

## Background

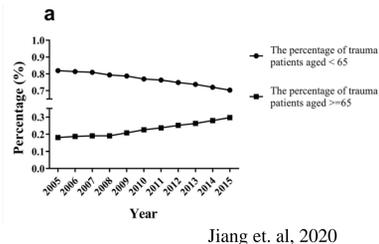
### Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA)

- Technique used to treat patients with noncompressible torso hemorrhage below the diaphragm.
- Minimally invasive alternative to resuscitative thoracotomy with aortic cross clamping.<sup>1</sup>

Since hemorrhage is the leading cause of preventable death in trauma patients, REBOA has the potential to improve outcomes for trauma patients with abdominal or pelvic trauma.<sup>2</sup>

### Population of Interest

Adults over the age of 65 are a growing population of trauma patients.<sup>5</sup> This population has unique considerations because of a higher incidence of comorbidities and due to physiologic changes associated with aging.<sup>5</sup>



### Purpose

Previous research done by our group looking at data from patients that underwent REBOA at a Level 1 trauma center found that advanced age was:

- Significantly associated with increased mortality
- Not significantly associated with longer length of stay nor with development of AKI following REBOA placement.

**The objective of this study is to investigate patterns of REBOA use and complications in a multicenter study involving a large population of geriatric trauma patients that undergo a REBOA procedure.**

## Hypothesis

It was hypothesized that patients 65 or older would have greater rates of complications, compared to those under 65, due to geriatric patients having a greater likelihood of pre-existing co-morbidities.

## Methods

Obtained data from AORTA database, containing data from ≥ 50 ACS Level I or II trauma centers in the U.S. where REBOA is utilized

Excluded patients younger than 18 and those whose age was not mentioned

Stratified the remaining 3,384 patients into two groups: 18-64 years old (3073 patients) and 65+ years old (311 patients)

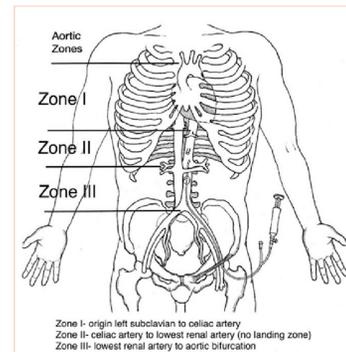
Analyzed variables including hospital outcomes, injury severity score (ISS), REBOA use, and access site complications.

Data were analyzed using Fisher's exact test and Student's t-test with p value <0.05 considered to be significant.

### REBOA Use and Complications

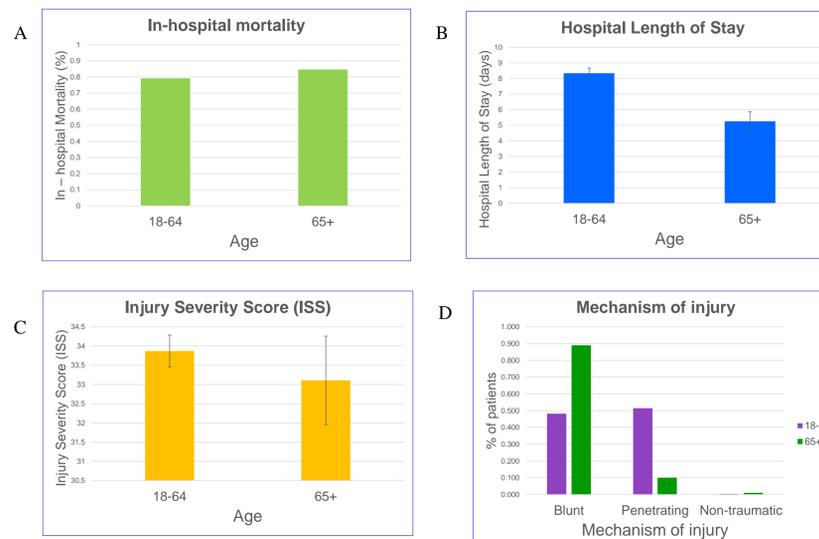
The most utilized version of REBOA is ER-REBOA. In this procedure, a catheter is placed, through the common femoral artery, and a balloon can be inflated at three different zones with Zone 1, at the distal thoracic aorta, and Zone 3, at the distal abdominal aorta, being the most common.<sup>3</sup>

Complications seen with REBOA utilization include ischemia caused by occlusion, limb amputations, post-operative thrombosis, rhabdomyolysis, etc.<sup>4</sup> Access site complications are also of concern.<sup>4</sup>



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## Hospital Outcomes, ISS, Mechanism of injury



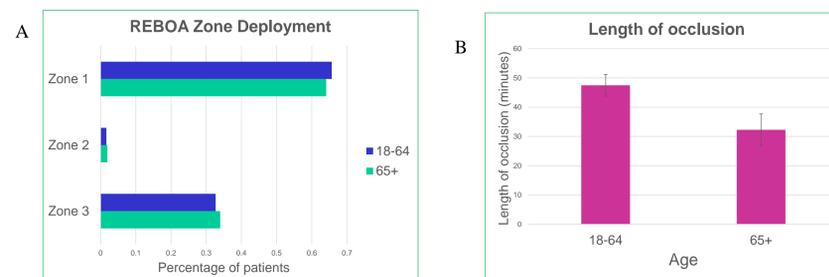
**Figure A:** Geriatric patients had significantly greater in-hospital mortality (85%) compared to non-geriatric patients (79%),  $p = 0.03$ .

**Figure B:** Compared to non-geriatric patients, geriatric patients had a significantly shorter length of stay ( $5.2 \pm 1.2$  days vs.  $8.3 \pm 0.6$  days),  $p = 0.004$

**Figure C:** There was no significant difference in injury severity score ( $33.1 \pm 2.3$  for geriatric patients and  $33.8 \pm 0.8$  for non-geriatric,  $p = 0.56$ )

**Figure D:** The mechanism of injury for the majority (89%) of geriatric patients was blunt. For non-geriatric patients, the mechanism of injury was mainly blunt (48%) and penetrating (52%).

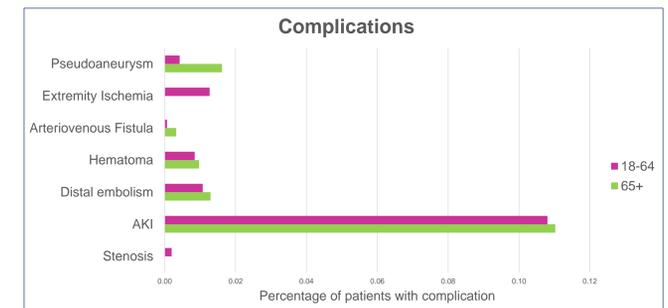
## REBOA Use



**Figure A:** The distribution of REBOA zone placement was similar for geriatric and non-geriatric patients ( $p=0.8378$ ). Zone 1 was most common (64-65%), followed by Zone 3 (33-34%), and zone 2 was used rarely (2%).

**Figure B:** The length of REBOA occlusion for geriatric ( $32.3 \pm 10.8$  minutes) and non-geriatric patients ( $47.5 \pm 7.4$  minutes) was not significantly different ( $p = 0.13$ ).

## REBOA Complications



There was no significant difference in the development of AKI (11.0% for geriatric patients and 10.8% for non-geriatric,  $p = 0.92$ ). Of the access site complications analyzed, there was significantly greater access site pseudoaneurysms in geriatric patients (1.6%) compared to non-geriatric patients (0.4%) ( $p = 0.019$ ). Interestingly, there was reduced development of extremity ischemia in geriatric patients compared to non-geriatric patients (0% vs 1.3%,  $p = 0.045$ ). There was not a significant difference between geriatric and non-geriatric patients in development of hematoma (1.0% vs 0.9%,  $p=0.92$ ), arteriovenous fistula (0.3% vs 0.1%,  $p=0.25$ ), stenosis (0% vs 0.2%,  $p=1$ ), or distal embolism (1.3% vs 1.1%,  $p=0.77$ ).

## Results

From the AORTA database, 3,384 patients were analyzed and 311 patients or 9.2% were geriatric. There was no significant difference in:

- Injury severity score, the distribution of REBOA zone placement, and length of REBOA occlusion
- Development of AKI, hematoma, arteriovenous fistula, stenosis, or distal embolism.

Compared to patients 18-64, geriatric patients had:

- Greater incidence of pseudoaneurysms and greater in-hospital mortality
- Lower incidence of extremity limb ischemia and shorter hospital length of stay

## Conclusion

REBOA use was similar among geriatric and non-geriatric patients. The hypothesis was not completely supported. Age greater than or equal to 65 was significantly associated with greater incidence of pseudoaneurysm, but decreased incidence of extremity limb ischemia. This difference could be due to pre-existing peripheral vascular disease or anatomic differences in this patient population. Future directions include studies to understand the association of specific co-morbidities with REBOA complications among geriatric trauma patients.

## References

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**Acknowledgements:** The results presented are based on data obtained from the **Aortic Occlusion for Resuscitation in Trauma and Acute Care Surgery (AORTA)** database.