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| **Case Title**  | Ketamine – induced Laryngospasm |
| **Scenario Name** | Ketamine – induced Laryngospasm |

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| **Learning Objectives -** [**Use action words**](http://ubccpd.ca/sites/ubccpd.ca/files/Accreditation_Learning%20Objectives_%20Verbs.pdf) |
| **Knowledge:**1. Review the pre-procedural patient assessment (i.e. ASA class, NPO status, underlying medical conditions)
2. Review dosing for ketamine (IV vs. IM)
3. Review other adverse effects of ketamine
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| **Skills:**1. Identify and manage laryngospasm induced by ketamine
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| **Attitude/Behaviours:**1. Demonstrate Team skills
2. Demonstrate Situational awareness
3. Demonstrate Graded Assertiveness
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| **Scenario Environment** |
| **Location** | ED |
| **Monitors** | Bedside |
| **Props/Equipment** | Splint and tensor |
| **Make-up/Moulage** |  |
| **Potential Distractors** |  |

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| **Case Introduction:** |
| 8 yr old boy who had a FOOSH on left hand, midshaft radius/ulna fracture requiring reduction under procedural sedation. Brought from school by EMS and EMS placed an IV in the right arm. Has a history of mild intermittent asthma (viral-induced). No current meds, no allergies, no previous sedations/GA (no previous anesthetic reactions). No family history of anesthetic reactions. Had a URTI 3 weeks ago, required Ventolin for 1 week (none over past 2 weeks). Has not received any analgesics. |

| **Patient Parameters** | **Effective Management** | **Notes** |
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| **Phase 1: Initial Presentation****Condition:** Pt cooperative. Mild discomfort. Deformed left upper extremity in splint.**Initial Assessment*** **Heart Rhythm:** Sinus
* **HR:** 110
* **BP:** 110/70
* **RR:** 20
* **SP02:** 99% RA
* **T:** 36.5
* **CNS:** GCS 15. Mild-mod discomfort.
* **Chest:** Clear
* **CVS:** cap refill ,<2 secs, pulses palpable, normal heart sounds
* **HEENT:** unremarkable, normal anatomy
* **MSK:** clinically deformed left upper extremity, in a splint
* **Weight:** 25 kg
 | 1. **Take a focused history** (see Notes column)
2. **Medical Management**
* Check VS, chest assessment
* Assess airway – establish Mallampati/ASA score
* Apply monitors – identify rhythm
* IV access
* Identifies need for RT and nursing staff
* Prepares procedural sedation checklist and equipment
* Administers ketamine +/- atropine (ketamine 1-1.5 mg/kg over 1 minute, atropine 0.01-0.02 mg/kg push)
 | 1. **Focused history**
* Anesthetic history

**PMHx*** No past anesthetics, no family hx of anesthetic reactions
* NPO x4 hours

**Meds*** No current meds
* Ventolin x1 week for URTI (not used for last 2 weeks)

**Allergies*** NKA
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| **Phase 2: Laryngospasm****Condition:** Patient has received Ketamine and starts having laryngospasm**Physical Examination*** **Heart Rhythm:** ST
* **HR:** 160
* **BP:** 130/80
* **RR:** 20
* **SP02:** gradually dropping to 80’s on RA
* **T:** 36.5
* **CNS:** sedated, eyes closed but open to stimulation
* **Chest:** decreased chest rise, mild stridor
* **CVS:** cap refill , <2secs, pulses palpable, normal heart sounds
 | 1. **Patient Reassessment** (see Notes column)
2. **Medical Management**
* Recognizes change in pt and need for intervention

**A*** Repositions patient airway
* Suctions airway
* Considers oral or nasal airway

**B*** Asks for BVM ventilation
* Considers paralytic and intubation as next step
 | 1. **Patient Reassessment**

**Airway*** Partial upper airway obstruction 2° to laryngospasm
* Stridor audible

**Breathing** * Auscultates chest – clear chest aside from obvious stridor
* Recognizes change in O2 sat

**Circulation*** Increased HR & BP
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| **Phase 3: Persistant Laryngospasm****Condition:** patient continues to have laryngospasm. Not responsive to airway repositioning and BVM ventilation**Physical Examination*** **Heart Rhythm:** ST
* **HR:** 160
* **BP:** 130/80
* **RR:** 30
* **SP02:** continues to drop to 70’s on 100% O2
* **T:** 36.5
* **CNS:** sedated, eyes closed but open to stimulation
* **Chest:** chest moving but no movement of air, no stridor
* **CVS:** cap refill ,<2secs, pulses palpable, normal heart sounds
 | 1. **Patient Reassessment** (see Notes column)
2. **Medical Management**
* Prepares for intubation due to persistent laryngospasm
* Orders paralytic (either succinylcholine 1.5-2mg/kg or rocuronium 1 mg/kg)
* Prepares equipment and ET
* 100% O2
* Pre-oxygenates, NP placed if not already
* continues BVM
* Intubates with appropriate size tube (5.5 cuffed or 6 uncuffed)
* Confirms tube position – auscultation, position at the lips, chest movement, CXR, cap gas
 | 1. **Patient Reassessment**

**Airway*** Complete upper airway obstruction 2o to laryngospasm
* Stridor no longer audible
* Recognized risk to airway due to laryngospasm

**Breathing** * Auscultates chest – no audible breath sounds
* Recognizes change in 02 stats

**Circulation*** No changes
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| **Phase 4: Airway managemement****Condition:** Intubated and Ventilated**Physical Examination*** **Heart Rhythm:** ST
* **HR:** 120
* **BP:** 130/80
* **RR:** 20-25
* **SP02:** 99-100% on 100% O2
* **T:** 36.5
* **CNS:** sedated, paralyzed
* **Chest:** chest moving symmetrically with ventilation
* **CVS: :** cap refill , <2secs, pulses palpable, normal heart sounds
 | 1. **Patient Reassessment** (see Notes column)
2. **Medical Management**
* Consults ICU

**Consequences of ineffective management** | 1. **Patient Reassessment**

**Airway*** Intubated

**Breathing** * Clear a/e with ventilation

**Circulation*** Normal
 |

**Insert more lines if more phases required.**

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| **Expected Patient Management** | **Debriefing Points** |
| 1. **Student**
2. **R1**
3. **Senior IM resident**
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**References:**