

## Airway Evaluation

| Evaluation*               | Equipment  | Interventions               |
|---------------------------|--|-----------------------------|
| Teeth                     | O <sub>2</sub> Delivery Devices (Nasal Cannula, Mask, Ambu® Bag) | Auditory/Manual Stimulation |
| Mouth Opening             | Nasopharyngeal Airways   | Reposition Head             |
| Neck Extension            | Oral Airways   | Chin Lift                   |
| Thyromental Distance      | Intubation Equipment   | Jaw Thrust                  |
| Mallampati Classification |  | Airway Adjunct Use          |
|                           |  | Assisted Ventilation        |

### LEMON Score (Difficult Intubation)

The score with a maximum of 10 points is calculated by assigning one point for each of the following LEMON criteria. A LEMON score  $\geq 5$  predicts difficult intubation.

**L** = Look externally (facial trauma, large incisors, beard or moustache, large tongue) (4 points)

**E** = Evaluate the "3-3-2 rule" (inter-incisor distance < 3-finger breadths, hyoid-mental distance < 3-finger breadths, thyroid-floor of mouth distance < 2-finger breadths) (3 points)

**M** = Mallampati (Mallampati score  $\geq 3$ ) (1 point)

**O** = Obstruction (presence of any condition like epiglottitis, peritonsillar abscess, trauma) (1 point)

**N** = Neck mobility (limited neck mobility) (1 point)

\*LEMON Score, OBESE Score

### OBESE Score (Difficult Mask Ventilation)



OBESE



BEARDED



ELDERLY



SNORES



EDENTULOUS

## The Obese Patient

| Pulmonary   | Cardiovascular  | Gastrointestinal  |
|---|---|---|
| <ul style="list-style-type: none"> <li>↑ Chest Wall Mass</li> <li>↑ CO<sub>2</sub> Production, ↓ FRC</li> <li>↓ Pulmonary Compliance</li> <li>↑ Risk of OSA*</li> <li>↑ Risk of Difficult Airway</li> <li>↑ Total O<sub>2</sub> Consumption</li> <li>↑ Work of Breathing</li> </ul> | <ul style="list-style-type: none"> <li>↑ Cardiac Output</li> <li>↑ Stroke Volume</li> <li>Systemic Hypertension</li> <li>Pulmonary Hypertension</li> <li>Right Heart Failure</li> <li>Difficulties With Monitoring</li> </ul> | <ul style="list-style-type: none"> <li>↑ Risk of Aspiration</li> <li>↑ Residual Gastric Contents</li> <li>↑ Intra-Gastric Pressure</li> <li>↑ Intra-Abdominal Pressure</li> </ul> |

\*Obstructive Sleep Apnea

## The Elderly Patient

| General/Metabolic   | Cardiac/Pulmonary   |
|---|---|
| <ul style="list-style-type: none"> <li>↓ Blood Volume (~25 percent)</li> <li>↑ Risk of Aspiration</li> <li>↓ Glomerular Filtration Rate</li> <li>↓ Metabolic Rate</li> <li>↑ Risk of Hypothermia</li> <li>↓ Albumin</li> <li>↑ Unbound Drug Concentration</li> <li>↓ Enzyme Activity</li> <li>↑ Sensitivity to CNS Depressants</li> <li>↑ Parasympathetic Tone</li> </ul> | <ul style="list-style-type: none"> <li>↓ Max/Resting HR</li> <li>↑ Risk of Coronary Artery Disease</li> <li>↑ Dysrhythmias</li> <li>↑ Chest Stiffness</li> <li>↓ Muscle Strength</li> <li>↓ Response to Hypoxia, Hypercarbia</li> </ul> |

↓ Drug Doses 30 to 50 Percent

## Pharmacology

| DRUG         | DOSE                 | ONSET      | PEAK EFFECT | DURATION   |
|--------------|----------------------|------------|-------------|------------|
| Fentanyl     | 25-50 mcg IV         | 3-5 min    | 5-15 min    | 30-180 min |
| Midazolam    | 0.5-2 mg IV          | 1-2 min    | 1-2 min     | 20-40 min  |
| Naloxone*    | 0.1-0.2 mg IV***     | 1-2 min*** | 5-15 min    | 30-45 min  |
| Flumazenil** | 0.2 mg IV (Max 1 mg) | 1-2 min    | 6-10 min    | 45-60 min  |

\*Use with care in patients on chronic opioids

\*\*May precipitate seizures

\*\*\*Naloxone may be given IM, 0.4 mg IM with onset 2-5 min

## Continuum of Sedation

|                           | Minimal Sedation | Moderate Sedation                                  | Deep Sedation  | General Anesthesia    |
|---------------------------|------------------|--|--|-----------------------|
| Response (to Stimulation) | ↔*               | Purposeful* Response to Verbal/Tactile Stimulation | Purposeful** Response to Tactile/Painful Stimulation | Unarousable           |
| Airway                    | ↔                | No Intervention Needed                             | Intervention Often Required                          | Intervention Required |
| Spontaneous Ventilation   | ↔                | Adequate   | Possibly Inadequate                                  | Inadequate            |
| Vital Signs               | ↔                | ↔  | ↔  | May be Impaired       |

\*↔ Indicates normal or minimal change from baseline

\*\*Localization to pain does not qualify as purposeful response

## High-Risk Patients

- > 70 Years
- BMI > 35 kg/m<sup>2</sup>
- Obstructive Sleep Apnea
- ASA Risk Class ≥ 3
- Difficult Airway
- Chronic Opioid Use?
- Drug/ETOH Abuse

## Monitoring: Sedation Scales

### Richmond Agitation Sedation Scale

### Ramsay Scale

| Sedation Level | Description  | Sedation Level | Description                              |
|----------------|--|----------------|--|
| 4              | Combative, Dangerous to Staff                        | 1              | Anxious, Agitated                        |
| 3              | Aggressive, Pulling at Lines                         | 2              | Cooperative, Oriented                    |
| 2              | Frequent Nonpurposeful Movement                      | 3              | Responds to Verbal Command Only          |
| 1              | Anxious, Apprehensive                                | 4              | Asleep, Responds to Light Stimulation    |
| 0              | Alert, Calm  | 5              | Asleep, No Response to Light Stimulation |
| -1             | Awakens to Voice for > 10 Sec                        | 6              | Unresponsive                             |
| -2             | Sedated, Awakens to Voice for < 10 Sec               |                |  |
| -3             | Moderate Sedation, Movement to Voice, No Eye Contact |                |  |
| -4             | Deep Sedation, No Response to Voice                  |                |  |
| -5             | Unarousable  |                |  |

## Pre-Procedural Evaluation

| MEDICAL HISTORY   | BASELINE VITAL SIGNS   | PHYSICAL EXAM   |
|---|--|---|
| <ul style="list-style-type: none"> <li>• Medications</li> <li>• Allergies</li> <li>• History of Sedation/Anesthesia Difficulties</li> <li>• Organ System Abnormalities</li> <li>• Tobacco, Alcohol, Other Drug Use</li> </ul> | <ul style="list-style-type: none"> <li>• Blood Pressure</li> <li>• Heart Rate</li> <li>• SpO<sub>2</sub></li> <li>• Height</li> <li>• Weight</li> <li>• Body Mass Index</li> </ul> | <ul style="list-style-type: none"> <li>• Body Habitus</li> <li>• Airway</li> <li>• Mental Status</li> <li>• Pre-Existing Neurological Deficits</li> <li>• Limitations to Positioning</li> <li>• Heart and Lung Exam</li> <li>• Other Relevant to Procedure</li> </ul> |