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| **Case Title** | Ethylene Glycol Intoxication |
| **Scenario Name** | Ethylene Glycol Intoxication |

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| **Learning Objectives -** [**Use action words**](http://ubccpd.ca/sites/ubccpd.ca/files/Accreditation_Learning%20Objectives_%20Verbs.pdf) | |
| **Knowledge:**   1. Identify symptoms and signs of ethylene glycol intoxication 2. Prescribe indication of antidote and hemodialysis. | |
| **Skills:**   1. Demonstrate how to utilize anion gap and osmolar gap in regard to time of ingestion 2. Utilize the resources & anticipate complications | |
| **Attitude/Behaviours:**   1. Demonstrate Team skills 2. Demonstrate Situational awareness 3. Demonstrate Graded Assertiveness | |
| **Scenario Environment** | |
| **Location** | ED |
| **Monitors** | ED bedside |
| **Props/Equipment** | Cardiopulmonary monitor  ECG, CXR, lab results |
| **Make-up/Moulage** |  |
| **Potential Distractors** |  |

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| **Case Introduction:** |
| 5 yr old boy was helping his dad to do some minor repairs and maintenance on family car. He drank from what he thought was cordial container, inadvertently ingesting up to 50ml of radiator coolant containing 95% ethylene glycol. It took 3 hours to arrive to the ER |

| **Patient Parameters** | **Effective Management** | **Notes** |
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| **Phase 1: Presentation**  **Condition:** vomiting and seems confused  **Initial Assessment**   * **Heart Rhythm:** ST * **HR:** 140 * **BP:** * **RR:** 34 * **SP02:** 98% RA * **T:** 35.5 * **CNS:** GCS 13 (spont eye opening, delirious but seems to answer some questions, localizes pain). Hyper-reflexia * **Chest:** clear * **CVS:** cap refill 2 secs, pulses palpable * **GI:** Abd soft * **Weight:** 20 kg | 1. **Take a focused history** (see Notes column) 2. **Medical Management**   **Airway**   * Assesses airway and talks to the patient * Clears / suctions the airway as needed. * Treat the seizure & R/O hypoglycemia or hypocalcemia   **Breathing:**   * Check oxygen saturation * Apply monitors * Auscultate chest * Checks for adequacy of chest rise * Applies oxygen by simple mask   **Circulation**   * Monitors (if not done yet) * Check pulse, cap refill, BP * Identify the rhythm : sinus tachycardia * Checks first IV line, asks for second large bore IV * Asks for bolus 20cc/kg NS * Orders blood work including:   + VBG, Serum lyte, serum osmolality, Alcohol level.   **Other**   * Do a Glucocheck. * Contact poison center. * Applies warm blankets | 1. **Focused history**  * Upon EMT arrival at scene, HR 120 RR 40, BP 116/76, O2 sat 95% * Initially delirious, screaming, GCS 14/15 * IV x 1 antecubital * Given oral ethanol but vomited. * Lab work done at referring hospital * Given NS 200 mL. * Transport time 2 hrs   **PMHx**   * Healthy   **Meds**   * Nil   **Allergies**   * NKA |
| **Phase 2: Seizure**  **Condition:** **:** condition has worsened, GCS fluctuation 8 to 10/15. Developed brief seizure  **Physical Examination**   * **Heart Rhythm:** ST * **HR:** 170 * **BP:** 90/50 * **RR:** 40 * **SP02:** 100% with O2 by mask * **T:** 36 * **CNS:** GCS 10 (eye opening to verbal, delirious but seems to answer some questions, localizes pain) *GTC seizure for 2 min.* * **CVS:** cap refill 3 secs, pulses palpable | 1. **Patient Reassessment** (see Notes column) 2. **Medical Management**  * Fomipazole 15 mg/kg I.V * Correct acidosis * Stat consultation : Nephrology * ICU and Poison center for hemodialysis. * Orders repeat blood test with alcohol level ,AG, OG ,VBG, Ca & urine for calcium oxalate crystal. * Consider co-factor (thiamine ..) * Consider Securing airway. * Inserts foley and monitor U.O.P | 1. **Patient Reassessment**   **Airway**   * Drowsy with gradual decrease in LOC * Continues to protect his airway spontaneously, but occasionally needs repositioning.   **Breathing**   * Auscultates chest * Continues to give oxygen and monitor sats   **Circulation**   * Reassess HR, pulses, BP, Cap refill * Asks for second bolus of 20 cc/kg of NS through second IV * Orders blood (not **arrived yet)** |
| **Phase 3: Rapid Deterioration**  **Condition:** rapid deterioration, hypotension, decreasing LOC. Eyes closed now, GCS < 8/15  **Physical Examination**   * **Heart Rhythm:** ST * **HR:** 170 * **BP:** 88-48 * **RR:** 40 * **SP02:** 92% with O2 by mask * **T:** 36 * **CNS:** 7 (eyes closed 1, no response to painful stimuli 3, withdraws to pain 4) no longer moaning in pain, does not answer to questions, responds to painful stimuli * **Chest:** cap refill 3 secs, pulses palpable | 1. **Patient Reassessment** (see Notes column) 2. **Medical Management**  * Prepare for intubation due to decreasing LOC   + Orders drugs for RSI   + Pre oxygenates   + Prepares equipment and ET CO2   + Atropine 0.02 mg/kg   + Etomidate 0.3 mg/kg   + Succs 1.5 – 2 mg/kg   + Checks tube placement post intubation, orders CXR * ICU staff & Nephrologist arrive – will take patient to PICU * Consider Thiamine & Pyridoxine * Discuss need for Fomepizole during dialysis | 1. **Patient Reassessment**   **Airway**   * Prepare for intubation due to decreasing LOC   **Breathing**   * Assesses chest pre/post intubation * Monitors oxygen saturation   **Circulation**   * BP remained stable. |

**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:**

**LABS – click** [here](https://extranet.interiorhealth.ca/IHUBCFaculty/Diagnostics/Forms/AllItems.aspx?RootFolder=%25252FIHUBCFaculty%25252FDiagnostics%25252FLabs&View=%25257bFD97E2FE-FD01-433F-B9CB-D75A4195924E%25257d) **OR fill out below**

LABORATORY \*LIVE\* Lab Summary Report

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| **Test** | **DATE/TIME here** | **Flag** (H or L) | **Reference** |
| **CBC** | | | |
| WBC | **12.5** | **H** | 3.5 – 10.8 10^9/L |
| Hgb | **100** | **L** | 130 – 170 g/L |
| Platelets | 400 |  | 150 – 400 10^9/L |
| **Chemistry** | | | |
| Na | 140 |  | 137 – 145 mmol/L |
| K | 5 |  | 3.5 – 5.0 mmol/L |
| Urea | **6.2** | **H** | 2.5 – 6.1 mmol/L |
| Creat | **46** | **L** | 62 – 106 umol/L |
| Glucose - Random | 7.5 |  | 3.0 – 11.0 mmol/L |
| **Coags** |  |  |  |
| INR | 1.2 |  | 0.9 – 1.2 |
| PTT | 39 |  | 28 – 38 s |
| **ABGs** | | | |
| **Arterial** | | | |
| pH | **7.24** | **L** | 7.35- 7.45 |
| pCO2 | 40 |  | 35 – 45 mmHg |
| PO2 | **56** | **L** | 80-100 mmHg |
| BE | **-10** |  | -2.0 to +2.0 mmol/L |
| HCO3 | **18** | **L** | 22 – 26 mmol/L |
| O2 Sat |  |  | 95 – 100% |