Introduction:

Incidence of cardiovascular disease and cardiac deaths are on the rise among elderly. As people are living longer, the admission rates of elderly presenting with acute coronary syndromes are also higher every year. This gives a constant challenge of providing the appropriate therapy for these patients as they often have several co-morbid conditions (2) (3). The number of Americans aged 65 and older is around 46 million now and expected to reach 98 million by year 2060. This case is an example of an elderly presenting with acute coronary syndrome and some clinical as well as some practical issues surrounding her care.

Case Report:

94-year-old female with remote history of myocardial infarction in 1993, history of hypertension, hyperlipidemia, presents with several days of dyspnoea on exertion and generalized weakness in September 2017. She is an independent individual who lives alone and swims regularly. On the morning of admission, she went for her usual swim; she developed extreme shortness of breath, felt tired. Subsequently she presented to the hospital.

In the emergency room, she was stable. Her vital signs were stable. She was afebrile. Her oxygen saturation was 89% on room air. Her cardiovascular examination revealed normal S1 and normal S2. Patient was noted to have grade 1/6 systolic murmur over precordium. Examination of lungs revealed bilateral wheezing.
Rest of the clinical examination was unremarkable. Her laboratory data revealed BUN of 22. Creatinine was 0.8. Her hemoglobin was 11.3. serum potassium was 3.8. Her electrocardiogram revealed normal sinus rhythm with new T wave inversions in the lateral leads. Her BNP was elevated to be 708. Chest radiograph revealed interstitial pulmonary edema. Patient was treated for non-STEMI and pulmonary edema (4). Subsequently she underwent resting echocardiogram which revealed left ventricular ejection fraction of 20-25%. Patient was also noted to have mild mitral incompetence and aortic leaflet thickening (Fig.1).

Because of her age, various treatment alternatives and diagnostic approaches were discussed with the patient and also with her daughter (5). As she wanted to be active, she preferred diagnostic cardiac catheterization. The following morning, patient underwent diagnostic cardiac catheterization via right radial artery, which revealed sub totally occluded right coronary artery (6). Left anterior descending artery revealed long segmental 95% mid stenosis with evidence of significant calcification. Patient was also noted to have mild left main coronary disease and moderate circumflex coronary artery disease (Fig.2).

After diagnostic cardiac catheterization, treatment options of medical therapy versus coronary stenting versus coronary artery bypass graft surgery were discussed with the patient and also with the family. Although this patient was elderly, she wished for aggressive interventional therapy and the following day, coronary stenting of the left anterior descending artery was planned (7) (8). Because of significant calcification of the left anterior descending artery, debulking of the left anterior descending artery stenosis using coronary atherectomy was planned prior to coronary stent placement (9).

While preparations were being made for Percutaneous Intervention of LAD next morning, patient became more short of breath and her oxygen requirements have gone up. She was noted to be in pulmonary edema and required IV Lasix. Patient also became hypotensive. In fact, she was in a clinical state of impending cardiogenic shock. Clearly, this would put her at a higher risk of complications for per Cutaneous coronary interventions. Once again, various treatment
alternatives were discussed with the patient (10). Patient opted for high risk coronary intervention as opposed to multivessel bypass surgery as this would give her better chance of survival. On the same day, patient was quickly taken to cardiac catheterization lab. An intra-aortic balloon pump was placed for hemodynamic stabilization. Patient also underwent temporary trans venous pacemaker insertion. With this support, patient underwent successful atherectomy of left anterior descending artery followed by successful stent placement of the left anterior descending artery using 3.0 mm drug-eluting stent. This stent was post dilated using 3.0 mm high-pressure balloon. Following stent placement, patient's hemodynamic status has improved. She was sent to intensive care unit for follow-up (Fig.3).

Next morning, it was possible to wean and discontinue her intra-aortic balloon pump. She remained hemodynamically stable. She was treated with dual anti platelet therapy and statins. She was observed in the hospital for fifteen days. Couple of days following stent placement, patient went into sustained ventricular tachycardia which spontaneously converted to sinus rhythm. Because of reduced left ventricular ejection fraction, Life Vest was offered. This was declined by the patient. Over time, her blood pressure readings improved, and no further arrhythmias developed. She was also placed on ace inhibitors and carvedilol. Her heart failure status improved. She became hemodynamically stable. Inpatient cardiac rehabilitation was initiated. After couple of more days of observation, this patient was discharged home to be followed as outpatient.

This patient did well following discharge with continued exercise and cardiac rehabilitation. She was taking all her medicines regularly. 2 months later, she came for follow-up office visit. During this time, she was asymptomatic and cardiovascular examination was unremarkable. Repeat echocardiogram revealed much improved left ventricular ejection fraction almost to normal level (Fig.4).

Fig.3. Cardiac Catheterization Image after the Procedure.

Fig.4. Echo image after two months.

She was continuing her cardiac rehabilitation 3 times a week and rest of the days she went back to swimming. She also started driving and became once again self-sufficient.

**Discussion:**

This case illustrates that age alone is not a contraindication for invasive/ interventional therapy in patients who present with acute coronary syndromes. Although elderly patients
experience higher rate of complications with invasive procedures, statistically this group will also get higher absolute clinical benefits compared to younger patients. Hence, patient care should be individualized based on patient's functional level, expected longevity, general outlook and wishes. It should be mentioned that we do not have critical guidelines or data from randomized trials when we are dealing with elderly patients and interventional cardiology procedures. Most of the studies have included patients under the age of 75 years. Prospective trials testing interventional procedures in elderly are essential and would be a welcome. Until then, we need to individualize therapies with best clinical judgment.

**Conclusion:** This patient is doing very well after the PCI of the LAD, recovered from cardiogenic shock and functionally back to her normal state. This has been possible due to availability of the interventional procedure regardless of her age. This may not have been offered in some countries in this age group.

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