Angioedema

Section 1: Case Summary

Scenario Title:	Angioedema
Keywords:	Difficult airway, awake intubation
Brief Description of Case:	67 year old with angioedema, other than airway/tongue swelling is stable and cooperative. Difficult airway is anticipated and option for awake intubation is performed.

Goals and Objectives	
Educational Goal:	Approach to a Difficult airway and expose learners to options for managing such an airway.
Objectives: (Medical and CRM)	CRM: Effectively lead team members through complex critical scenario. Medical: 1) Recognize the advantages and disadvantages of an awake intubation and how to perform an awake intubation. 2) Use closed-loop communication and frequent summaries in order to maintain effective communication and a shared mental model.
EPAs Assessed:	F1 Initiating and assisting in resuscitation of critically ill patients C3 Provide airway management and ventilation TD 3: Facilitating communication of information between a patient in the emergency department, caregivers, and members of the health care team to organize care and disposition of the patient

Learners, Setting and Personnel				
Target Learners:	☐ Junior Learners	☒ Senior Learners	☒ Staff	
	☐ Physicians	☐ Nurses	☐ RTs	☒ Inter-professional
	☐ Other Learners:			
Location:	☒ Sim Lab	☒ In Situ	☐ Other:	
Recommended Number of Facilitators:	Instructors: 1			
	Confederates:			
	Sim Techs: 1			

Scenario Development	
Date of Development:	May 2, 2020
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Last Revision Date:	September, 2025
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Version Number:	2

Section 2A: Initial Patient Information

A. Patient Chart					
Patient Name: John			Age: 67	Gender: male	Weight:
Presenting complaint: Short of breath					
Temp:36.9	HR: 104	BP:120/60	RR:28	O_2Sat:94% r/a	FiO_2:
Cap glucose: 6			GCS: (E V M) 15		
Triage note: Eating popcorn last night before bed. Awoke a few hours later with the feeling of a swollen tongue and now feels short of breath. 2 hours later called 911 and Brought in by EHS.					
Allergies: none known but if asked did have an episode of lip swelling 2 years ago after unknown precipitant, lasted a day and resolved with Benadryl					
Past Medical History: NIDDM			Current Medications: Metformin		

Section 2B: Extra Patient Information

A. Further History	
Include any relevant history not included in triage note above. What information will only be given to learners if they ask? Who will provide this information (mannequin's voice, confederate, SP, etc.)?	
B. Physical Exam	
List any pertinent positive and negative findings	
Cardio: normal	Neuro:
Resp: normal NO wheeze	Head & Neck:
Abdo:	MSK/skin: Notes muffled voice, No stridor but marked swelling of lips and tongue
Other:	

Section 3: Technical Requirements/Room Vision

A. Patient
☒ Mannequin *(specify type and whether infant/child/adult)*
☐ Standardized Patient
☐ Task Trainer
☐ Hybrid
B. Special Equipment Required
-airway equipment and cricothyrotomy supplies
C. Required Medications
D. Moulage
E. Monitors at Case Onset
☐ Patient on monitor with vitals displayed ☒ Patient not yet on monitor
F. Patient Reactions and Exam
Include any relevant physical exam findings that require mannequin programming or cues from patient (e.g. – abnormal breath sounds, moaning when RUQ palpated, etc.) May be helpful to frame in ABCDE format.

Section 4: Confederates and Standardized Patients

Confederate and Standardized Patient Roles and Scripts	
Role	*Description of role, expected behavior, and key moments to intervene/prompt learners. Include any script required (including conveying patient information if patient is unable)*

Section 5: Scenario Progression

Scenario States, Modifiers and Triggers				
Patient State/Vitals	Patient Status	Learner Actions, Modifiers & Triggers to Move to Next State		Facilitator Notes
1. Baseline State Rhythm: sinus HR: 104 BP: 120/60 RR: 28 O_2SAT: % 94 r/a T: ^oC 36.9 GCS: 15	*Patient is obese, appears anxious, muffled voice. Patient weight is 100kg* *When look in airway, ++ swollen tongue can only see soft palate and no uvula, both lips swollen*	<u>Expected Learner Actions</u> ☐ Obtains a full history and physical exam ☐ Determines allergy and medical history including OTC/herbal medications ☐ performs primary survey- immediately recognizes difficult airway and calls for help. ☐ IV/O2/Monitor ☐ Give Epi 0.5mg IM if no response in 5 min repeat to 0.5mg IM and repeat x2 q 5 min ☐ Famotidine 20 mg IV ☐ Methylprednisone 125mg IV	<u>Modifiers</u> -If does not call for help and immediate treatment for anaphylaxis then have patient become acutely agitated, bradycardic, hypoxic and PEA Arrest - Otherwise progress to stage 2	Recognizes potential/impending airway and likely difficult airway. Verbalizes DDx being anaphylaxis or angioedema.
2. HR-120 BP- 150/95 RR=35 92 % O 2 sat'n on O2	Patient having more labored breathing/anxious/tongue and lips are still swollen	<u>Expected Learner Actions</u> ☐ Calls for help again	<u>Modifiers</u> - Verify that help has been called for ask specifically when help is coming. No help from anaesthesia or ENT available at this time- they are coming in but will not arrive for another 30 min.	Verbalizes that airway is impending occlusion and need to secure airway. 2 options: 1) RSI/Double set up for Cricothyrotomy. 2) Awake intubation
3. If Awake intubation:		<u>Expected Learner Actions</u>	-Topicalization of airway with topical lidocaine/spray -IV glycopyrrolate 0.2mg IV	<u>Verbalize airway plan and checklist</u>

Awake Intubation Cont'd		☐ Explains option of awake intubation and verifies that patient is cooperative ☐ patient partially sitting up ☐ Once topicalized slide glidescope/CMAC into oropharynx past tongue and can visualize posterior pharynx (No swelling of uvula or posterior pharynx)and cords- Patient starts to gag- unable to pass ETT tube. ☐ Re spray topicalize, give low dose (dissociative) of ketamine (20-50m IV) and try to insert bougie with ETT tube already loaded. ☐ Once ETT tube viewed going past cords and tube position verified, then immediate sedation	- ondansetron to blunt gag reflex <u>Triggers</u> - Patient will become ++ agitated if no immediate sedation is given once intubated - If incomplete topicalization or no sedation then unable to perform awake intubation and proceed to RSI/Double set up	Consider fiberoptic option if familiar with equipment. If decide to use ketamine for dissociation then only 25mg IV SLOW push over 5 sec every 15 sec. (0.25- 0.5mg/kg Ketamine) Use 4% lidocaine spray atomizer. Spray 100 into oropharynx. Viscous xylocaine 5% direct application to posterior pharynx/tongue Once ETT tube verified through cords- immediate sedation either Ketamine push or propofol- make sure that these are drawn up prior to intubation
4. RSI- vitals remain the same		<u>Expected Learner Actions</u> ☐ Use US to locate cricothyroid membrane and draw location on patient's neck ☐ Set up for Cric and have neck prepped and sterilized ☐ Perform RSI	<u>Modifiers</u> - If don't prep neck/prepare for cric and try RSI- not successful- will need to proceed to Cricothyrotomy -If successfully prep for Cric- will be able to intubate with RSI.	

Appendix A: Laboratory Results

CBC WBC Hgb Plt Lytes Na K Cl HCO_3 AG Urea Cr Glucose Extended Lytes Ca Mg PO_4 Albumin TSH VBG pH pCO_2 pO_2 HCO_3 Lactate	Cardiac/Coags Trop D-dimer INR aPTT Biliary AST ALT GGT ALP Bili Lipase Tox EtOH ASA Tylenol Dig level Osmols Other B-HCG

Appendix B: ECGs, X-rays, Ultrasounds and Pictures

AME Infinity Edition Excerpt: Awake, When and Why
When and Why to do an Awake Tracheal Intubation
An awake intubation should be considered primarily if serious doubt exists about whether the clinician can easily take over the gas exchange a patient is presently doing for him- or herself. There are two broad categories of indications to consider awake tracheal intubation in an emergency:
***Predicted difficult airway anatomy**. Awake intubation should be considered if difficulty is predicted both with tracheal intubation **and** maintaining oxygenation with face mask ventilation (FMV) or supraglottic airway (SGA) rescue ventilation should intubation fail. Two types of difficult airway anatomy can be described:*
***1)Variations in normal head/neck anatomy**: Some aspect(s) of the patient's usual anatomy predicts difficulty with tracheal intubation or the ability to accomplish effective ventilation by FMV or SGA;*
***2)Pathologic airway distortion or obstruction**: Difficulty is predicted based on de novo pathologic changes in the airway.*
The distinction is important because as discussed in table 2, VL may be an option for awake intubation of some of the former group, while the latter group will often require flexible endoscopic intubation (FEI).

***Predicted difficult physiology.** Even with favorable airway anatomy, some patients present physiologic issues that may favor an awake intubation.*
***Hemodynamic instability:** With significant hemodynamic instability, concern may exist over the effects of RSI induction agents on the blood pressure. While careful choice of induction agent and dose, together with a fluid bolus and/or the pre-emptive use of vasopressors and inotropic agents will often enable safe conduct of an RSI in this situation, an awake intubation is a second option to help maintain blood pressure during tracheal intubation.*

***Apnea intolerance:** This can occur in two clinical settings:*
***1)High minute ventilation:** The patient who is extremely dyspneic on the basis of cardiopulmonary compromise or who is hyperventilating to compensate for a profound metabolic acidosis will tolerate interruption of gas exchange poorly. Early institution of FMV with PEEP and administration of high flow oxygen by nasal cannulae during an RSI is one option. Alternatively, an awake intubation will allow the patient to continue to manage his or her own gas exchange until the airway is secured.*
***2)Hypoxemia:** Patients with significant shunt physiology will be difficult to pre- oxygenate and their resultant small oxygen reservoir (the functional residual capacity, FRC), often combined with higher than normal rates of oxygen consumption will predispose them to rapid desaturation with the onset of apnea as part of an RSI. These patients will often desaturate very quickly despite apneic oxygenation. While assisted ventilation during the induction phase of an RSI may avert critical hypoxemia, clinicians may alternatively choose an awake approach with humidified high flow nasal oxygenation support during the procedure.*

Clarify difference of "topicalized" awake sedation without any sedation vs Dissociative awake with Ketamine

Awake intubation should be reserved for physicians who are experienced with laryngoscopy. NOT for novices! Awake intubation is much more difficult than RSI.

Awake intubation is NOT Ketamine only intubation.

Use Awake intubation only if:
1) cooperative patient
2) master of RSI/laryngoscopy
3) topicalized airway- familiarity with equipment and drugs- need a specific oropharyngeal atomization device such as MAD- Laryno-Tracheal Mucosal Atomization Device

Can use antisialogogue: glycopyrrolate 0.3mg IV or atropine 0.5mg IV 15 min prior to procedure. Prior to procedure should also dry mouth with guaze and give suction to patient.

Need topical anesthetic: 4% aqueous or cream lidocaine.

Sedative medication if necessary such as midazolam 1mg IV or Ketamine 20mg aliquots prn

Be aware of toxic dose of topical lidocaine 9mg/kg so for 70kg then 15ml 4% lidocaine (40mg/ml for liquids or per g for creams mg/g) or 15g 4% lidoacaine cream.

Once mouth is dried-steps:

1) Apply 2ml lidocaine cream to base of tongue with tongue depressor- allow cream to slide down back of tongue

2) Atomize with 4% lidocaine liquid to pharynx and then around base of tongue and then larynx.

3) Use VL or endoscopic approach-if endoscopic then can "spray as you go" with liquid through device's working side port channel.

Appendix C: Facilitator Cheat Sheet & Debriefing Tips

References

1. Emcrit.org Podcast 247- The Dissociated Awake Intubation May 16, 2019
2. Emcrit .org Emergency Awake Topicalized Intubation (EAT) intubation- July, 2016
3. https://aimeairway.ca/announcement/65/ame-infinity-edition-excerpt-awake-when-and-why
4. Sandefur BJ et al. Managing Awake Intubation. Annals of Emergency Medicine, 85, (1), Jan 2025, Pages 21-30

