Introduction: Non-cardiogenic pulmonary edema associated with protamine administration is a rare adverse event that has been reported to occur in 0.2% of cardiopulmonary bypass patients. Despite various supportive treatments, the mortality rate is as high as 30%. Here we report a case of a patient developing catastrophic noncardiogenic pulmonary edema after protamine administration that prompted emergent ECMO institution with early recovery.

Case report: A 55-year-old male diagnosed with mitral valve prolapse and severe mitral regurgitation presented for mitral valve repair. Intraoperative TEE revealed a cleft anterior mitral leaflet and partial flail with severe MR. Biventricular function was mildly impaired. He underwent mitral valve repair with closure of the cleft and insertion of a 38-mm posterior annuloplasty band, and a biatrial Maze procedure. The patient separated from CPB with stable hemodynamics. About 10 min after 350 mg of protamine was administered, the patient's lung compliance and oxygenation declined and copious pink frothy fluid (about 1 L) was suctioned from the endotracheal tube. No cardiogenic etiology was found on TEE. Furosemide was given in escalating doses. Oxygenation and ventilation remained poor with ensuing acidosis. Vasopressor doses were escalated at the same time. Eventually venous-arterial ECMO was instituted via the femoral artery and femoral vein with immediate improvement in the arterial blood gases and hemodynamics. Patient remained stable on ECMO with ensuing decrease in vasopressor requirement. Patient was successfully decannulated after two days.

Discussion: Non-cardiogenic pulmonary edema associated with protamine administration is a rare but potentially lethal syndrome. It is characterized by sudden onset, severe bronchoconstriction, and capillary leak resulting in extreme difficulty in ventilation and oxygenation. It is also characterized by pulmonary hypertension with normal pulmonary wedge or left atrial pressures, progression to fulminant noncardiogenic pulmonary edema, and significant mortality. Conventional treatments consist of administration of vasopressors, steroids, and high setting mechanical ventilation. Venous-arterial ECMO provides respiratory support as well as hemodynamic support. Early recognition of the problem and use of ECMO should be considered when traditional circulatory and ventilatory support fails.

References: