SIMULATION CASE TITLE: Extensive facial trauma and respiratory failure requiring an emergency surgical airway

LEARNER AUDIENCE: EM residents, EM attendings, trauma residents, trauma physician assistants, trauma attendings, EM nursing

PATIENT NAME: Jiminy Cryeckit

PATIENT AGE: 27 year-old male

CHIEF COMPLAINT: Everything hurts

PHYSICAL SETTING: 27 year-old male is brought from outside a bar after assault. Per EMS, patient was leaving a bar this morning when he was confronted by multiple assailants. The patient was choked, punched, and kicked multiple times by multiple assailants.

Brief narrative description of case	27 year-old male with no known medical history is brought from outside a bar after assault. Per EMS, patient was leaving a bar late at night when he was confronted by multiple assailants. The patient was choked, punched, and kicked multiple times by multiple assailants. Patient was found altered on the scene with significant facial trauma. EMS was unable to intubate in the field, and they placed the patient in a c-collar and brought the patient in on non-rebreather.
Primary Learning Objectives	*Learning:* 1. Perform ATLS - Complete primary survey, secondary survey, adjunct studies, and stabilizing interventions in an organized and timely fashion 2. Practice resuscitation of a patient with blunt facial trauma and respiratory failure 3. Recognize and manage difficult airway skills 4. Practice surgical airway skills *Communication:* 1. Become familiar with team roles and responsibilities 2. Employ closed loop communication 3. Practice using shared mental model
Critical Actions	❒ Team members wear PPE ❒ Expose patient starting at the chest to allow for vitals and IV placement ❒ Place on monitor ❒ Place large bore IVs

	❒ Perform primary survey ❒ Identify and treat significant facial trauma ❒ Successfully perform cricothyroidotomy ❒ Obtain chest x-ray, pelvis x-ray, and EFAST ❒ Perform secondary survey
Learner Preparation or Prework	None
Simulation Moulage/equipment	**<u>Moulage</u>**: Significant facial ecchymosis Loose jaw if possible Blood in oropharynx Blood in ear canals A tooth in airway if possible (can place a cork in the airway to make oral intubation impossible) Scalp contusion **<u>Equipment</u>**: Manikin C-collar in place Fully clothed Non-rebreather on face 7-0 or large endotracheal tube with stylet Glidescope or laryngoscope Cricothyroidotomy kit 6-0 or small endotracheal tube Bag-valve mask Bougie Simulated uncrossed pRBC product Simulated rapid sequence intubation (RSI) medications

Initial Presentation	
Overall Setting and Appearance	Scenario: In trauma bay Patient on stretcher, fully clothed
Trauma Activation level	Level 1
Activation level justification	Altered mental status Respiratory failure

Assigned sim team roles	1.EMS-gives team field information and vital signs 2.The Patient- all cases utilize a manikin, but someone needs to be the voice of the patient 3.Observer-ensures that team achieves critical actions and takes notes on team dynamics 4.Debriefer-leads post sim debrief on team communication, resuscitation logistics and medical management		
EMS report	27 year-old male with no known medical history is brought from outside a bar after assault. Per bystanders, he was leaving the bar when he was confronted by multiple assailants. The patient was choked, punched, and kicked multiple times by multiple assailants. He was found altered on the scene with significant facial trauma when someone called 911 EMS was unable to intubate in the field, they placed the patient in a c-collar and brought the patient in on NRB.		
EMS vital signs	HR 120, BP 140/70, SpO2 85% on NRB		
Past Medical/Surgical History	**Medications/Allergies**	**Social History**	**Last meal**
PMH: unknown **PSH:** unknown	**Meds:** unknown **All:** unknown	**Soc:** unknown	unknown

Primary Survey	
Initial ED vital signs	HR 115, BP 140/70, SpO2 88% NRB, RR 18

General	Ill appearing with respiratory distress
Airway	Not protecting airway, moaning/gargling, no audible words, muffled, with blood in the airway
Breathing	Equal bilateral breath sounds
Circulation	2 + distal pulses
Disability	GCS 7 (Eyes Closed 1, Incomprehensible Sounds 2, Withdraws from Pain 4)
Exposure	Significant facial trauma, no other obvious deformities, no other signs of hemorrhage
EFAST	Normal in all views (video #1,2,3,4,5)

Secondary Survey- should be completed after surgical airway	
General	Intubated, sedated
HEENT	Significant facial ecchymosis/abrasions, blood in oropharynx, tongue swelling, laryngeal edema, blood in nares, no proptosis, PERRLA, EOMI, + mandibular instability, hemotympanum, scalp contusion
Neck	No step-offs
Lungs	Equal bilateral breath sounds, initially tachypneic
Cardiovascular	Tachycardic, S1/S2, no chest wall crepitus or instability
Abdomen	Soft, non-tender
Pelvis/MSK	Unstable mandible, Stable pelvis, No obvious deformity, No cervical/thoracic/lumbar spine step-offs
Neurological	GCS 7, not following commands, normal rectal tone
Skin	Significant head and face ecchymosis, contusion to scalp
GU	Normal GU exam
Psychiatric	NA

Imaging (see image bank)	
Chest x-ray	Surgical airway in place (image #14)
Pelvis x-ray	Normal (image #2)
EFAST	Negative (video #1,2,3,4,5)

Instructor Notes - Changes and Case Branch Points
This section should be a list with detailed description of each step than may happen during the case. If medications are given, what is the response? Do changes occur at certain time points? Should the nurse or other participant prompt the learners at given points? Should new actors or participants enter, and when? Are there specific things the patient will say or do at given times? There are a few examples given, but it is expected that most cases will have many more changes and potential branch points.

Intervention / Time point	Change in Case	Additional Information
Team recognizes need for definitive airway during primary survey, do not move past A until airway secured	If oropharyngeal airway attempted, will be unsuccessful	Team member doing airway should vocalize plan which should include surgical airway Team must attempt airway with c-spine precautions SpO2 goes down to 80% if oral airway is persistently attempted If attempted again, SpO2 goes down to 50%
Unsuccessful oral attempt	Team activates surgical airway team	Successful surgical airway
Once airway secured, team should continue with primary and secondary survey	HR 100, BP 130/75, SpO2 100% on Bag-Valve-Mask	

Ideal Scenario Flow
Learners enter the room to find a patient fully clothed. As the team walks into the room, roles should be assigned. Team leader and primary nurse should identify themselves clearly. All team members must wear PPE. As a team approaches the patient, nurse should be putting the patient on the monitor and getting vital signs as examining residents begin the primary survey.

Two large bore IVs are placed. Team initiates the primary survey and recognizes gurgling as compromised airway and the need for definitive airway. GCS is also noted to be 7. Team member at the head of the bed responsible for the intubation vocalizes airway plan, which can include an attempt for the oropharyngeal airway. If attempted, oropharyngeal airway will be unsuccessful as the intubating resident should see blood in the oropharynx and obstruction of the airway. Team should move quickly to surgical airway using a cricothyroidotomy kit or scalpel-finger-bougie technique. Once the endotracheal tube is in place and secured with confirmatory bilateral breath sounds, team should restart the primary survey noting scalp contusion.

The rest of the primary and secondary survey is unremarkable. If FAST exam is done, it will be negative. Chest x-ray will show cricothyroidotomy tube in place. The case is completed with decision to go to CT scan.

Anticipated Management Mistakes
Possible management errors or difficulties that are commonly encountered when using this simulation case.

1. Failure to recognize the need for surgical airway
2. Failure to stabilize cervical spine
3. Failure to complete primary +/- secondary survey before addressing the airway

Debrief Points		**Additional Information**
Communication	Closed loop communication	Don't ask the room for things, ask people, especially for critical actions
	Role clarity	-Designate roles out loud, so everyone knows who is doing what. -Be sure to ask who the team leader is and who the primary nurse is. -When you arrive, introduce yourself. -Speak up if you are unable to complete task asked of you.
	Shared mental model	-Talk out loud so that everyone is on the same page -Summarize the case at key moments or pauses -Vocalize airway plan out loud so team can help prepare
Logistics	Activate surgical airway team	Each institution has different surgical airway team members and policy for activation

	Equipment	Be familiar with the location of the surgical airway tray/kit and its contents
Medical		
Reiterate the need to stop and address life threatening process as they are discovered during primary survey	Do not go to B if A is not secured	
Review how to perform a successful cricothyroidotomy	Review different techniques: Open cricothyroidotomy vs. Melker/Seldinger technique vs. scalpel/bougie	https://lifeinthefastlane.com/ccc/surgical-cricothyroidotomy/ https://lifeinthefastlane.com/ccc/airway-management-major-trauma/
	Review indications and contraindications for cricothyroidotomy	<u>Indications</u> Can't intubate, can't ventilate scenario <u>Contraindications</u> ·Ability to secure an airway in a timely fashion with less invasive means ·Airway trauma that renders access via the cricothyroid membrane futile ·Tracheostomy should be performed, or access achieved via the traumatic airway opening ·Children < 10 years of age ·Young children have small cricothyroid membranes that may not accommodate an airway, are prone to laryngeal trauma and have a higher incidence of postoperative complications

		·Perform needle cricothyrotomy is generally advised, however life-saving surgical cricothyroidotomy has been successfully performed in children