Background

- Non-compressible torso hemorrhage (NCTH) is the leading cause of preventable deaths
- Resuscitative endovascular balloon occlusion of the aorta (REBOA) is a promising strategy for control of NCTH
- pREBOA-PRO provides partial aortic occlusion to mitigate downstream ischemia (Figure 1)
- Thoracic aorta can be occluded for 2-4 hours with pREBOA-PRO in swine models
- The optimal inflation strategy for balance between proximal hemorrhage control and distal ischemia is unknown

Objective

Evaluate the hemostatic efficacy of the pREBOA-PRO in a model of uncontrolled vascular injury

Methods

- Yorkshire swine, 40-45kg (n=5/group)
- Anesthetized and instrumented
- Through-and-through common iliac artery injury (Figure 3)
- Experimental groups:
  1. pREBOA-PRO
  2. Control (no treatment)
- pREBOA inflated at 3 min post-injury
- Inflation target distal mean arterial pressure (MAP): 30mmHg
- No balloon titration after target MAP achieved for 15 minutes
- Rapid normal saline infusion for hypotension
- End organs H&E stained, and reviewed by pathologist
- End point- 2 hours survival following balloon deflation
- Primary Outcome- Post-inflation blood loss

Results

- All pREBOA animals survived to the endpoint
- Control animals had a mean survival time of 35 minutes (p<0.05)
- No significant differences in pre-balloon blood loss (813.2±252.4 vs 730±192.7)
- pREBOA group had significantly less post balloon inflation blood loss (93.8±115.3 vs 1980±368.5ml, Figure 4). 40% required brief vasopressor support following reperfusion
- Lactate clearance was appropriate (mean peak lactate 6.8, end lactate 4.2mmol/L)
- Pathologic scores had mild to moderate ischemia for kidney, liver, small bowel, and hindlimb

Conclusions

Partial aortic occlusion with the pREBOA-PRO can achieve the desired balance between effective hemorrhage control and adequate distal flow, without a need for balloon titration.

Reference