Not all cardiogenic shocks are created equal: the particular case of obstructive hypertrophic cardiomyopathy

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Topic(s):
Acute Cardiac Care – CCU, Intensive, and Critical Cardiovascular Care

Citation:
A 45 year-old man with severe abdominal aortic coarctation was admitted for elective aortic repair. He had already developed severe hypertension, left ventricular hypertrophy (LVH) and chronic renal disease.

During surgery, there was major blood loss (around 2L) and the patient went into to shock, at first interpreted as hypovolemic. Blood transfusions, fluids and high doses of vasopressor and inotropics were started but the patient kept deteriorating. The surgery lasted 8 hours and he was admitted in the intensive care unit (ICU) in refractory shock. In the following hours, fluids and vasopressors were up-titrated and sustained low-efficiency dialysis (SLED) started, but the hemodynamic instability persisted with lactates rising. A cardiology consult was requested. Transthoracic echocardiogram (TTE) revealed severe asymmetric LVH (ventricular indexed mass 215 g/m2) with systolic anterior movement of the mitral valve and midventricular obstruction (gradient 60 mmHg at 100 bpm) and mild pericardial effusion (image 1). At this point, the pathophysiology of the refractory shock was better understood. This patient had a small, non-compliant ventricular cavity with a mid-ventricular obstruction. With such structural abnormalities, a hypovolemic state and the use of inotropics further increased the obstruction and decrease cardiac output.

Baring this mechanism in mind, we decreased inotropic support, increased fluids and started esmolol aiming to decrease heart rate and inotropism and therefore the intraventricular gradient allowing for a better stroke volume.

The patient hemodynamic status improved temporarily with stable BP and lower lactates. However, in the following days he progressed to multi-organ failure and died.

This case leaves us 2 fundamental messages. First: Regardless of the type of shock, if the patient is not responding to initial measures, a TTE should be performed as soon as possible to assess for structural abnormalities that may be responsible for or that worsen the scenario Two: Although in most cases, vasoactive drugs will be indicated in cardiogenic shock (CS), obstructive hypertrophic cardiomyopathy (OHCM) may be the exception to this rule. In OHCM, vasoactive drugs should be used with caution because they might increase intra-ventricular gradient and decrease cardiac output. In this specific shock type, correcting fluid status and b-blockers may be indicated.

In conclusion, not all CS are created equal, therefore, our approach shouldn’t be exclusively based on algorithms. Shock mediated by OHCM is particularly complex since treatment is almost "paradoxal" to other kinds of CS. We need to be careful in assessing this patients to avoid such unfavourable results.
Abstract: P581
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2D images in diastole and continuous Doppler flow aligned with mid-ventricular cavity