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Case Report

Penetrating cardiac trauma and the use of emergent extracorporeal membrane oxygenation and therapeutic hypothermia: When cooler heads prevail

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ABSTRACT

This is a case of penetrating chest trauma with traumatic arrest from cardiac tamponade, right and left ventriculotomies, mitral valve injury and ventricular septal defect. Patient underwent resuscitative thoracotomy converted to clamshell thoracotomy for haemorrhage control. Ventriculotomies were repaired on initial damage control operation. Extracorporeal membrane oxygenation cannulation and therapeutic cooling bridged to definitive cardiac repair several days later. Patient was discharged to an inpatient rehabilitation facility in 16 days.

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Background and case

Whilst extracorporeal membrane oxygenation (ECMO) has been used for temporising patients with cardiac injuries, the most common indications for ECMO in the literature are lung injury and acute respiratory distress syndrome [1]. Therapeutic cooling for neuroprotection has become standard in the setting of cardiac arrest, but this practise has not expanded into patients after traumatic arrest [2]. This case describes an instance of major penetrating cardiac injury managed with ECMO and therapeutic cooling. (See Figs. 1–3.)

This 28 year old man was brought to a level one trauma centre after being stabbed in the chest. He was found in pulseless electrical activity and treated with 10 to 20 min of CPR and three rounds of epinephrine whilst en route. On trauma evaluation, he had a stab wound to the left chest with no pulse. A resuscitative thoracotomy and pericardiotomy were performed revealing minimal blood in the left chest, but a large amount of

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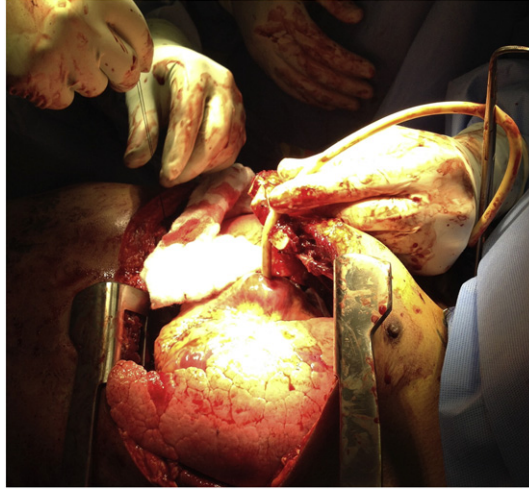


Fig. 1. Haemorrhage from the right ventriculotomy is controlled with gentle traction via a Foley catheter as the internal mammary arteries are ligated.

dark blood in the pericardium. The patient had return of spontaneous circulation. The incision was extended to a clamshell thoracotomy, allowing the identification of an actively haemorrhaging right ventricular injury. This was occluded with direct pressure until a Foley catheter was placed through the ventriculotomy and inflated (Fig. 1), allowing for haemostatic resuscitation and transfer to the operating room. Estimated downtime was approximately 20–25 min.



Fig. 2. CT angiogram demonstrates the ventricular septal defect prior to surgical repair.

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