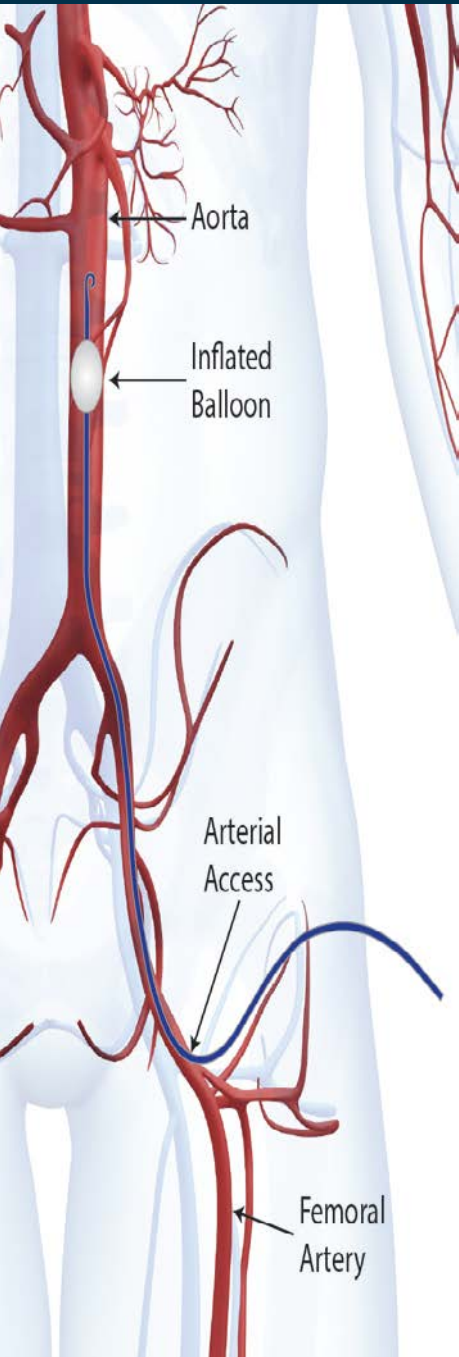


Case Report: ER-REBOA™ Catheter

Deployed in Non-Traumatic Cardiac Arrest Setting

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Presentation

A 26-year-old man was found lying on the ground in an abandoned building known for illicit intravenous drug use.

Diagnosis

The man was in cardiac arrest and paramedics began cardiopulmonary resuscitation. The patient had return of spontaneous circulation prior to transport. Paramedics noted the man had lower-abdominal bruising as well as ligature marks across his bilateral lower extremities.

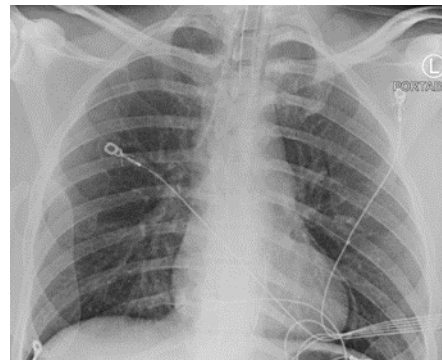
Course of Care

Upon arrival to the Emergency Department, the patient was non-responsive with a Glasgow Coma Scale (GCS) of 3 but breathing spontaneously. The patient was intubated for airway protection and naloxone was administered with no response. The patient's pulse rate was 130 bpm and blood pressure 50/palp. Since the patient was unresponsive and with extensive bruising, the patient's clinical status was escalated to a Level I trauma patient. The trauma team arrived with the patient still in extremis. The massive transfusion protocol was activated. Given concern for possible intraabdominal or pelvic hemorrhage, the decision was made to insert an ER-REBOA™ catheter (Prytime Medical, Boerne, TX).^{1,2,3} The right femoral artery was cannulated with a 7 Fr arterial introducer and the catheter balloon was advanced and inflated in Zone 1. Immediate blood pressure improvement followed to 115/65. A FAST examination, chest x-ray and CT scan of the head, chest, abdomen, and pelvis were negative except for a small-volume pneumomediastinum which was attributed to the patient receiving chest compressions and right middle-lobe opacities likely due to aspiration.

The catheter balloon was deflated after 30 minutes. Systolic blood pressure dropped to the 70s, but was augmented successfully with pressor medications. The next morning, acute compartment syndrome of the right lower extremity was noted and the patient underwent a four-compartment fasciotomy. An intra-operative angiogram of the right femoral artery revealed no arterial injury or abnormality to suggest catheter-related complications.

Figure 1.

ER-REBOA catheter inserted into Zone 1 in via right femoral artery in cardiac arrest patient. Balloon was inflated 30 minutes improving blood pressure from 50/palp to 115/65.



Thus, the patient compartment syndrome, and subsequent rhabdomyolysis, was attributed to a prolonged compression position after being down for an unknown period of time.

Patient Outcome

The patient later required an above-the-knee amputation for necrotic tissues of his right lower extremity. He was discharged on hospital day 52 and was seen doing well in an outpatient clinic two weeks later.

Considerations

Resuscitative Endovascular Balloon Occlusion of the Aorta (ER-REBOA) has been used to temporarily occlude the aorta in Zone 1 or 3 in order to control intraabdominal or pelvic hemorrhage and to provide proactive management of life-threatening, refractory, hemorrhagic shock in addition to maximal conventional therapy.^{4,5} This is the first published case report to date of ER-REBOA use in the non-traumatic cardiac arrest setting leading to a patient surviving. Much like an intra-aortic balloon pump inflating during diastole, the ER-REBOA balloon catheter augmented the patient's coronary perfusion pressure in the acute period to better perfuse the heart. This allowed time to resuscitate the patient with blood transfusions, quickly evaluate the patient, and augment the patient's hemodynamics to the point that they could be supported with pressor medications. This ultimately contributed to the patient surviving this incident. While an intra-aortic balloon pump would have been the ideal tool to use to support our patient's hemodynamics, the ER-REBOA was more readily available and could be placed much faster and without the need for angiography. Future uses of ER-REBOA in the setting of a cardiac arrest patient should also consider partial balloon inflation to allow some distal perfusion while augmenting proximal cardiac and cerebral perfusion.

¹Daley J, Morrison JJ, Sather J, Hile L. The role of resuscitative endovascular balloon occlusion of the aorta (REBOA) as an adjunct to ACLS in non-traumatic cardiac arrest. *Am J Emerg Med.* 2017 May;35(5):731-736.

²DuBose JJ, et al. The AAST prospective Aortic Occlusion for Resuscitation in Trauma and Acute Care Surgery (AORTA) registry: Data on contemporary utilization and outcomes of aortic occlusion and resuscitative balloon occlusion of the aorta (REBOA). *J Trauma Acute Care Surg.* 2016 Sep;81(3):409-19.

³Napolitano LM. Resuscitative Endovascular Balloon Occlusion of the Aorta: Indications, Outcomes, and Training. *Crit Care Clin.* 2017 Jan; 33(1):55-70. ⁴Stensaeth KH, Sovik E, Haig IN, Skomedal E, Jorgensen A. Fluoroscopy-free Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for controlling life threatening postpartum hemorrhage. *PLoS One.* 2017 Mar 29;12(3):e0174520.

⁵Pezy P, et al. Fixed-Distance Model for Balloon Placement During Fluoroscopy-Free Resuscitative Endovascular Balloon Occlusion of the Aorta in a Civilian Population. *JAMA Surg.* 2016 Dec 14.



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