Background

- Intubation is an essential skill for the Emergency Physician (EP). As educators, we are charged with preparing emergency medicine (EM) residents for successfully intubating patients with even the most troublesome anatomy.
- Novice airway managers completing standard intubation with direct laryngoscopy have a success rate of intubation ranging from 35-65%.1
- Prior studies have shown that with direct laryngoscopy, the complication rate ranges from 9.3% to 14.9%.2,4
- These numbers can be expected to worsen with a difficult airway where the leading cause of difficult intubations, insufficient laryngoscopic view, contributes to morbidity and mortality.5,7
- One clinical situation occasionally requiring endotracheal intubation of the difficult airway is severe angioedema. Whereas angioedema accounts for 80,000 to 112,000 emergency department (ED) visits annually, the hospitalization rate is 18% with even fewer requiring intubation.8,9
- As a result, it is both important and difficult to ensure each EM resident is well trained in this intubation scenario prior to graduation and independent practice. There are commercial mannequins that allow for tongue swelling, however it has been shown that cadaver training is more realistic than simulators.10,11

Educational Objective

- Our primary objective was to develop a teaching model to increase resident knowledge, confidence, and proficiency at intubating in the clinical setting of severe angioedema.

Curricular Design

Curricular Design (Cont)

- The saline was replaced with agave syrup. Even using a large gauge needle to overcome resistance, injection was very difficult and the agar still leaked, again requiring frequent suctioning and making the setup time between trainees prohibitively slow. (Figure 1)
- Our most practical model came from the insufflation of air bilaterally near the sublingual glands. Using a 22 gauge spinal needle and a 60 cc syringe, we were able to easily cause realistic distention of the lips, tongue, and oropharynx when we injected approximately 300ml of air. (Figure 2&3) Leaking still occurred, but re-insufflation was rapidly performed anytime deflation was detected, and the leaking did not fill the airways with liquid unlike our saline and agave models.

Figure 1. Initial attempts with agar showing distention and leakage.

Figure 2. Fresh frozen cadaver prior to insufflation.

Figure 3. Fresh frozen cadaver immediately after insufflation with 300ml of air through a spinal needle into the sublingual gland area.

Impact/Effectiveness:

- Participants included 29 EM residents, with participants from all year groups.
- In response to the statement, “The angioedema model was high fidelity”, 12 residents strongly agreed, while the remaining 17 respondents agreed.
- In response to the statement, “The angioedema model was a good training model for angioedema”, 13 residents strongly agreed, while the remaining 16 respondents agreed. None of the participants answered strongly disagree, disagree, or neutral to either question.

Participant Comment

“Awesome opportunity, I will be markedly less terrified when I get an angioedema/anaphylaxis case”.

Conclusion

- As educators, we are always looking for more realistic training models for our residents. Because angioedema requiring intubation is an uncommon phenomenon, many residents will never encounter this scenario during their training.
- We have developed a simple angioedema training model using air insufflation in a fresh frozen cadaver. Our participants uniformly expressed positive impressions of both the fidelity and training quality of this model.
- Other EM residencies are encouraged to use this model in their own programs to facilitate training of the difficult airway in the angioedema patient.

References


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Disclaimers

- This option or description contained herein are the private views of the authors and can not be attributed to or reflecting the views of the Department of the Army or the Department of Defense.
- The author has no financial conflicts of interest with either Fyberg or Simulab.