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| **Case Title** | Adrenal Insufficiency |
| **Scenario Name** | Adrenal Crsis |

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| **Learning Objectives -** [**Use action words**](http://ubccpd.ca/sites/ubccpd.ca/files/Accreditation_Learning%20Objectives_%20Verbs.pdf) | |
| **Knowledge:**   1. Recognize the possibility of adrenal crisis and/or ACTH deficiency in an emergency patient 2. Initiate a pre-treatment diagnostic workup of possible cortisol/aldosterone/ACTH deficiency 3. Initiate replacement hormone therapy in the patient with suspected adrenal crisis and/or ACTH deficiency 4. Consider the possibility of associated hormone deficiencies in the patient with suspected adrenal crisis and/or ACTH deficiency 5. Consider the possibility of associated or underlying pathophysiology in the patient with suspected adrenal crisis and/or ACTH deficiency | |
| **Skills:**   1. Manage hypotension, hyperkalemia and hypoglycemia in the patient with suspected adrenal crisis and/or ACTH deficiency | |
| **Attitude/Behaviours:**   1. Demonstrate Team skills 2. Demonstrate Situational awareness 3. Demonstrate Graded Assertiveness | |
| **Scenario Environment** | |
| **Location** |  |
| **Monitors** | ECG |
| **Props/Equipment** |  |
| **Make-up/Moulage** |  |
| **Potential Distractors** |  |

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| **Case Introduction:** |
| 10 year old boy who has been feeling unwell for the past few weeks. Vomitting x8 today. Become drowsy, and started twitching. Brought to ER by parents. |

| **Patient Parameters** | **Effective Management** | **Notes** |
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| **Phase 1: Initial Presentation**  **Condition:** Looks unwell, toxic  **Initial Assessment**   * **Heart Rhythm:** ST, peaked T waves, wide QRS, absent P waves, occasional PVCs (ECG #1) * **HR:** 150 * **BP:** 70/40 * **RR:** 36 * **SP02:** 90% RA * **T:** 39.5 * **Glucose:** 2.1 * **Chest:** crackles * **CNS:** GCS 10, difficult to arouse * **CVS:** gallop rhytm, soft murmur, cap refill 4 sec, weak pulses * **GI:** perfuse vomitting * **Integ:** yellowish skin (hyperpigmented) * **Weight:** 25 kg (5th %ile), appears thin | 1. **Take a focused history** (see notes) 2. **Medical Management**  * Apply monitors * Check pulse, cap refill, BP, O2 sats * Identify rhytm (ECG #1), hypotension * Apply O2 by mask * Auscultate chest, identify crackles * Insert IVx2 * Give NS bolus 20 cc/kg x1, repeat PRN * Open airway – head tild, chin lift, jaw thrust prn * Order CXR * Have suction available * Prepare for possible intubation * Check cap glucose * Give D50W 0.4 or D10W 2 cc/kg bolus IV * Order BW (see notes) * U/A, UC&S plus sample on hold * Antipyretic for fever * Talk to patient and parents | 1. **Take a focused history**  * Previously healthy child * Unwell for past few weeks, loosing weight * Nauseated and vomiting for a few days, seen by GP, Dx with GI flu * Began vomiting profusely today, some diarrhea * Difficult to awaken after nap this afternoon, seemped to have twitchy fingers and eyelids, brought to ER   **Order BW**   * CBC, electrolytes, blood gas, lactate, renal function, coag, blood culture, toxicology, extra serum/plasma on hold |
| **Phase 2: Slight Improvement**  **Condition:** Some improvement, but still looks unwell  **Physical Examination**   * **Heart Rhythm:** sinus tachycardia, peaked T waves, widened QRS, absent P waves (ECG #1) * **HR:** 140 * **BP:** 90/50 * **RR:** 32 * **SP02:** 94% on O2 * **T:** 38.9 * **Glucose:** 4.2 * **Chest:** clear * **CNS:** GCS 12, less drowsy and difficult to arouse * **CVS:** gallop rhythm, soft murmur, cap refill 3 sec, pulses improved | 1. **Medical Management**  * Review lab results * Identify metabolic acidosis: lactic acidosis + normal-AG acidosis * Identify diagnosis of glucocorticoid and mineralocorticoid deficiencies (1° adrenal failure,NOT hypothalamic-pituitary ACTH deficiency) * Re-order BW (see notes) * Order stress dose of glucocorticoid: hydrocortisone sodium succinate (Solu‑Cortef®) 50–75 mg/m2 IV (methylprednisolone and dexamethasone less desirable options) * Identify serious hyperkalemia and institute immediate therapy: * Ca gluconate / Ca chloride * NaHCO3 * Ventolin nebs * Glucose bolus followed by insulin infusion (careful!) * Continue O2 – Prepare BVM * Maintain airway – jaw thrust, chin lift, head tilt PRN * Have suction nearby * Prepare equipment for intubation * Re-assess need for another NS bolus * Identify ECG changes (ECG #1) | **Lab Results back – see lab results sheet**  **Re-order BW**   * Electrolytes, glucose, cortisol * Repeat cap glucose |
| **Phase 3:Improvement**  **Condition:** appears improved  **Physical Examination**   * **Heart Rhythm:** SR (ECG #2) * **HR:** 100 * **BP:** 100/60 * **RR:** 28 * **SP02:** 95% on O2 * **T:** 38.2 * **Chest:** clear * **CNS:** GCS 13, more alert * **CVS:** gallop gone, normal heart sounds and pulses, capillary refill normal * **CNS:** more alert | 1. **Medical Management**  * Review repeat lab results (see notes) * Order repeat electrolytes q 1–2 h until K+ stable * Order repeat capillary glucose q 1–2 h until stable * Order ongoing glucocorticoid coverage: hydrocortisone sodium succinate (Solu‑Cortef®) 50–75 mg/m2/d divided QID * Order ongoing mineralocorticoid coverage: fludrocortisone (Florinef®) 0.05–0.1 mg PO BID when able to tolerate PO * Assess need for acute or chronic treatment (Kayexelate) for elevated K+ * Continue antibiotics for pneumonia * Continue antipyretics * Admit for observation, diagnostic w/u * Consult Endocrine service * Reassess breathing/airway * Continue to monitor O2 sat * Identfiy improvement incirculation and cardiac rhytm * Reassess need for another NS fluid bolus * Run D5NS @ 1.5-2x maintenance | **Lab results back – see lab results sheet** |

**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:**

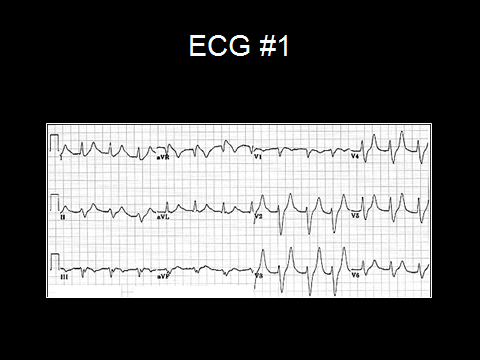
**LABS – click** [here](https://extranet.interiorhealth.ca/IHUBCFaculty/Diagnostics/Forms/AllItems.aspx?RootFolder=%25252FIHUBCFaculty%25252FDiagnostics%25252FLabs&View=%25257bFD97E2FE-FD01-433F-B9CB-D75A4195924E%25257d) **OR fill out below**

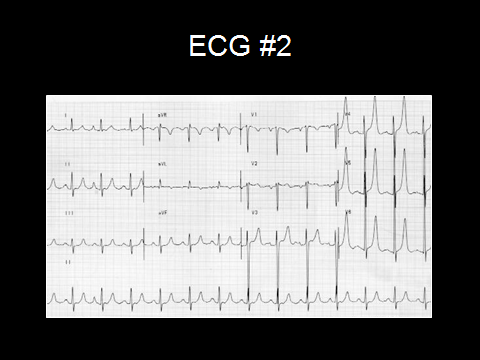
RUN DATE: Today LABORATORY \*LIVE\* Lab Summary Report

LOCATION

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| Name: | | | | | | Age/Sex: | | | | | | | |
| Acct#: | | | Unit#: | | | | | | Status: Admitted | | | | Location: SIM |
| Reg: | | | | | Disch: | | | | | | | Code status - | |
| COMPLETE BLOOD COUNT | | | | | | | | | | | | | |
| Date |  | | |  | | | |  | | |  | |  |
| Time |  | | |  | | | |  | | | Reference | | Units |
| WBC |  |  | |  | | | H |  | |  | (3.5-10.8) | | 10^9/L |
| Toxic changes seen |  |  | |  | | |  |  | |  | (4.3-5.7) | | 10^12/l |
| Hgb |  |  | |  | | | L |  | |  | (130-170) | | g/L |
| MCV |  |  | |  | | | L |  | |  | (0.37-0.47) | | L/L |
| Platelets |  |  | |  | | | H |  | |  | (150-400) | | 10^9/L |
| INR |  |  | |  | | | H |  | |  | 0.9-1.2 | |  |
| D-Dimer |  |  | |  | | |  |  | |  |  | |  |
| PTT |  |  | |  | | |  |  | |  |  | |  |
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| CHEMISTRY | | | | | | | | | | | | | |
| ADMISSION |  | | |  | | | |  | | |  | |  |
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| Glucose-Random |  |  | |  | | | H |  | |  | (3.0-11.0) | | mmol/L |
| Na |  |  | |  | | | L |  | |  | (137-145) | | mmol/L |
| K |  |  | |  | | | H |  | |  | (3.5-5.0) | | mmol/L |
| Cl |  |  | |  | | |  |  | |  | (98-107) | | mmol/L |
| HCO3 |  |  | |  | | | L |  | |  | (22-26) | | mmol/L |
| Urea |  | H | |  | | | H |  | |  | (2.5-6.1) | | mmol/L |
| Creat |  |  | |  | | | H |  | |  | (62-106) | | mmol/L |
| GFR Est |  |  | |  | | | L |  | |  | (> 60) | | ml/min |
| C Reactive Protein |  |  | |  | | | H |  | |  | <10 | |  |
| Lactic Acid |  |  | |  | | | H |  | |  | <2.0 | | mmol/L |
| ARTERIAL BLOOD GAS  pH - , PC02 – , p02 – , HC03 – , O2 Sat - % | | | | | | | | | | | | | |

**EKGs – click** [here](https://extranet.interiorhealth.ca/IHUBCFaculty/Diagnostics/Forms/AllItems.aspx?RootFolder=%25252FIHUBCFaculty%25252FDiagnostics%25252FECGs&View=%25257bFD97E2FE-FD01-433F-B9CB-D75A4195924E%25257d) **or paste**

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