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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 | |
| **Skills:**   1. Identify and manage laryngospasm induced by ketamine | |
| **Attitude/Behaviours:**   1. Demonstrate Team skills 2. Demonstrate Situational awareness 3. Demonstrate Graded Assertiveness | |
| **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 |
| **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 |
| **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 |
| **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** |  |

**References:**