



Review Article

Acute Coronary Syndrome in Octogenarians: Management Perspectives

Sunil Modi and Ranjan Modi*

Indraprastha Apollo Hospital, New Delhi, India

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ABSTRACT

Current guidelines for acute coronary syndrome are derived from the data in randomized clinical trials and meta-analysis conducted in patients. These patients are generally of younger age. The data of acute coronary syndrome in octogenarians is mainly derived from registries. This mid and long-term data regarding medical therapy or interventions in octogenarians is low in number with smaller subsets of patients. Most of the physicians are reluctant to use the same guidelines in these elderly patients due to increased chances of complications. This article reviews the available data and literature in acute coronary syndrome in octogenarians and provides management perspectives for these elderly patients.

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Introduction

Age is one of the most important factors for cardiovascular disease; moreover, it is also a factor to determine the prognosis, morbidity and mortality in a patient. It also determines the side effects of pharmacotherapy, particularly antithrombotic therapies. The literature mentions the mortality rate after non-ST segment elevation myocardial infarction (non-STEMI) in very elderly patients. It increases progressively with respect to 1-year outcomes, from 13.3% to 23.6%, 33.6% and 45.5%, among ages 65-79, 80-84, 85-89, and at least 90 years old, respectively [1]. Older patients have complex cardiovascular disease and with that added comorbidities. There is higher incidence of comorbidities like hypertension, congestive heart failure (CHF), atrial fibrillation, cerebrovascular disease, anemia, and renal insufficiency in octogenarians. These comorbidities may be more pronounced in elderly due to low cardiac reserve secondary to reduced beta adrenergic responsiveness and severe coronary artery disease. Keeping in mind the age, the challenges in elderly patients are not only the comorbidities but also the timely recognition of ACS and initiation of lifesaving therapies.

Current guidelines regarding use of interventions in ACS are based on data derived from randomized clinical trials. These trials have been mostly conducted in younger patients [2-6]. The literature regarding ACS in octogenarians is limited. There is very little data regarding

interventions in octogenarians with ACS, also this data is mostly registries, with not derived from meta-analysis studies [5-11]. These interventions are mostly operator dependent and guidelines regarding such interventions in octogenarians is lacking. When incidence rates of major adverse cardiac events, defined as the combined events of death, revascularization, and myocardial infarction (MI) were compared between elderly and younger patient. Some studies found the MACCE to be higher in elderly and others found it similar between the two aged population [8-11]. A few available observational studies published in the past have demonstrated higher in-hospital mortality and bleeding complications in elderly population [12, 13]. The lack of data in octogenarians, the clinicians have difficulty to make decision on the use of PCI in ACS. Prevailing guidelines determine the need of PCI in these elderly populations, despite this sometimes it is withheld solely with respect to their age. This decision may be debatable on ethical basis [14-17].

In view of the past literature which suggested that interventional strategy in the elderly may have negative outcomes, most were managed conservatively. However, over the last decade, there has been a progressive switch from a conservative to an invasive strategy in these patients by many interventionists. This change in the strategy may have contributed to mortality reduction across the ACS spectrum, irrespective of age and gender [1]. As the mortality at baseline in elderly is high, thus

*Correspondence to: Dr. Ranjan Modi, Associate Consultant, Indraprastha Apollo Hospitals, New Delhi 110076, India; Tel: 09844917110; E mail: modi.ranjan@gmail.com, ranjan_modi@hotmail.com

early revascularization may show absolute benefit in them when compared to younger population.

As yet, there have been two trials of ACS in octogenarians. The Italian Elderly study: The study compared an aggressive approach in comparison to a conservative strategy in 313 octogenarians. They concluded that an early aggressive approach resulted in a significant reduction in the primary endpoint (the composite of death, MI, disabling stroke, and repeated hospital stay for cardiovascular causes or severe bleeding within 1 year) in patients with elevated troponin on admission [18, 19].

The After Eighty study: This was a multicentre study of 457 stable ACS patients > 80 years old who were randomized to an invasive or conservative strategy. They reported that those who underwent an invasive strategy had a decrease in the primary composite endpoint (MI, need for urgent revascularization, stroke, and death) at a median follow-up of 18 months as compared with a conservative approach with no change in bleeding complications [20].

Diagnosis of ACS in Octogenarians-The Atypical Unexplained Symptoms

Elderly have worse prognosis with ACS, which may not only be related to the management but even the diagnosis. There may be several explanations for this observation, which may include their presentation of symptoms. Chest pain may remain the most common presentation for ACS but most elderly patients frequently present with symptoms which may not include this. Thus, the diagnosis of ACS is often be missed or delayed, leading to guarded outcomes. On statistical analysis, it has been seen that chest pain may be a presenting symptom only in 40% of patients > 85 years. Common symptoms suggestive of ACS in these subsets of patients may include dyspnea, diaphoresis, nausea and vomiting, and syncope, most common being acute pulmonary edema, which could be attributed to increased arterial stiffness and multivessel CAD [21]. The 12-lead electrocardiogram (ECG) may be many a times non-diagnostic, as well in octogenarians. The elderly have higher prevalence of left bundle branch block (LBBB), and hence diagnosing STEMI in its presence is a challenge [22].

Strategies for Medical Management

The medical therapy for ACS is governed by the present guidelines, which specify the role of antiplatelets, statins, ACE inhibitors and betablockers. The regimen for medical management remains similar among all population irrespective of age. A subgroup analysis from the PROVE-IT-TIMI 22 trial of comprising of 634 elderly patients suggested that high-dose statin regimen resulted in a greater reduction in adverse events in the elderly than in the younger. It also concluded that the incidence of major statin side effects was similar in the elderly and the younger patients with no difference with the intensity of the statin regimen [23]. An observational study in > 75 years age population revealed that early beta-blocker therapy was not used for 51% of patients who were hospitalized with ACS, although they did not have any contraindication to this therapy. The same study stated that all patients who received betablockers had a lower in-hospital mortality rate than patients who did not receive beta blockers [8].

The analysis of the Crusade ACC/AHA guidelines revealed that initiation of aspirin and betablockers was less in patients > 65 years and heparin use was significantly reduced in patients > 85 years. Similar was with the use of clopidogrel, only 30% of patients > 85 years and platelet glycoprotein IIb/IIIa inhibitors, only 12.8%. For patients surviving the index hospitalization, use of many medications at discharge was similar in young and old patients except clopidogrel and lipid-lowering therapy. These remained less commonly prescribed in elderly patients. While in-hospital mortality and complication rates were higher with advancing age, those receiving the recommended therapies had lower mortality than those who did not [5]. Thus, emphasizing the fact that the medical treatment at discharge should not change with respect to age.

Revascularization

There are a few points to remember for octogenarians when planning for revascularization. These include bleeding risk and kidney function. As bleeding risk increases with age, dose adjustment is important when it comes to anticoagulation therapy. Also, renal function should be interpreted using creatinine clearance which is calculated by the Cockcroft-Gault equation and should form the basis for renal dosed adjusted medications. In view of coronary circulation, majority of elderly, myocardial ischaemia presents without ST elevations on the ECG, which may be due to multi vessel CAD that may have led to ischaemic preconditioning or significant collaterals [6]. While GRACE registry recommended that coronary reperfusion is crucial within 12 hours of symptom onset, 30% subset of the STEMI patients in the registry did not receive reperfusion therapy. In their case, age was the utmost defining characteristic, being > 75 years of age were less likely to receive revascularization [7].

At present, the current data and guidelines support the use of reperfusion therapies, including fibrinolysis, up to the age of 85 years [10]. Also, the selection for revascularization technique (fibrinolytics or PCI) is determined largely by factors other than age, such as time from presentation, travel time to cardiac catheterization laboratory, comorbidity, and signs of cardiogenic shocks [9]. Thus, again re-emphasizing that need for revascularization irrespective of age.

Strategies

- i. While assessing revascularization options for the elderly, it is reasonable to consider coronary artery bypass graft (CABG) surgery over PCI in them, particularly those with diabetes mellitus or complex multivessel CAD [24].
- ii. When interventional invasive approach planned-transradial access may be appealing in the elderly in view of reduced access site bleeding complications. This was confirmed in a subgroup analysis of the RIVAL trial.

Though it also stated that the elderly also had higher rates of access site crossover with radial access compared with femoral access, which may be due to tortuosity or the diffuse atherosclerosis in elderly [25]. Thus, irrespective of the chances of changing the access site, first choice in elderly should be radial access.

Cardiac Rehabilitation

Presently the most underutilized entity in the care of elderly patients is cardiac rehabilitation. Keeping in mind the reduced functional status in them, the elderly are at an elevated risk of disability following ACS. Though there is undebatable evidence of the benefit of cardiac rehabilitation in ACS patients [26]. Older adults may even benefit more, as cardiac rehabilitation in the elderly may extend beyond the cardiovascular system and lead to an overall improvement in physical fitness as well as enhancement in balance, stability, muscle strength, and tone.

Conclusion

All the data and literature that has been reviewed concludes that PCI has a strong association with improved survival and prognosis in octogenarians, thus among them there is a potential benefit of interventional revascularization in patients presenting with ACS. Though there are no randomized, controlled clinical trials available to compare head to head between PCI-treated and non-PCI-treated octogenarians with ACS, the available data suggests that efficacy of PCI needs further study in octogenarian ACS patients. As the proportion of elderly population continues to increase, physicians will be confronted with an increasing number of octogenarians presenting with ACS. While care needs to be individualized, age alone should never be the reason to withhold potentially lifesaving procedures and interventions. Elderly patients are at high risk for bleeding complications, also they are at the highest risk for ischaemic complications if less aggressive treatment strategies are pursued. Keeping both entities in mind, clinicians are tasked with meticulous risk stratification for ischaemic and bleeding risk, taking into account assessment of frailty, quality of life, goals of care, and individual preferences in this subset of population.

Literature has proved that early invasive protocols seem to be just as feasible in the elderly as in the general population. In order to mitigate any pharmacological side effects, it is imperative to correct the dosages to age-adjusted renal function. It is up to the treating physician to acknowledge the gap that exists between chronological and biological age and determining the patient's preference and goals for life before individualizing the management protocol.

Main Points

- i. PCI had a strong association with improved survival in octogenarian with ACS, thus among elderly patients, there is a prognostic benefit.
- ii. Age alone should never be the reason to withhold potentially lifesaving procedures and cardiac interventions.
- iii. Meticulous risk stratification for ischaemic risk and bleeding risk should be done in Octogenarians while taking into account assessment of frailty, quality of life, goals of care, and individual preferences.
- iv. Early invasive protocols seem to be just as feasible in the elderly as in the general population.
- v. Dosages of pharmacotherapy need to be calculated according to age-adjusted renal function in Octogenarians.

Conflicts of Interest

None.

Consent

Not applicable.

Ethics Committee Clearance

Not applicable.

REFERENCES

1. Renato D Lopes, S Michael Gharacholou, DaJuanicia N Holmes, Laine Thomas, Tracy Y Wang et al. (2015) Cumulative incidence of death and rehospitalization among the elderly in the first year after NSTEMI. *Am J Med* 128: 582-590. [[Crossref](#)]
2. Niels Engberding, Nanette K Wenger (2017) Acute Coronary Syndromes in the Elderly. *Research* 6: 1791. [[Crossref](#)]
3. Juan C Muñoz, Joaquín J Alonso, Juan M Duran, Federico Gimeno, Benigno Ramos et al. (2002) Coronary stent implantation in patients older than 75 year of age: clinical profile and initial and long-term (3 years) outcome. *Am Heart J* 143: 620-626. [[Crossref](#)]
4. Chin Hiew, Trent Williams, Rachael Hatton, Seshasayee Narasimhan, Simon O'Connor et al. (2010) Influence of age on long-term outcome after emergent percutaneous coronary intervention for ST-elevation myocardial infarction. *J Invasive Cardiol* 22: 273-277. [[Crossref](#)]
5. Karen P Alexander, Matthew T Roe, Anita Y Chen, Barbara L Lytle, Charles V Pollack Jr et al. (2005) Evolution in cardiovascular care for elderly patients with non-ST-segment elevation acute coronary syndromes: results from the CRUSADE National Quality improvement initiative. *J Am Coll Cardiol* 46: 1479-1487. [[Crossref](#)]
6. Karen P Alexander, L Kristin Newby, Paul W Armstrong, Christopher P Cannon, W Brian Gibler et al. (2007) Acute coronary care in the elderly, part II: ST-segment elevation myocardial infarction: a scientific statement for healthcare professionals from the American Heart Association Council on Clinical Cardiology: in collaboration with the Society of Geriatric Cardiology. *Circulation* 115: 2570-2587. [[Crossref](#)]
7. Kim A Eagle, Shaun G Goodman, Alvaro Avezum, Andrzej Budaj, Cynthia M Sullivan et al. (2002) Practice variation and missed opportunities for reperfusion in ST-segment elevation myocardial infarction: findings from the Global Registry of Acute Coronary Events (GRACE). *Lancet* 359: 373-377. [[Crossref](#)]
8. H M Krumholz, M J Radford, Y Wang, J Chen, T A Marciniak (1999) Early beta-blocker therapy for acute myocardial infarction in elderly patients. *Ann Intern Med* 131: 648-654. [[Crossref](#)]
9. Patrick T O'Gara, Frederick G Kushner, Deborah D Ascheim, Donald E Casey Jr, Mina K Chung et al. (2013) 2013 ACCF/ AHA guideline for the management of ST-elevation myocardial infarction: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol* 61: e78-e140. [[Crossref](#)]
10. H D White, G I Barbash, R M Califf, R J Simes, C B Granger et al. (1996) Age and outcome with contemporary thrombolytic therapy. Results from the GUSTO-I trial. *Global Utilization of Streptokinase*

- and TPA for Occluded coronary arteries trial. *Circulation* 94: 1826-1833. [Crossref]
11. Raymond T Yan, Andrew T Yan, Mary Tan, Chi Ming Chow, David H Fitchett et al. (2006) Age-related differences in the management and outcome of patients with acute coronary syndromes. *Am Heart J* 151: 352-359. [Crossref]
 12. David A Alter, Douglas G Manuel, Nadia Gunraj, Geoff Anderson, C David Naylor et al. (2004) Age, risk-benefit trade-offs, and the projected effects of evidence-based therapies. *Am J Med* 116: 540-545. [Crossref]
 13. L W Klein (2006) Percutaneous coronary intervention in the elderly patient (Part 1 to 11). *J Invasive Cardiol* 18: 286-295.
 14. Christian W Hamm, Jean Pierre Bassand, Stefan Agewall, Jeroen Bax, Eric Boersma et al. (2011) ESC Committee for Practice Guidelines. ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation. The Task Force for the management of acute syndromes (ACS) in patients presenting without persistent ST-segment elevation of the European Society of Cardiology (ESC). *Eur Heart J* 32: 2999-3054. [Crossref]
 15. Frans Van de Werf, Jeroen Bax, Amadeo Betriu, Carina Blomstrom Lundqvist, Filippo Crea et al. (2008) Management of acute myocardial infarction in patients presenting with persistent ST-segment elevation: the Task Force on the Management of ST-Segment Elevation Acute Myocardial Infarction of the European Society of Cardiology. *Eur Heart J* 29: 2909-2945. [Crossref]
 16. William Wijns, Philippe Kolh, Nicolas Danchin, Carlo Di Mario, Volkmar Falk et al. (2010) Guidelines on myocardial revascularization. *Eur Heart J* 31: 2501-2555. [Crossref]
 17. Clare E Appleby, Joan Ivanov, Karen Mackie, Vladimír Džavík, Christopher B Overgaard (2011) In-hospital outcomes of very elderly patients (85 years and older) undergoing percutaneous coronary intervention. *Catheter Cardiovasc Interv* 77: 634-641. [Crossref]
 18. Stefano Savonitto, Claudio Cavallini, A Sonia Petronio, Ernesto Murena, Roberto Antonicelli et al. (2012) Early aggressive versus initially conservative treatment in elderly patients with non-ST-segment elevation acute coronary syndrome: a randomized controlled trial. *JACC Cardiovasc Interv* 5: 906-916. [Crossref]
 19. Marco De Carlo, Nuccia Morici, Stefano Savonitto, Vincenzo Grassia, Paolo Sbarzaglia et al. (2015) Sex-Related Outcomes in Elderly Patients Presenting with Non-ST-Segment Elevation Acute Coronary Syndrome: Insights from the Italian Elderly ACS Study. *JACC Cardiovasc Interv* 8: 791-796. [Crossref]
 20. Nicolai Tegn, Michael Abdelnoor, Lars Aaberge, Knut Endresen, Pål Smith et al. (2016) Invasive versus conservative strategy in patients aged 80 years or older with non-ST-elevation myocardial infarction or unstable angina pectoris (After Eighty study): an open-label randomized controlled trial. *Lancet* 387: 1057-1065. [Crossref]
 21. A J Bayer, J S Chadha, R R Farag, M S Pathy (1986) Changing presentation of myocardial infarction with increasing old age. *J Am Geriatr Soc* 34: 263-266. [Crossref]
 22. P H Stone, B Thompson, H V Anderson, M W Kronenberg, R S Gibson et al. (1996) Influence of race, sex, and age on management of unstable angina and non-Q-wave myocardial infarction: The TIMI III registry. *JAMA* 275: 1104-1112. [Crossref]
 23. Kausik K Ray, Richard G Bach, Christopher P Cannon, Richard Cairns, Ajay J Kirtane et al. (2006) Benefits of achieving the NCEP optional LDL-C goal among elderly patients with ACS. *Eur Heart J* 27: 2310-2316. [Crossref]
 24. Ezra A Amsterdam, Nanette K Wenger, Ralph G Brindis, Donald E Casey Jr, Theodore G Ganiats et al. (2014) 2014 AHA/ACC guideline for the management of patients with non-ST-elevation acute coronary syndromes: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol* 130: e139-e228. [Crossref]
 25. Warren J Cantor, Shamir R Mehta, Fei Yuan, Vladimír Džavík, Matthew Worthley et al. (2015) Radial versus femoral access for elderly patients with acute coronary syndrome undergoing coronary angiography and intervention: insights from the RIVAL trial. *Am Heart J* 170: 880-886. [Crossref]
 26. J Dermot Frengley, Giorgio R Sansone, Augusta Alba, Kiranjit Uppal, Jay Kleinfeld (2011) Influence of age on rehabilitation outcomes and survival in post-acute inpatient cardiac rehabilitation. *J Cardiopulm Rehabil Prev* 31: 230-238. [Crossref]