hypertension, diabetes mellitus, obesity, lack of physical activity, poor oral hygiene, peripheral vascular disease, aortic dissection, genetics, conditions like hyperthyroidism, etc.<sup>3</sup> Amongst all, atherosclerosis is the predominant cause.

It is most prevalent in patients older than the age of 40, however, younger men and women can be affected. The prevalence is higher in males than females for all ages.<sup>4</sup> The average age surpasses 70 years with the prevalence doubling from 6% between the age group of

**\*Correspondence****Dr. Aman Mubarak Naikwadi**

Department of General Medicine, SMBT Institute of Medical College and Research Center, Nasik, Maharashtra

Email id: [dramannaikwadi@gmail.com](mailto:dramannaikwadi@gmail.com)

60–79 years to 14 % in those > 80 years.<sup>5</sup> The clinical presentation include a wide array of symptoms including the classical sub-sternal chest pain radiating from left arm to neck, jaw, shoulder or arm (pain perception reduces with advancing age), dyspnea (increases with advancing age), sweating, nausea, vomiting, abnormal heart beating; neurological symptoms like anxiety, fatigue, weakness, stress, depression, etc.<sup>6</sup> The pain may be intermittent or persistent (lasting for more than 20 minutes) and is unaffected by positional changes or active movement. Myocardial infarction may sometimes be asymptomatic.<sup>7</sup>

Myocardial Infarction may be associated with high morbidity and mortality rates. It has been reported that elderly patients have a higher pervasiveness of functional impairments, including deficits in cognition, vision and hearing, along with reduced strength and grip, and sensory domains than younger individuals. Research reflects that the mortality rates tend to be higher in elderly owing to the age related anatomical, functional and metabolic changes of the heart. Also, in the geriatric population, the adaptation of cardiovascular system to stress is impaired and there is associated increase in encumbrance to ventricular ejection due to morphological alterations in the arterial bed and scarce vasodilatory capacity of the peripheral vessels. Higher mid-term mortality of patients may also due to their meager level of activity and poor adherence to medication.<sup>8</sup>

Numerous studies have shown that approximately 45% patient with chronic heart disease show signs of cognitive impairment. The associated vascular insufficiency may lead to cerebrovascular changes such as reduced cerebral blood flow, lesions and infarctions in the white matter of brain which may be the underlying cause of cognitive impairment and of dementia.<sup>9</sup>

Loss or impairment in vision although rare, but may be encountered in patients with infarction. It may occur due to reperfusion therapy following the attack, however, according to a theory depicted by *Symonds and Mackenzie*, blindness or impairment of vision may be due to embolism, anywhere from the cardiac region to the basilar artery which may splinter to involve the posterior cerebral arteries bilaterally.<sup>10</sup>

Hearing impairment may be associated with wide array cardiovascular risk factors, like smoking, diabetes, hypertension, hyperlipidemia, and obesity. The internal auditory artery is highly susceptible to ischemia as it doesn't have collateral anastomotic network.<sup>11</sup>

Grip strength is related to overall body strength, including the strengths of arms, backs, and legs.

Patients with cardiovascular disease may report with reduced grip strength, although, there is no direct correlation between the same.

The current study was conducted to evaluate the complications associated with patients with myocardial infarction.

### Materials and Methods

This study was conducted on 150 patients who attended the Out Patient Department of the Cardiology Clinic, SMBT Medical College, Nasik, Maharashtra between 2017-2019.

All the patients were followed up for a period of 6 months and a variety of complications associated with myocardial infarction were recorded. The included parameters are functional impairments, including deficits in cognition, vision and hearing, along with reduced strength and grip, and mortality. All the parameters were evaluated by a single expert.

The protocol of the current research was approved by the Institutional Review Board of the Maharashtra University of Medical Sciences. The readings were recorded in master chart, and the data analysis was carried out statistically.

### Results

A total of 150 patients who attended the Cardiology Clinic, SMBT Medical College were included in the study. All the patients had a history of myocardial infarction in past 6 months.

All the patients were evaluated for parameters such as mortality, recent fall history, weak grip strength, cognitive, hearing and visual impairment.

All the subjects were between the age group of 62 to 87 years. Mean, median and standard deviation were 73.54, 73 and 6.778 (Table 2). The present study comprised of 65 females and 85 males. Chi square value was found to be non significant as T- test value 0.99904 and p- value less than 0.5.

27 patients out of 150 were reported dead in 6 months follow up. All these subjects were above 77 years of age. 19 out of these 27 subjects were males, whereas, 08 were females. 122 out of 150 subjects reported with a fall history (81.33%, range: 80-85 %, Chi square value: 13.8). 82 out of 150 subjects reported with weak grip strength (54.67%, range: 50-55 %, Chi square value: 5.41). Only 13 individuals out of 150 reported with cognitive impairment (8.67%, range: 10-15 %, Chi square value: 14.83). 49 out 150 reported with visual impairment (32.67%, range: 30-33%, Chi square value: 8.12). 81 out 150 reported with hearing impairment (54%, range: 50-55 %, Chi square value: 4.79). (Table 1, Table 3)

**Table 1: Age wise distribution of various parameters**

Age Group	Gender	Mortality	Recent Fall History	Weak Grip Strength	Cognitive Impairments	Visual Impairments	Hearing Impairments
60-60	<b>Female</b>	-	<b>10</b>	<b>07</b>	<b>01</b>	<b>02</b>	<b>07</b>
	Male	-	06	07	-	05	05
66-70	<b>Female</b>	-	<b>14</b>	<b>06</b>	<b>01</b>	<b>07</b>	<b>12</b>
	Male	-	15	13	04	04	10
71-75	<b>Female</b>	-	<b>09</b>	<b>09</b>	<b>02</b>	<b>04</b>	<b>07</b>
	Male	-	14	10	-	06	07
76-80	<b>Female</b>	<b>02</b>	<b>12</b>	<b>06</b>	<b>04</b>	<b>04</b>	<b>06</b>
	Male	-	14	07	-	08	11
81-85	<b>Female</b>	<b>04</b>	<b>08</b>	<b>04</b>	-	<b>02</b>	<b>05</b>
	Male	-	14	08	01	05	06
86-90	<b>Female</b>	<b>02</b>	<b>03</b>	<b>02</b>	-	<b>02</b>	<b>02</b>
	Male	-	03	03	-	-	03

**Table 2: Age predilection**

Group	N	Minima	Maxima	Mean	SD	Median	T-Test Value	P- Value
<b>Patients Age</b>	150	62	87	73.54	6.778	73	0.999	0.5

**Table 3: Statistical Analysis Of Various Symptoms**

Sr No	Symptoms	Chi Square Value	Incidence Percentage	Range
01	<b>Recent Fall History</b>	13.84	122/150 ×100= 81.33%	80-85 %
02	<b>Weak Grip Strength</b>	5.41	82/150 ×100= 54.67 %	50-55 %
03	<b>Cognitive Impairments</b>	14.83	13/150 ×100= 8.67 %	10-15 %
04	<b>Visual Impairments</b>	8.12	49/150 ×100= 32.67 %	30-33 %
05	<b>Hearing Impairments</b>	4.79	81/150 ×100= 54 %	50- 55 %

### Discussion

A total of 150 patients with a history of myocardial infarction in past 6 months attending the Cardiology Clinic of SMBT Medical College were included in the study.

All the subjects were between the age group of 62 to 87 years. The present study comprised of 65 females and 85 males. Our findings were in concordance with the study conducted by Zucker et al to assess the influence of gender on the likelihood of myocardial infarction. It was observed that, men had an approximately twofold higher prevalence of myocardial infarction amongst all age subgroups in comparison to women.<sup>12</sup> It has been reported that cardiovascular disease develops 7 to 10 years later in women than in men, however, is still the chief cause of fatality in women above 65 years of age.<sup>13</sup>

27 patients out of 150 were reported dead in 6 months follow up. All these subjects were above 77 years of age. It has been reported that myocardial infarction is associated with a mortality rate of approximately 30% and about 50% of the fatalities occur before the patient reaches the hospital.<sup>14</sup>

122 out of 150 subjects reported with a fall history (81.33%, range: 80-85 %, Chi square value: 13.8).

Morbidity associated with falls in elderly includes bone fracture, head injury, hospitalization, limited mobility, decreased ability to perform activities of daily living. It is believed that older adults admitted to the hospital are feeble and poorly prepared to respond to the insult of a myocardial infarction attack. Their activity is restricted during the hospital stay, they experience troubled sleep, emotional stress, and their medication schedule is dramatically altered. Falls may contribute to a vicious cycle in which phobia of falling causes a decline in physical activity, leading to frailty, increase in dependence, and even future falls.<sup>15</sup>

82 out of 150 subjects reported with weak grip strength (54.67%, range: 50-55 %, Chi square value: 5.41). Biomarkers are symbols at the level of pathology, body function or activity that offer an objective clue of individual's medical status. Grip strength, has been recommended as a biomarker of aging and is referred to as the measure of body function. It has been stated that reduced muscular strength/ grip strength, has been allied to an increased risk of cardiovascular mortality. It is a rapid and economical tool of stratifying the risk of cardiovascular death.<sup>16</sup>

Only 13 individuals out of 150 reported with cognitive impairment (8.67%, range: 10-15 %, Chi square value:

14.83). Cognitive impairment is one of the comorbidities projected to affect around 1/5<sup>th</sup> of elderly patients, with a higher frequency amongst the ones with vascular disease. It is an imperative cause of functional decline and increased utilization of health care facilities.<sup>17</sup> In our study, cognitive impairment was seen in individuals above 70 years of age, and was more prevalent in females.

49 out 150 reported with visual impairment (32.67%, range: 30-33%, Chi square value: 8.12). Visual impairment in our study was categorized as a response of fair, poor, very poor, or completely blind. 81 out 150 reported with hearing impairment (54%, range: 50-55 %, Chi square value: 4.79).

### Conclusion

Elderly patients tend to be plagued by multiple comorbidities, frailty, polypharmacy, depression and cognitive impairments. Future research is needed to understand where opportunities exist to improve care experience and outcomes for the vulnerable subsets of myocardial infarction.

### References

- Ojha N, Dhamoon AS. Myocardial Infarction. [Updated 2020 Aug 10]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-.
- Lu L, Liu M, Sun R, Zheng Y, Zhang P. Myocardial Infarction: Symptoms and Treatments. *Cell Biochem Biophys*. 2015; 72(3): 865-7.
- Mechanic OJ, Grossman SA. Acute Myocardial Infarction. [Updated 2020 Aug 11]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-.
- Nielsen M, Andersson C, Gerds TA, Andersen PK, Jensen TB, Køber L, Gislason G, Torp-Pedersen C. Familial clustering of myocardial infarction in first-degree relatives: a nationwide study. *Eur Heart J*. 2013; 34(16): 1198-203.
- Benjamin EJ, Blaha MJ, Chiuve SE, et al. Heart Disease and Stroke Statistics—2017 Update: A Report From the American Heart Association. *Circulation*. 2017; 135: e146–e603.
- Gregoratos G. Clinical manifestations of acute myocardial infarction in older patients. *Am J Geriatr Cardiol*. 2001; 10(6): 345-7.
- Frangogiannis NG. Pathophysiology of Myocardial Infarction. *Compr Physiol*. 2015; 5(4): 1841-75.
- L.C. Bhatia, R.H. Naik. Clinical profile of acute myocardial infarction in elderly patients. *Journal of Cardiovascular Disease Research* 2013; 4: 107-111.
- van Oijen M, de Jong FJ, Witteman JC, Hofman A, Koudstaal PJ, Breteler MM. Atherosclerosis and risk for dementia. *Ann Neurol*. 2007; 61(5): 403–10.
- Brettell RP. A case of blindness associated with myocardial infarction. *Postgrad Med J*. 1980; 56(656): 423-424.
- Lee W, Chang Y, Shin H, Ryu S. Hearing Loss and Risk of Overall, Injury-Related, and Cardiovascular Mortality: The Kangbuk Samsung Health Study. *J Clin Med*. 2020; 9(5): 1415.
- Zucker DR, Griffith JL, Beshansky JR, Selker HP. Presentations of acute myocardial infarction in men and women. *J Gen Intern Med*. 1997; 12(2): 79-87.
- Maas AH, Appelman YE. Gender differences in coronary heart disease. *Neth Heart J*. 2010; 18(12): 598-602.
- Rathore SS, Gersh BJ, Weinfurt KP, Oetgen WJ, Schulman KA, Solomon AJ. The role of reperfusion therapy in paced patients with acute myocardial infarction. *Am Heart J*. 2001; 142(3): 516-9.
- Viccaro LJ, Perera S, and Studenski SA. Is timed up and go better than gait speed in predicting health, function, and falls in older adults? *J Am Geriatr Soc*. 2011; 59(5): 887-92.
- Leong DP, Teo KK, Rangarajan S, Lopez-Jaramillo P, Avezum A Jr, Orlandini A, Seron P, Ahmed SH, Rosengren A, Kelishadi R, Rahman O, Swaminathan S, Iqbal R, Gupta R, Lear SA, Oguz A, Yusoff K, Zatonska K, Chifamba J, Igumbor E, Mohan V, Anjana RM, Gu H, Li W, Yusuf S; Prospective Urban Rural Epidemiology (PURE) Study investigators. Prognostic value of grip strength: findings from the Prospective Urban Rural Epidemiology (PURE) study. *Lancet*. 2015; 18: 386(9990): 266-73.
- Gharacholou SM, Reid KJ, Arnold SV, et al. Cognitive impairment and outcomes in older adult survivors of acute myocardial infarction: findings from the translational research investigating underlying disparities in acute myocardial infarction patients' health status registry. *Am Heart J*. 2011; 162(5): 860-869.

**Conflict of Interest:** Nil

**Source of support:** Nil