## Scenario Overview

### Summary

ww man, arrives at the operating room (OR) holding area from the emergency room for urgent surgery due to a suspected ruptured appendix. During induction he becomes difficult to intubate with direct laryngoscopy.

### Setting

OR holding area (pre-op holding)
Operating room
Simulation center

### Time

Simulation 20–30 minutes
Debrief 15–20 minutes

### Participants

Simulation facilitator
Multidisciplinary OR team: anesthesia provider (MD and/or CRNA and/or SRNA), surgeon, surgical assistant, anesthesia technician, surgical technologist or RN in scrub role, RN circulator, charge RN, Postanesthesia care unit RN, respiratory therapist, family members

### Progressive Complexity

Direct laryngoscopy, use of a GlideScope®
Loss of airway
Vomiting
Re-establishment of airway
Incidental extubation (optional)

### Potential Systems Explored

Roles of perioperative team members
Emergency airway equipment location and availability
American Society of Anesthesiologists (ASA) protocol and processes specific to the difficult airway algorithm

Learning Objectives

## Learning Objectives

1) The learner will anticipate and recognize difficult airway situations.
2) The learner will manage a difficult airway in a timely and thoughtful manner.
3) The learner will communicate with the team effectively, using crisis resource management skills.
4) The learner will review the contents and unit-specific location of the difficult airway cart and review the unit-specific tracheostomy tray contents and location (including tracheostomy tubes).

## Participant Preparation

### Pre-simulation

Review the contents of the difficult airway cart
Review the American Society of Anesthesiologists (ASA) difficult airway algorithm (website: https://www.asahq.org/For-Members/Practice-Management/Practice-Parameters.aspx)

### Pre-Brief:

Team is provided with the following information:
Please treat this scenario as if happening in your OR.
Inject medications per usual.
Cardiac monitor displays real time vital signs.

### Patient History

Joe Doe is a 25-year-old obese man with a 1.5 day history of severe abdominal pain with accompanying nausea and vomiting. He does not have diarrhea. IV fluids are infusing at 125 mL/hour. Diagnosis: Potential ruptured appendix. The OR team has been called to prepare for an open appendectomy procedure. The patient is being transported from the emergency room to the holding area for airway and anesthetic assessment.
Allergies: Seafood, Sulfa
Medications: Vitamins
Weight: 240 lb
Height: 5' 8"
Social history: Married. Construction worker. Non-smoker. Family is in the waiting room and is aware of the situation.
Past surgical history: Negative

### Baseline Vital Signs

BP 165/76, P 118, R 20, SaO2 98% on room air, sinus tachycardia with LBBB.

### Baseline Test Results

Glucose: 150
HGB: 10.7
HCT: 42
PLTS: 250,000
WBC: 13,000
Neutrophils: 77
Bands: 2
Lymphocytes: 38
Monocytes: 6.2
Eosinophils: 5.8
Basophils: 1.4
MCV: 88
MCH: 30
MCHC: 34.5
CT: Enlarged right lower quadrant appendix with questionable abscess and free air. Inflammatory changes and thickening appendix wall noted. Impression: ruptured appendix.

## Set-up

### Room

Pre-op holding area
Operating room or simulation-equipped operating room
Family waiting area

### Equipment

OR table
SimMan® or Manikin dressed in a hospital gown, with hospital ID and allergy band on
IV running (IV pump) in forearm
Open appendectomy setup (or case cart)
Back table
Mayo stand
Tracheostomy tray
Selection of tracheostomy tubes
Difficult airway cart
Anesthesia cart
Anesthesia machine equipped with oxygen, suction, and cardiac monitor
Intubation equipment (laryngoscope, GlideScope)
Cautery
Patient warming system
Sequential compression devices

### Medications (Simulated)

Antibiotics
Benzodiazepine
Anesthetic induction agent
Narcotic
Non-depolarizing agent
Depolarizing agent
Anesthesia gases

### Documentation

Electronic or paper health record
Medical record
Surgical verification process forms

## Sequence of Events

**Patient arrives in the holding area**
Anesthetic and airway assessment
OR is prepared
Surgical verification process is begun (eg, consent, site marking)
Communication with the patient and family
Communication with the OR team

**Pre-induction**
The patient arrives in the OR and is positioned and prepared for surgery.

**Induction**
Induction of anesthesia
Identification of difficult airway
Attempts to ventilate (laryngeal mask airway [LMA] or mask).

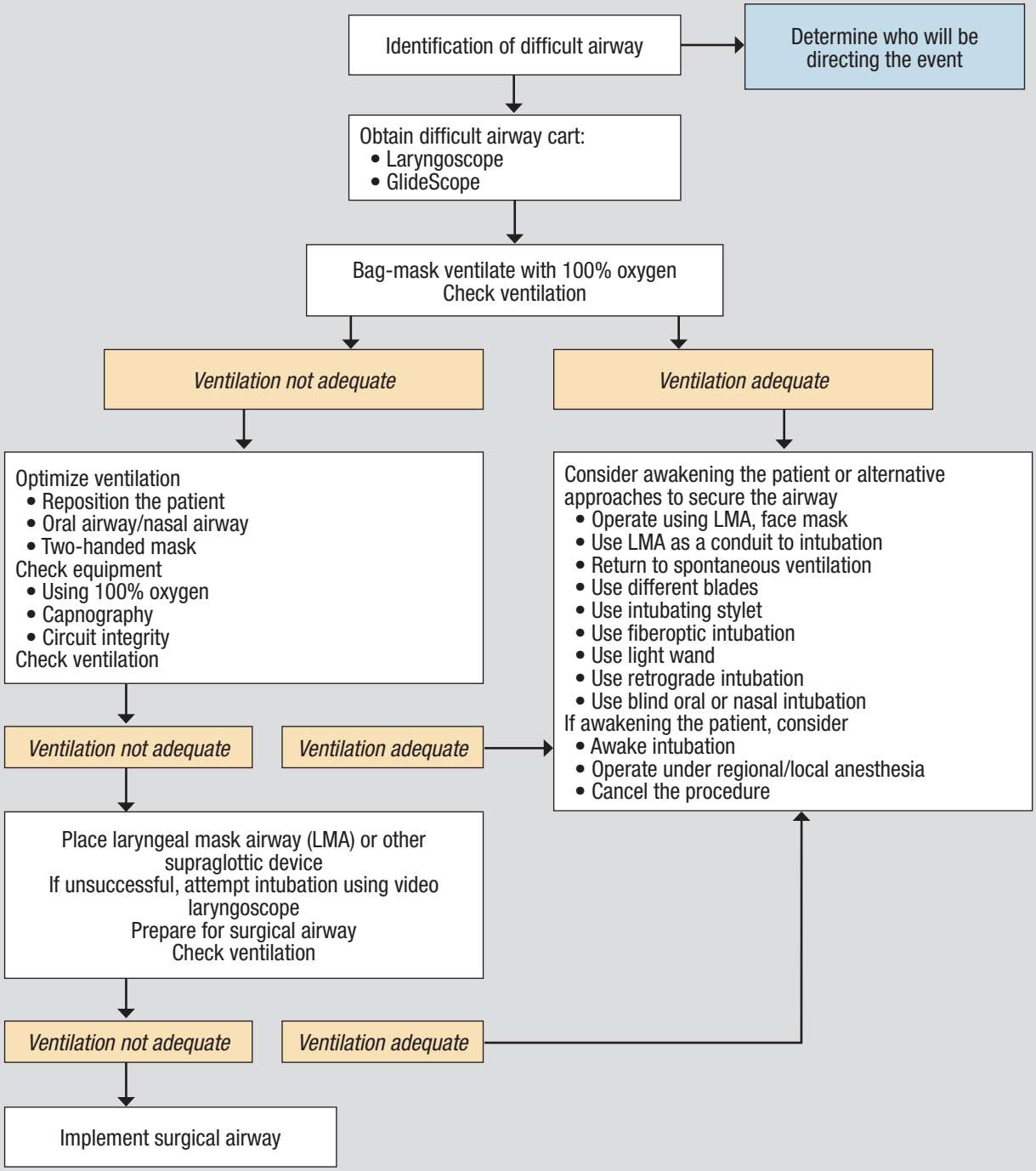
- If able to mask, the situation is non-urgent.
- When unable to mask, the situation becomes urgent.

Progress to a surgical airway scenario.
Fiberoptic intubation/GlideScope/LMA
Airway secured
Verification of airway placement

Continue with the simulation until the following action/treatments are completed:

| Responsibility | Skill met | Action/Treatment Checklist |
|---|---|---|
| OR team<br>Anesthesia providers | | Recognize difficult airway situation. |
| OR team<br>Anesthesia providers | | Manage difficult airway in a timely manner. |
| OR team<br>Anesthesia providers | | Communicate effectively using crisis resource management skills. |
| OR team | | Locate and bring difficult airway cart to the OR. |
| OR team | | Locate and bring emergency tracheostomy tray to the OR. |
| OR team | | Locate and bring a selection of tracheostomy tubes to the OR. |

## Difficult Airway Algorithm




NOTE: Difficult Airway Algorithm adapted from http://airwayeducation.homestead.com/ASA.html

## Debrief

### Standardized debrief questions:

How did the simulation experience of caring for this patient make you feel?
Did you have the knowledge and skills to meet the objectives of this simulation experience?
What gaps did you identify in your own knowledge?
If you performed the scenario again, how would you handle the situation differently?
In what ways did you perform well?
How well did the team work together?

### Debrief questions for observers:

What did the group do well?
What did the group not do well?
Is there anything else you would like to discuss?

**Review of learning objectives.**
**Review of participants, roles, and team expectations.**
**Review of communication expectations (patient, family).**
**Review the ASA algorithm for difficult airway.**

Resources

## Contents of a Difficult Airway Cart

### Fiberoptic (FO) Equipment

- Flexible FO bronchoscope (in sizes relevant to population served)
- Bullard scope
- FO light source
- Silicone spray

### Laryngoscope Equipment

- Laryngoscope handles and blades in sizes relevant to population served
- Alkaline batteries, or chargers for FO handles
- Video laryngoscope (eg, Glidescope)

### Endotracheal Tubes (ETTs) in sizes relevant to population served

- Regular ETTs (cuffed and uncuffed)
- Oral RAE® ETTs (cuffed and uncuffed)
- Nasal RAE® ETTs (cuffed and uncuffed)
- Reinforced ETTs (cuffed)
- Controlled-tip ETTs (eg, Endotrol®)
- Combitube

### Airways in sizes relevant to population served

- Regular oral
- Regular nasal
- FO intubating (eg, Ovassapian, Williams, Berman)
- Nasopharyngeal with inflatable introducer
- Supraglottic (eg, laryngeal mask airway [LMA], intubating LMA [ILMA])
- Tongue blades
- Water-soluble lubricant

### Intubating Equipment

- Intubating stylets
- McGill forceps in sizes relevant to population served
- Esophageal gastric tube airways (EGTA) in sizes relevant to population served
- Hollow ETT changers with removable luer-lock connectors (for $O_2$ insufflation)

### Suction Equipment

- Flexible and stiff suction catheters to provide oral, ETT, and LMA suction in sizes relevant to population served

### Topical Anesthesia Equipment

- Atomizers and pressurized topical anesthetic spray
- Long, cotton-tipped swabs
- Lidocaine 4%–solution
- Lidocaine 5% with phenylephrine 0.5%–topical solution
- Lidocaine 2%–viscous
- Lidocaine 5%–ointment
- Lidocaine 10%–spray
- Tetracaine 1%–solution

### Transtracheal Airway Equipment

- Transtracheal $O_2$ jet ventilator with pressure regulator, manual control valve, and luer-lock male connector
- Assorted large IV catheters
- Assorted long guidewires, epidural needles and epidural catheters (for retrograde intubation)

### Miscellaneous

- Heat-moisture exchanger (eg, Humidivent)
- Assorted facemasks with port for FO scope
- Right angled connectors (for face-masks)
- Exhaled carbon dioxide detectors (eg, Easycap)
- Tape to secure ETT
- Skin adhesive (eg, Mastisol®)

Rothrock JC, ed. *Alexander's Care of the Patient in Surgery*. 15th ed. St Louis, MO: Elsevier/Mosby; 2015:143.

## Resources

Example trach setup


Example emergency airway cart

## Resources


Example trach tray and tube storage

Example Mayo stand set up for possible tracheostomy

Resources

## Difficult Airway Pre/Post Test

1. What should the perioperative RN ensure is available, set up, and ready for use by the anesthesia provider in the operating room before any procedure?
   a. Malignant hyperthermia cart
   b. Suction
   c. Tracheostomy tray
   d. Robot

2. Where are the tracheostomy tray and tracheostomy tubes located?

3. Where is the difficult airway cart located?

4. Effective team communication is not necessary in a difficult airway situation, because the anesthesia providers manage everything.
   a. True
   b. False

5. When an anesthetized patient is in an OR, a perioperative nurse should always be immediately available to provide assistance if needed.
   a. True
   b. False

Resources

## Difficult Airway Test Answers:

1. B
2. Varies by surgical suite
3. Varies by surgical suite
4. B
5. A

***Acknowledgments***

*Lead authors: Bradley M. Haase, MS, BSN, RN-BC, CNOR, Nursing Instructor, Mayo Clinic College of Medicine/Program Director, Perioperative Nursing Program/Nursing Education Specialist in Surgical Services, Mayo Clinic Hospital, Phoenix, AZ; and Colleen K. Lindell, RN, MHSA, CNOR, Technical Services Specialist/OR Nurse, St. Paul, MN*

*Special thanks to members of the 2014 Simulation Taskforce for their assistance in the development of this simulation scenario.*