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Acute papillary muscle rupture: multi-specialty team approach ensuring good clinical outcome

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Topic(s):
Acute Heart Failure: Multidisciplinary Interventions

Citation:
A 48 year old male presented to a district general hospital with acute shortness of breath, with chest pain in the preceding 12 hours. Physical examination revealed a pan-systolic murmer at the apex with bilateral lung crepetations. Initial ECG appeared relatively unremarkable and pulmonary oedema was demonstrated on chest radiograph. Within 2 hours his condition deteriorated with type II respiratory failure and academia. Transthoracic echocardiogram confirmed suspicion of acute posterior papillary muscle rupture with severe mitral regurgitation. Left atrial size appeared normal and hyperdynamic left ventricular systolic function. The patient was transferred to the nearest cardiac centre with catheterization laboratory. The cardiothoracic surgery team and cardiac anaesthetics responded immediately and the patient was intubated and ventilated. Simultaneously, interventional cardiology performed emergency cardiac catheterization revealing an occluded RCA, severe proximal LAD and left circumflex disease and an intra-aortic balloon pump was placed. There was marked haemodynamic instability with significant adrenaline requirements and a short cycle of CPR. There was no facility for VA ECMO in this centre. Repeat arterial blood gas sampling was consistent with cardiogenic shock. pH 7.08, lactate 5.6, PCO2 10.9, PO2 34.7. A multi-specialty decision was made to proceed to emergency surgery despite high mortality likelihood. pH was recorded at 6.9 at the beginning of the case. Emergency mitral valve replacement was performed with concomitant coronary artery bypass grafting to the left anterior descending, right and obtuse marginal coronary arteries. There was haemodynamic instability in the immediate post operative period and recovery thereafter was complicated by renal failure and academia. Total ICU stay was 22 days before discharge at day 33 to make an excellent recovery with persevered left ventricular systolic function with a normally functioning prosthetic mitral valve. This case is particularly poignant due to the patients’ excellent clinic outcome despite severe acidaemia (pH 6.9). Internal audit on emergency cases performed in this regional centre demonstrated no survival in patients with pH less than 7.1.

Problem
Acute papillary muscle rupture often results in marked and rapid clinical deterioration. Without emergency surgery, there is 90% mortality within one week and therefore early involvement of the cardiac surgical team is paramount to survival.

Discussion
In instances of acute heart failure secondary to mechanical complication there is a narrow time window in which prompt diagnosis, percutaneous intervention and surgery are crucial. This was achieved in this case by an effective multi-specialty team approach. Trauma centers are perhaps the original example of this, finding a mortality reduction of 15% in trauma cases by utilizing this method. As a result of this case, formation of a 'cardiac shock' team should be considered.
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# P16-13931