ECCOA
Essentials of Cardiovascular Care in Older Adults

ACUTE CORONARY SYNDROMES IN OLDER ADULTS

Case: Reperfusion in Older Adults

An 82 year old woman is brought to the local ED by her son following 6 hours of severe epigastric pressure, nausea and dizziness. She lives independently and performs her own activities of daily living. She has a history of hypertension, diabetes mellitus, and osteoarthritis. On examination, she is diaphoretic, mildly agitated and disoriented. Blood pressure is 100/78 mm Hg, heart rate is 92 bpm, arterial oxygen saturation 94% on 4 liters of oxygen/minute by nasal cannula, and weight is 60 kilograms. Her cardiovascular examination is notable for elevation of her jugular venous pressure and bibasilar rales. Her electrocardiogram demonstrates sinus rhythm with 3-4 mm of ST elevation in V2-V6. Initial CK-MB is 33 mg/dL and troponin T is 0.28 ng/ml. You explain that she is having a heart attack, but she is uncomfortable and agitated, and asks that you speak with her family. She thinks her symptoms are “indigestion”, and asks for milk of magnesia. After discussing your recommendation with the patient and her son, they agree that treating her heart attack is consistent with her wishes. She is eligible to receive reperfusion, but your hospital does not have primary PCI capabilities. An affiliated academic center that can perform primary PCI is a 20 minute transfer away At this point making a door to balloon time under 90 minutes. The patient has received aspirin and clopidogrel.

How would you proceed?

Reperfusion therapy for STEMI is widely available and provides clear mortality benefit compared with no reperfusion up to age 85 years and possibly beyond. Selection of reperfusion is based on multiple factors including availability of the reperfusion strategy, time from onset of symptoms, risks and benefits, but in general, primary PCI is favored. She is a candidate for reperfusion therapy, with symptoms of 6 hours duration. There is favorable door to balloon time for primary PCI (<90 minutes), but given her confusion, family members should be contacted first. Primary PCI would be the preferred strategy, however, if she were not able to be reperfused with PCI, fibrinolytics would be the next choice. Older women are more likely to present with atypical ischemic symptoms, and a proton pump inhibitor for GI prophylaxis would be good, but her “GI symptoms” are cardiac. Analyses from GUSTO-1 and COMMIT raised concerns over the use of IV beta blockers in patients with acute myocardial infarction *and* signs of heart failure increased risk of developing cardiogenic shock and death. The 2008 STEMI Guidelines Update also specifically advises against using IV beta blockers in those who are at risk for shock. Those at risk include patients with signs of heart failure, evidence of low output state, and those at increased risk for cardiogenic shock (age >70 years, SBP <120mmHg, sinus tachy >110 bpm, HR <60 bpm, longer time since onset of sxs). In contrast to younger persons, a systolic blood pressure of 100 mm in an 82 year old likely represents a significant decline from baseline which also makes this patient at high risk for developing cardiogenic shock. Choice E is wrong because half dose fibrinolytics with GP IIb/IIIa inhibitors, studied in GUSTO V and ASSENT III, demonstrate no survival advantage *and* increase the rate of intracranial hemorrhage compared with full dose fibrinolytics with heparin in older adults.

Although STEMI accounts for a smaller proportion of acute coronary syndromes in older adults, the absolute number of STEMIs still increases with age. The likelihood of receiving reperfusion therapy decreases with age for fibrinolytic therapy and primary PCI. Abnormal baseline electrocardiograms, such as left ventricular hypertrophy, atrial fibrillation, paced rhythms, prior

MI, and underlying conduction disease also confounder the interpretation of electrocardiograms in older adults presenting with myocardial ischemia. A STEMI can be heralded by new left bundle branch block more commonly with advanced age.

Patient age and comorbidities, antithrombin regimen, and type of reperfusion are all important considerations in older adults. Receiving reperfusion (compared with not receiving reperfusion) for STEMI is associated with a substantially lower risk of death because the baseline risk of death is so high. Reasons for no reperfusion include delayed presentation, heart failure, absence of chest pain, non-diagnostic ECGs, and patient preferences. Results from the Fibrinlytic Therapy Trialists collaboration confirm that among the 3,322 eligible (ongoing chest pain, ST elevation or LBBB, and <12 hours from symptom onset) older adults (age ≥75 years) given fibrinolytics, outcomes were better compared with those not given fibrinolytics.

However, risk-benefit consistently favors PCI over fibrinolytic therapy for reperfusion in older adults (up to age 80) from data in small randomized trials, meta-analyses, and observational studies. In addition, when administered early (< 3 hours), fibrinolytics and PCI are likely comparable. PCI is particularly beneficial in patients with shock, prior stroke, anterior infarcts, or presenting late (>6 hours) after symptom onset. The major benefit from PCI is in the greater reduction in ischemic events and need for target vessel revascularization. Time to reperfusion is also a key for myocardial salvage. The Primary Coronary Angioplasty Trialist's (PCAT) investigators pooled 11 randomized trials of PCI versus fibrinolytic therapy conducted from 1989 through 1996 (n=2,635) and did an elderly subgroup comparison. They found that among the elderly (≥70 years; n=640), PCI was more effective than fibrinolytic therapy for reducing 30-day mortality (13.3% vs. 23.6% p<0.05). While relative risk reductions were similar across age, the number needed to treat with PCI over fibrinolytic therapy was 8 among age >70 years compared with 23 among age <60 years. In addition, the risk for hemorrhagic stroke was lower with PCI at 30 days (RR=0.34; *P*=0.009). Although stroke is a devastating and feared complication of fibrinolytic therapy, the risk of death after STEMI is almost ten-fold higher than the risk of stroke in patients over 75 years of age. A logistic model developed from the Cooperative Cardiovascular Project (CCP) identified 8 factors which increase risk of intracranial hemorrhage in elderly patients with acute myocardial infarction treated with thrombolytic therapy: age ≥75 years, female, black race, prior stroke, blood pressure ≥160 mm Hg, tissue plasminogen activator, excessively low body weight (≤65 kg for women; ≤80 kg for men). The rate of intracranial hemorrhage overall was 1.43% (455 of 31 732) but varied from 0.69% if none or 1 of the factors (n=6651) to 4.11% if ≥5 factors (n=1071).

Older adults are at higher risk for adverse outcomes including mortality, bleeding, heart failure, and mechanical complications of myocardial infarction than younger adults. Fibrinolytic therapy is associated with an increased risk of myocardial rupture within the first 24-48 hours of treatment. Although not an issue in this case, providing fibrinolytic therapy "late" (>12 hours) to older adults has been associated with an increased risk of cardiac rupture. Time to presentation is longer in the real world than in clinical trials, particularly among older adults. In addition, death is the most common complication of fibrinolytic therapy. Even older adults with shock did benefit from reperfusion (when appropriately selected) in the SHOCK trial registry.

One study found a three-fold increase in the risk of free wall rupture in older adults treated with fibrinolytics compared with those undergoing primary angioplasty or not reperfused. In this study of 706 consecutive patients (age ≥75 years) presenting with STEMI, the incidence of

mechanical complications (ie.free wall rupture) was 17% in those receiving fibrinolytics compared to 8% in the group who did not receive reperfusion and 5% in those who underwent

primary PCI. In fact, the main cause of death in patients treated with fibrinolytics was mechanical complications, whereas in patients treated with PCI or no reperfusion it was more likely to be shock. The timing of the mechanical complications is also early in the first 48 hours. Recognized risk factors of free wall rupture include age, infarct location, hypertension, late presentation, and female gender. Suspected cases of free wall rupture have a mortality rate >90%. Pathology often shows myocardial edema and intramyocardial hemorrhage, which suggests aging myocardium may predispose to reperfusion injury with fibrinolytics. Older persons with a first STEMI are less likely to have collaterals to the infarct vessel than younger persons which probably increases rupture risk as well.

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