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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
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| **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** |
| --- | --- | --- |
| **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**
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**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

|  |  |
| --- | --- |
| 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 |  |  |  |  |  |
|  |  |  |  |  |  |
| 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 GASpH - , 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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