

**Factors Predicting Conversion to Resuscitative Thoracotomy after Resuscitative Endovascular Balloon Occlusion of the Aorta Placement for Aortic Occlusion: An Analysis of the Aorta Database**



*Jonathan B Imran, MD, Andrew J Benjamin, MD, Gary A Bass, MD, Melissa Hornor, MD, Jeremy W Cannon, MD, FACS, Mark J Seamon, MD, FACS, Matthew B Bloom, MD, FACS, Joseph J DuBose, MD, FACS, Shariq S Raza, MD*  
 University of Pennsylvania, Philadelphia, PA  
 Cedars-Sinai, Los Angeles, CA  
 University of Maryland, Baltimore, MD

**INTRODUCTION:** Resuscitative endovascular balloon occlusion of the aorta (REBOA) is a management option for noncompressible torso hemorrhage after trauma. The aim of our study was to identify predictors of need for conversion to resuscitative thoracotomy (RT) after REBOA placement.

**METHODS:** Analysis of the AORTA database (2013-2020) was performed, identifying all patients who underwent REBOA placement. Those undergoing initial RT were excluded. Patients were divided into 2 groups: those undergoing REBOA alone and those requiring conversion to RT after initial REBOA placement. Predictors of conversion were evaluated using multivariable logistic regression.

**RESULTS:** Seven hundred and forty-two of 2,262 patients (33%) underwent REBOA placement and, of those, 40 (1.7%) required conversion to RT. Zone II deployment (odds ratio 5.5; 95% CI, 1.26 to 24.49;  $p = 0.02$ ) and bleeding above aortic occlusion (odds ratio 2.1; 95% CI, 1.01 to 4.58;  $p = 0.04$ ) were associated with conversion from REBOA to open RT, and increased trauma center volume (more than 4,000 trauma admits/year) were less likely associated with conversion (odds ratio 0.16; 95% CI, 0.07 to 0.38;  $p < 0.01$ ) when controlling for age, sex, penetrating or blunt mechanism, Injury Severity Score, admission lactate, and pre-occlusion hemodynamic parameters. Eleven patients (28%) in the conversion group had bleeding above the aortic occlusion site.

**CONCLUSIONS:** In trauma patients undergoing REBOA placement, failure to achieve proximal control is associated with increased need for conversion to open RT, and treatment at high-volume trauma centers appears to impart a reduced need for conversion. Appropriate patient selection and experience remain key in the success of REBOA placement.

**Head CT in Patients with Glasgow Coma Scale Score of 15 after Trauma: Who Needs It**



*Avital N Yohann, MD, Laura N Purcell, MD, MPH, Andrew B Schneider, MD, MSCR, Anthony G Charles, MD, MPH, Jared R Gallaher, MD, MPH*  
 University of North Carolina, Chapel Hill, NC

**INTRODUCTION:** CT imaging is used commonly to evaluate for head injury. However, patients with no physical examination findings and a Glasgow Coma Scale (GCS) score of 15 often do not require a head CT, per published guidelines like the Canadian CT Head Rule.

**METHODS:** We analyzed the 2017-2018 National Trauma Data Bank using ICD-10 codes to identify patients who received a head CT. Abbreviated Injury Scale scores were used to identify patients with a moderate to severe head injury defined as an Abbreviated Injury Scale severity  $\geq 3$ . Modified Poisson modeling was used to identify risk factors for having a moderate to severe head injury among patients with head CT and GCS score of 15. Invasive head injury management was defined as having an intracranial monitor or operative decompression.

**RESULTS:** Of 2,041,706 patients, 1,007,212 (49.3%) had a head CT. Among patients who had a head CT, 722,131 patients (74.7%) had a GCS score of 15 on arrival. Of this group, only 16.7% ( $n = 120,849$ ) had a moderate to severe head injury with risk factors listed in Table 1. For those with moderate to severe head injury, 6.1% ( $n = 7,354/120,849$ ) of patients underwent invasive head injury management with risk factors noted in Table 1.

**CONCLUSIONS:** Few patients had moderate to severe head injury when presenting with a GCS score of 15. However, patients who were 50 years and older, men, and those who suffered falls were at higher risk. Anticoagulation use was not associated with moderate to severe head injury, but did increase the risk of invasive head injury management. Given the cost and associated radiation, targeting head CT utilization for high-risk patients can provide substantial patient

**Table.** Factors Associated with Moderate to Severe Head Injury and Invasive Management

Patient factors	Moderate to severe head injury, RR (95% CI)
	Age 50 y or older
Male sex	1.32 (1.30–1.33)
Fall mechanism	1.85 (1.83–1.87)
Multisystem trauma	1.05 (1.04–1.07)
Use of anticoagulation	0.97 (0.95–0.98)
Patient factors	Invasive head injury management, RR (95% CI)
	Age 50 y or older
Fall mechanism	1.48 (1.40–1.56)
Use of anticoagulation	1.18 (1.11–1.25)