Myocardial Infarction in a Hospitalized Patient with Chronic Renal Failure

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ABSTRACT

Introduction: Patients hospitalized with renal failure who have a myocardial infarction are a specific group at risk for worse outcomes. One of the major challenges is the choice to use contrast angiography and the fear of contrast-induced nephropathy. Another challenge is the treatment regimen patients should receive at discharge and weighing the risk vs. benefit ratio concerning the increased mortality rates were seen in this specific subset of patients.

Case Presentation: The case being presented is an 82-year-old male patient diagnosed with stage 4 chronic renal failure who suffered an in-hospital myocardial infarction while undergoing treatment for bacterial endocarditis and a suspected GI bleed. The patient has several other diagnoses including severe aortic stenosis, CLL, and hypostatic pneumonia. The purpose of this case report is to outline the challenges and considerations clinicians must make when treating patients with chronic renal failure who suffer a myocardial infarction while hospitalized. The patient’s presentation, workup, diagnostic tests, and treatment are discussed in detail.

Conclusion: The present case poses numerous challenges for the care team. Angiography was not performed on this patient due to the risk of exacerbating the patient’s renal failure with the use of IV contrast angiography. The decision to forgo angiography was also made as the patient would not be a candidate for open heart bypass surgery. Anticoagulation with IV heparin and IV Rosufen (Fenofibrate 160 mg, rosuvastatin Ca 10 mg) was the treatment in this case. It is important to stress the importance of aggressive treatment post discharge in patients with chronic renal failure who suffer a myocardial infarction, as the greatest risk for mortality is in the first 6 months post discharge. Clinicians may also be reluctant to aggressively treat such patients post discharge due to the risks of adverse medication effects, potentially leading to higher mortality rates in this subset of patients.

Keywords: Myocardial infarction, Chronic renal failure, Treatment

1. INTRODUCTION

Patients who suffer a myocardial infarction while hospitalized have higher rates of morbidity and mortality compared to patients who suffer a myocardial infarction outside of the hospital. Some of the factors associated with the higher morbidity and mortality include being of older age, hypertensive, higher body mass index, and commonly of the female gender. Patients with chronic renal failure are a specific subset of patients who have an even higher mortality rate from cardiac events. The traditional treatment modalities including percutaneous coronary intervention or thrombolytic therapy may be contraindicated in such patients with chronic renal failure. One study reported that chronic kidney disease was the
most important factor that could predict both short and long-term adverse outcomes of percutaneous coronary intervention\(^6\).

The purpose of this article is to demonstrate some of the common problems that can arise when attempting to treat a patient who suffers from an in-hospital myocardial infarction when the patient also has several other comorbidities, specifically chronic renal failure.

2. CASE PRESENTATION

An 82-year old Caucasian man with a history of CLL, type 2 diabetes mellitus, coronary artery disease, hypertension, and chronic kidney disease stage IV with associated anemia of chronic disease was hospitalized to undergo workup for a suspected GI bleed and treatment of bacterial endocarditis. His home medications include 40 mg daily of pantoprazole, Synthroid daily, 5mg daily of enalapril, 250 mcg of digoxin, 50 mg of metoprolol, 10/40 mg Vytorin (ezetimibe and simvastatin) daily, 5 mg enalapril BID. The patient presented to his primary care provider complaining of dark blood stained tarry stool. He was immediately hospitalized and underwent upper endoscopy. The findings were unrevealing. The patient was scheduled to be discharged home and undergo colonoscopy as an outpatient.

The patient developed a fever while hospitalized. Blood cultures were done and were positive for Enterococcus faecalis. Echocardiography revealed the presence of vegetation’s present on the mitral valve. IV vancomycin was used to treat the endocarditis. While undergoing treatment for endocarditis the patient developed hypostatic pneumonia. His CLL is currently in remission.

The patient developed a myocardial infarction while hospitalized. EKG (figure 1) revealed ST-segment elevation in the anterior leads consistent with an anterior wall myocardial infarction. The patient was hemodynamically stable and treated with IV heparin and Rosufen (Fenofibrate 160 mg, rosuvastatin Ca 10 mg). The patient did not undergo percutaneous coronary intervention or thrombolytic therapy.

The patient's troponin T was 3.29 ng/mL; PT was 18.4 seconds, INR 1.56, PTT is 36.5 seconds. Creatinine is 4.0 mg/dL, estimated GFR is 15 ml/min. 2D echocardiography was performed and revealed mild left ventricular dilation, mild concentric left ventricular hypertrophy, global left ventricular systolic function at the lower limits of normal, left ventricular ejection fraction of 50-55%, normal right ventricular size and function, mild left atrial dilation, mild mitral regurgitation, moderate aortic valve calcification, mild aortic regurgitation, severe aortic

*Fig.1 ECG of the patient*
stenosis with a gradient of 50 mmHg, mild tricuspid regurgitation, and moderate pulmonary hypertension.

The benefit of the patient in this case undergoing angiography was not established as the patient’s ejection fraction remained between 50-55%, while the risks of exacerbating the patient’s renal failure with contrast outweigh the benefits. This is especially true when the patient was deemed not to be a suitable candidate for open heart bypass surgery and was also unwilling to undergo this procedure.

3. DISCUSSION

Patients who suffer in-hospital myocardial infarctions have a higher mortality rate, interestingly not attributed to a higher amount of myocardial damage\(^2\). Typically, patients who suffer in hospital STEMI are older, most likely to be female, and have several associated comorbidities\(^2\). Patients are also more likely to suffer from hypertension, higher body mass indexes, and were more likely to present with cardiac arrest or cardiogenic shock\(^3\). These patients were also more likely to have higher rates of chronic kidney disease\(^2\).

The primary modalities of treatment for inpatient myocardial infarction are early reperfusion strategies employing percutaneous coronary intervention or thrombolytic therapy\(^4\). Both interventions were contraindicated in the proposed case due to a stage 4 chronic renal failure as a comorbidity.

Patients with impaired renal function also had increased mortality at 30 days and 6 months in one study, examining non-ST elevation MI in patients with and without impaired renal function, a risk of 10.5% vs. 3.4% at 6 months\(^5\). The in-hospital mortality rate listed in the Global Registry of Acute Coronary Events for patients who suffer an STEMI who also have stage 4 or 5 renal failure was 30% \(^6\). The one-year mortality of these patients approaches 60% in a patient on dialysis\(^7\). The fear of complications arising from treatment can also lead practitioners to undertreat this specific subset of patients. This subset of patients is less likely to be treated with aspirin, beta blockers and thrombolytics possibly contributing to the increased mortality rate\(^7\). The significance of this finding is the risk of mortality post-MI in patients with renal failure is highest in the first few months after the event, tapering off at 6 months and beyond\(^7\). This demonstrates the need for clinicians to aggressively treat patients with chronic renal failure post-MI as the risk for mortality is greatest in the first 6 months directly after the event. It is important to weigh the long-term benefits of aggressive treatment versus the short-term risk of further exacerbation of renal failure.

4. CONCLUSION

Based on careful consideration of the literature it is imperative for clinicians to be observant for sometimes obscure symptoms hospitalized patients may complain of and have a low threshold for performing an EKG\(^2\). This recommendation stems from the observation in one study noting one of the major sources of delay in hospitalized patients receiving reperfusion therapy or other interventions was time of symptom onset to the performance of an EKG\(^2\). Delays to treatment result in more myocardial damage and a worse prognosis\(^2\). Patients with chronic renal failure are a specific group of patients who are at increased risk of worse outcomes when they suffer an in-hospital myocardial infarction. Reasons for this are the possible contraindication of contrast angiography in this subset of patients and the fear of worsening renal failure through contrast-induced nephropathy\(^7\). Another reason for the worse prognosis in these patients is under treatment post-MI and discharge due to fear of complications\(^7\). These findings necessitate clinicians evaluate each patient individually and seriously consider the short-term and long-term benefits and risks of treatments in this specific subgroup of patients.

REFERENCES
