In multivariate analysis, presence of soft palate swelling (OR 4; p=0.03) and base of tongue edema (OR 4.5; p=0.02) increased the likelihood of supraglottic or glottic edema on exam. However, there was no significant correlation between lip swelling (r=−0.09), soft palate swelling (r=0.3), anterior tongue swelling (r=0.18), floor of mouth swelling (r=0.32) or base of tongue swelling (r=0.39) with supraglottic or glottic swelling.

Conclusion: This is a large study of patients with AAIA who underwent fiberoptic exams. Our study suggests that a significant portion of patients without upper aerodigestive tract swelling may still have supraglottic or glottic swelling. Since supraglottic and/or glottic swelling is considered a significant risk factor for predicting airway interventions, physicians should not use absence of upper aerodigestive tract swelling to reliably predict absence of supraglottic and/or glottic swelling.

**76 Airway Complications in Angioedema**
Arnold GG, Kedaria D, Iyer P, Jackson C, Khan A, McDonald AP, Pattanaik DN, Shrestha R, Singh U, VanVaikunth J, Sodhi A/University of Tennessee Health Science Center, Memphis, TN

Study Objectives: Angioedema is a common and potentially life-threatening diagnosis that results in more than one million emergency department (ED) visits per year. It manifests as localized edema of the deep dermis and subcutaneous tissues secondary to increased vascular permeability. The face, lips, mouth, throat, and extremities are commonly affected. The pathophysiology is complex and the disorder is broadly classified as resulting from histamimergic or bradykinin-mediated mediators. Angioedema is a well-known adverse effect of angiotensin-converting enzyme (ACE) inhibitors. ACE inhibitor-induced angioedema (AIAA) affects 0.1% to 0.7% of patients taking ACE inhibitors and accounts for approximately one-third of all ED visits for angioedema in the United States. Early ED provider recognition of the specific type of angioedema is essential to optimize management and patient outcomes. We sought to characterize airway interventions and complications for AIAA versus non-ACE inhibitor induced angioedema (NAIA).

Methods: We performed a retrospective chart review of patients seen in the ED with a diagnosis of angioedema at Methodist LeBonheur Healthcare facilities in Memphis, TN from 1 January 2006 to 31 August 2016. Adult patients greater than 18 years were included.

Results: Among the 1,299 patients diagnosed with angioedema, 954 had AIAA and 345 had NAIA. AIAA patients were older than those with NAIA (59 years vs 55; p<0.01). Approximately 62% were female in both groups. AIAA patients were more likely to be African American (89% vs 76%; p=0.001) and more likely to be current smokers (28% vs 21%; p=0.001). BMI distribution was similar between the two groups. Initial symptoms were similar in the 2 groups except rash (<1% in AIAA group vs. 8% in NAIA group; p<0.001) and face swelling (42% and 32% respectively; p=0.01). Anaphylaxis and shock on presentation was much more common in the NAIA group (p=0.0001). Patients with AIAA required intubation significantly more frequently (19.8% vs 12.2%; p=0.03) and had a higher likelihood of difficult intubation (50.8% vs 40.4%; p=0.04). One-third of patients who required intubation in the AIAA group required nasotracheal intubation (NAIA, 16%; p=0.02). Patients with AAIA were intubated by Otolaryngology much more frequently as compared to NAIA (30% vs 9%; p=0.002). Rates of emergency cricothyrotomy and semi elective tracheostomy were similar in both groups. Extubation failure rates were also similar, with approximately 8% failing extubation once and 2.4% failing twice. In multivariate analysis, patients with AAIA were more likely to be African American (OR 3; p=0.007), currently smoke (OR 1.5; p=0.02), and have lip swelling (OR 2.5; p=0.017). They were less likely to have rash (OR 0.089; p=0.0001) and anaphylaxis (OR 0.032; p=0.016).

Conclusion: Airway complications occurred more commonly in patients suffering from AAIA. This population is more likely to need intubation, be difficult to intubate, and require advanced airway techniques such as nasotracheal intubation.

**77 Virtual Reality Trauma Simulation: An Immersive Method to Enhance Medical Personnel Training and Readiness**
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Study Objectives: Immersive virtual reality (IVR) can be highly effective as a medical simulation training platform. Given recent advancements this technology has become increasingly portable and visually realistic. While IVR technology appears to hold promise, there is a great deal to learn about the best way to functionally develop, implement, and share these training resources. Several groups have created models that recreate current simulation lab environments with instructor input. While these systems increase training opportunities, decrease equipment needs, and offer broad potential, they still require a skilled trainer to ‘prompt the system.’ Removing this limitation seems like a potential way to increase scalability. We are currently in the process of creating, to our knowledge, the only simulator that would offer immediate autonomous feedback to users through both real-time patient physiologic responses and overall grading.

Methods: We created a working group of 10 active duty or former military emergency physicians and 2 technical experts. We hosted 15 meetings to facilitate the development process. The program was developed with financial support from the Telemedicine and Advanced Technology Research Center (TATRC), through the primary vendor Ensonics, Inc., with support from Anatomy Next Inc. and Kiware, Inc. Development was completed using an agile project management style, which allowed our team to review progress and provide immediate feedback on previous milestones throughout its completion. The working group completed the resulting 4 simulation scenarios to evaluate perceived realism and training potential. Finally, while one member of the team was deployed, testing of the technology platform off the network in a deployed role 3/tent environment was conducted.

Results: Upon completion we created four IVR scenarios based on the highest mortality battlefield injuries: hemorrhage, tension pneumothorax, and airway obstruction. The working group unanimously indicated a high level of realism and potential training usefulness. Throughout this process there have been a number of lessons learned and we present these here to show what we have created as well as provide guidance to others creating IVR training solutions.

Conclusion: Our team developed trauma scenarios that, to our knowledge, are the only IVR trauma scenarios to run autonomously without instructor input. Furthermore, we provide a potential template for the creation of future autonomous IVR training programs. This framework may offer a dynamic starting point as more teams seek to leverage the capabilities IVR offers.