PEDIATRICS

DOCTOR’S ORDERES

COLLECTION OF GUIDELINES THAT HELP YOU TO REMEMBER THE ORDERS DURING ONCALLS

COLLECTED BY
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2016
- ACUTE CHEST SYNDROME (SICKLE CELL DISEASE)
- ADRENAL CRISES (ACUTE ADRENAL INSUFFICIENCY)
- ALKALI INGESTION
- ALTE (APPARENT LIFE THREATENING EVENT)
- ANAEMIA
- ANAPHYLAXIS
- ASPIRATION PNEUMONIA
- BA (BRONCHIAL ASTHMA)
- BETABLOCKER INGESTION
- BLOODY STOOL
- BPN (BRONCHOPNEUMONIA)
- BRONCHIOLITIS
- BURN
- CARDIOGENIC SHOCK
- CELLULITIS
- CONGESTIVE HEART FAILURE (CHF)
- CROUP
- DIGOXIN TOXICITY (DIGITALIS TOXICITY)
- DKA (DIABETIC KETOACIDOSIS)
- DRUG INGESTION
- EPISTAXIS
- FEBRILE CONVULSION
- FEBRILE NEUTROPENIA
- FEVER TO R/O SEPSIS
- GASTROENTERITIS (GE)
- HEMATURIA
- HSP (HENOCH-SCHONLEIN PURPURA)
- HYDROCARBON INGESTION
- HYPERAMMONEMIA & METABOLIC CRISIS
- HYPERKALEMIA
- HYPERNATREMIA
- HYPERTENSIVE CRISIS
- HYPOCALCEMIA
- HYPOGLYCEMIA
- HYponatremia
- IBUPROFEN TOXICITY
- IDIOPATHIC THROMBOCYTOPENIC PURPURA (ITP)
- INCREASED INTRACRANIAL PRESSURE (ICP)
- IRON TOXICITY
- KAWASAKI
- LYMPHADENOPATHY
- MASTOIDITIS
- Meningitis
- NEAR DROWNING (SUBMERSION INJURY)
- NEPHROTIC SYNDROME
- NNJ (NEONATAL JAUNDICE
- ORBITAL CELLULITIS
- ORGANOPHOSPHATE & CARBAMATE POISONING
- PARACETAMOL TOXICITY (ACETAMENOPHIN)
- PERIORBITAL CELLULITIS
- PLEURAL EFFUSION
- RAPID SEQUENCE INTUBATION (RSI)
- RHEUMATIC FEVER
- SALICYLATE TOXICITY
- SCORPION STING
- SEPTIC SHOCK
- SICKLE CELL DISEASE WITH FEVER
- SICKLE CELL DISEASE WITH VASOOCCLUSIVE CRISIS
- SNAKE BITE
- STATUS EPILEPTICUS
- SUPRAVENTRICULAR TACHYCARDIA (SVT)
- TRICYCLIC ANTIDEPRESSANT OVERDOSE
- URINARY TRACT INFECTION (UTI)
**MEDICATION'S DOSES**

- ACYCLOVIR
- ADENOSINE
- ALBUMIN, HUMAN
- AMIKACIN
- AMOXICILLIN
- AMPICILLIN
- ATROPINE (ANTICHOLINERGIC)
- AUGMENTIN
- AZITHROMYCIN
- BACTRIM (Sulfamethoxazole/Trimethoprim)
- CALCIUM GLUCONATE
- CEFEPIME
- CEFOTAXIME
- CEFTAZIDIME
- CEFTRIAXONE
- CEFURUXIME
- CHARCOAL ACTIVATED
- CLARYTHROMICIN
- CLINDAMYCIN
- CRYOPRECIPITATE
- DEXAMETHASONE
- DIAZEPAM (VALIUM)
- DICLOxacillin
- DIPHENHYDAMINE (ANTIHISTAMINE)
- DOBUTAMINE
- DOPAMINE
- EPINEPHINE (ADRENALIN)
- ERYTHROMYCIN
- FENTANYL
- FLAGYL (METRONIDAZOLE)
- FLEET ENEMA
- FRESH FROZEN PLAZMA (FFP)
- GENTAMICIN
- GLYCERIN (OSMOTIC LAXATIVE)
- HYDRALAZINE
- IBUPROFEN
- IVIG (IV IMMUNE GLOBULIN)
- KCL (POTASSIUM CHLORIDE)
- KETAMINE
- LACTULOSE (DUPHLAC)
- LASIX (FURESMIDE)
- LORAZEPAM
- MAGESIUM SULFATE (MgSo4)
- Mannitol
- MEBENDAZOLE (VERMOX)
- MEROPENUM
- METHYLPREDNISOLONE
- METOCLOPRAMIDE (ANTIEMETIC)
- MIDAZOLAM
- MOPHINE
- MYCOSTATIN (NYSTATIN)
- OMEPRAZOLE
- OXACILLIN
- PACKED RBC'S
- PARACETAMOL (ACETAMENOPHIN)
- PHENOBARBITONE (PHENOBARBITAL)
- PHENYTOIN
- PLATELET TRANSFUSION
- PREDNISONE
- RANITIDINE
- SODIUM BICARBONATE (NaHCO3)
- TAMIFLUE
- TAZOCIN (Piperacillin/tazobactam)
- VANCOMYCIN
- ZOFRAN (OSENSETRON)
ADRENAL CRISES (ACUTE ADRENAL INSUFFICIENCY)

Definition: development of a new pulmonary infiltrate accompanied by symptoms (fever, chest pain, tachypnea, retractions, cough, hypoxemia, and wheezing)

Investigations:
- CBC + diff + retics, U&E + LFT
- CXR
- Blood gas
- Blood grouping and cross match
- If febrile take blood, urine, stool, sputum c/s
- Viral screen
- Hgb electrophoresis

Treatment:
- IVF for dehydration
  - Over hydration can cause pulmonary edema or heart failure
  - Lasix if fluid overload suspected
  - Daily weight and input/output chart
- Control pain (paracetamol, NSAID, morphine)
- Bronchodilator if there is wheezing
- Cefotaxime or ceftriaxone (change to clindamycin if the patient is allergic to cephalosporin)
- Consider azithromycin or erythromycin
- Add vancomycin if severely ill patient or pleural effusion is present
- Simple transfusion 10-15 ml/kg
  - To reach Hgb of 11 g/dl
  - To reach Hct of 30%
- Exchange transfusion
  - To decrease level of HbS <30%
  - Not exceed Hgb level >10 g/dl

Instructions
- Keep SPO2 >92%
- Consider intubation if needed
- Incentive spirometry Q2h (to reduce atelactasis)
- Thoracocentesis if significant pleural effusion
- PICU consultation

ALKALI INGESTION

Alkaline ingestion: Most ingestions by children are accidental and the amounts ingested tend to be small

Esophageal burns: the most serious injuries and leads to chronic complications associated with toxic ingestions

Household cleaning products: the most common caustic ingestion which are strong lyes that contain sodium and potassium hydroxides

pH of >11.5: is likely to cause significant GI ulceration
**Management:**
- **ABC**
  - Check for symptoms of nausea, vomiting, drooling, refuse to eat/drink, stridor, and respiratory distress
  - Activated charcoal is contraindicated
  - If there is respiratory distress do CXR
  - If there is seizure give lorazepam 0.05 mg/kg (Max 2mg)
- Call toxicology center
- If asymptomatic you may dilute with fluid by 10 ml/kg of water (Max 250ml)
- If no symptoms after 4 hrs and able to eat and drink the patient can be discharge safely
- If any symptoms, consult the surgeons for possible esophagoscopy

**ALTE (APPARENT LIFE THREATENING EVENT)**

ALTE: frightening event include Apnea, cyanosis, seizure, unresponsiveness, floppiness and chocking

**Patients with ALTE should be admitted to PICU**

**Investigations**
- CBC+diff, U&E, ESR, CRP, and RBS
- Blood c/s
- Urine analysis and c/s
- Urine dipstick
- CSF analysis and c/s
- CXR
- Blood gas
- CT brain if needed
- ECHO
- ECG (ex. Long QT interval, SVT)
- RSV screen, nasopharyngeal swab for pertusses and virology
- Ammonia, lactate level
- Metabolic screenin (TAMS)
- Urine for organic acid
- Serum for amino acid
- Urine for toxicity screen if needed

**Medications**
- IVF
- Oxygenation
- Empirical antibiotic if cultures are indicated

**Instructions**
- CRM, apnea monitoring
- Close observation
- Cardiology consultation
- Neurology consultation
- GIT consultation

**ANAEMIA**

**Investigations**
- CBC + diff + retic & RDW, U&E + LDH + LFT
- Peripheral blood smear
- DCT to exclude autoimmune hemolytic anaemia

**ANAPHYLAXIS**

**Diagnostic criteria:** Acute onset + one of the following:
- **Criteria I:**
  - Mucocutaneous manifestation + respiratory system or CVS (↓BP)
- **Criteria II:**
  - Exposure to likely allergen to that patient + 2 or more of the following:
    - Mucocutaneous manifestation
    - Respiratory system
    - CVS (↓BP)
    - GIT system
- **Criteria III:**
  - Exposure to known allergen + ↓BP

**Cutaneous/mucosal** (flushing, urticaria, pruritus, angioedema); seen in 90%

**Respiratory** (laryngeal edema, bronchospasm, dyspnea, wheezing, stridor, hypoxemia); seen in about 70%

**Gastrointestinal (GI)** (vomiting, diarrhea, nausea, crampy abdominal pain); seen in about 40% to 50%

**Circulatory** (tachycardia, hypotension, syncope); seen in about 30% to 40%

Symptoms may recur up to 72 hours after initial recovery. Patients should therefore be observed for a minimum of 6 to 24 hours for late-phase symptoms

**Initial management:**
- **ABC** (intubate immediately if evidence of impending airway obstruction)
  - If intubated give epinephrine IM/SC, then call PICU
- Epinephrine IM mid antero-lateral thigh (1:1000) 0.01 ml/kg (Max. 0.5 ml); can be repeated every 5-15 min as needed
- Bolus IVF NS 20 ml/kg if needed
- Neb Albuterol (Ventoline) 0.15 mg/kg (Min. 2.5 mg) + 3ml NS and repeat as needed
- Racemic epinephrine 0.5 ml of 2.25% solution inhaled for signs of upper airway obstruction
- Diphenhydramine IV (H1 antihistamine) 1 mg/kg (Max. 40 mg)
- Ranitidine IV (H2 antihistamine) 1 mg/kg (Max. 50 mg)
- Methylprednisolone IV 1 mg/kg (Max. 125 mg)

**Instructions**
- CRM

**Iron profile**
- Stool for occult blood
- Urine analysis
- Urine dipstick for hemoglobin (G6PD)
- Hgb electrophoresis if hemoglobinopathy is suspected

**Medications**
- Packed RBC’s if severe or symptomatic anemia with lasix mid transfusion
- Cross matching, BBG
- IVF if needed

**Instructions**
- Collect urine (G6PD)
- Hematology consultation

**ANAEMIA**

**Investigations**
- CBC + diff, U&E, ESR, CRP, and RBS
- Blood c/s
- Urine analysis and c/s
- Urine dipstick
- CSF analysis and c/s
- CXR
- Blood gas
- CT brain if needed
- ECHO
- ECG (ex. Long QT interval, SVT)
- RSV screen, nasopharyngeal swab for pertusses and virology
- Ammonia, lactate level
- Metabolic screenin (TAMS)
- Urine for organic acid
- Serum for amino acid
- Urine for toxicity screen if needed

**Medications**
- IVF
- Oxygenation
- Empirical antibiotic if cultures are indicated

**Instructions**
- CRM, apnea monitoring
- Close observation
- Cardiology consultation
- Neurology consultation
- GIT consultation

**ANAEMIA**

**Investigations**
- CBC + diff + retic & RDW, U&E + LDH + LFT
- Peripheral blood smear
- DCT to exclude autoimmune hemolytic anaemia
- Discharge the patient on Epi-pen if >30 kg; Epi-pen junior for <30 kg

**BA (BRONCHIAL ASTHMA)**

**Investigations**
- CBC + diff, U&E
- Blood C/S (for febrile pt)
- Blood gas (if severe asthma)
- X-ray (if needed, ex: fever, asymmetrical auscultation)

**Medications**
- **Ventolin** (<1 y 0.3 ml; >1y 0.5 ml) diluted in 3 ml NS
- **Pulmicort** (250-500 mcg OD-TID, diluted in 3 ml NS)
- **Atrovent** (125-250 mcg/dose Q8h for infant; 250 mcg/dose Q6-8hr for children)
- **Methylprednisolone IV** (loading 2 mg / kg then 2 mg / kg / 24h divided Q6h)
- **Dexamethasone** (0.6 mg / kg/OD, IV/PO/IM, Max. 16 mg)
- **MgSO4** (25-75 mg/kg/dose Q4-6h PRN, IV, Max. 2g in single dose; infusion over 20 min; consider Hypotension if any worrisome give IV bolus)
- **Theophylline**:  
  - **Loading dose** (ref: Medscape): IV (preferred)/PO: 5-7 mg/kg/dose; IV infused over 20-30 min  
  - **Maintenance dose** (ref: Medscape): 2 to 6 months: 0.5 mg/kg/hr IV or 10 mg/kg/day PO in divided doses  
    - 6 to 12 months: 0.6-0.7 mg/kg/hr IV or 12-18 mg/kg/day PO in divided doses  
    - **Children 1 to 9 years**: 1 mg/kg/hr IV or 8 mg/kg/PO (extended release) Q8h  
    - **Children 9 to 12 years**: 0.8-0.9 mg/kg/hr IV or 6.4 mg/kg PO (extended release) Q8h  
  - **Dosage should be adjusted according to serum concentration measurements (target concentration of 10 mcg/mL) during the first 12-24 hour period**  
  - **On the average, for every 1 mg/kg theophylline given, blood concentrations will rise 2 mcg/mL**
- **Terbutaline** (2 to 10 mcg/kg IV load, followed by continuous infusion of 0.1 to 0.4 mcg/kg/min titrated to effect in increments of 0.1 to 0.2 mcg/kg/min every 30 minutes depending on clinical response. Infusion should be started with lowest possible dose; doses as high as 10 mcg/kg/min have been used). **Use appropriate cardiac monitoring in intensive care unit (ICU)**  
  - Epinephrine (in severe attack if needed) 0.01 mg/kg/dose IM/SC up to a Max. dose of 0.5 mg/dose Q20 min–4 hr PRN  
    - If using EpiPen or EpiPen Jr, give only via IM route using following dosage:  
      - <30 kg: 0.15 mg  
      - ≥30 kg: 0.3 mg  
  - ABX if suspicion of bacterial infection (eg, Azithromycin for atypical pneumonia)  
  - IVF (if decrease feeding)

**Instructions**
- Keep SPO2 >92%

- NPO if RR >(*) (Don't Forget IVF)  
- Semi-setting position  
- If HR > (*) skip ventolin  
- Suction PRN (better to avoid CPT)  
- If the patient is sick (near station room, CRM, close observation, PICU)

**BETA-BLOCKER INGESTION**

**Initial management:**
- **ABC** (give supplemental O2)  
- **RBS** (high dose may cause hypoglycemia)  
- If hypoglycemic give D10% 2.5 ml/kg IV bolus  
- Give IVF NS bolus if hypotensive 20 ml/kg  
- Call toxicology center  
- Give Active charcoal 1g/kg  
- Orogastric lavage may be considered if the patient present shortly after potential dose

**Medications:**
- **Atropine** 0.02 mg/kg (Min 0.1 mg and Max 2 mg) for bradycardia  
- **Glucagon 150 µg/kg over 1 min (Max 5 mg)** IV bolus (it will bypasses the beta receptor and increase cAMP level leading to increase in inotropic effect and BP)  
  - Also give a continuous infusion in D5% if effective by 2-5 mg/hr  
- **Give NaHCo3** (1-2 mEq/kg) IV bolus if signs of Na channel blockade on ECG followed by infusion of 3 ampules of NaHCo3 in 1 L of D5% at twice maintenance (monitor serum pH)
- If no improvement you may start inotropes like:
  - **Norepinephrine infusion** (0.1-2 µg/kg/min) IV and titrate to maintain adequate cardiac output  
    - *Directly stimulates alpha- and beta1-adrenergic receptors, thus increasing inotropic and vasopressor effects*
  - **Epinephrine infusion** (0.1 µg/kg/min) IV and titrate to maintain adequate cardiac output  
    - *Directly stimulates alpha- and beta1-adrenergic receptors*
  - **Dopamine** 5–20 µg/kg/min IV and titrate to maintain adequate cardiac output  
    - *Indirectly stimulates alpha- and beta1-adrenergic dopaminergic receptors to produce ionotropic, chronotropic, renal/splanchnic vasodilatory (at low doses), and vasopressor (at high doses) effects*
  - **High-dose insulin/glucose infusion:**  
    - **Insulin** (1 unit/kg bolus followed by 1 unit/kg/hr)  
    - **Glucose** must be coadministered, initially 1 g/kg bolus followed by infusion of 0.5 g/kg/hr
- Frequent blood glucose monitoring, initially q10–15min for the 1st few hours, is necessary
  * The theorized mechanism is via positive inotropic effects of insulin and cardiac utilization of glucose as an energy source

**Investigations:**
- CBC
- Electrolyte + KFT + LFT
- CXR for possible pulmonary edema
- If altered mental status, consider CT brain
- ECG (look for bradycardia or conduction abnormalities)

**BLOODY STOOL**

**Investigations**
- CBC + diff + Retic, U&E + LFT
- ESR + CRP
- Stool analysis & C/S
- Stool for occult blood
- Coagulation profile
- In newborn consider APT test
- U/S abdomen if suspect surgical cause

**Medications**
- Packed RBC’s if severe or symptomatic anemia
- Antibiotics indicated in (Shigella, Salmonella if sick patient, Amoebiasis, and Giardiasis)
- IVF (if needed)

**Instructions**
- Surgical consultation if suspect surgical cause

**BPN + ASPIRATION PNEUMONIA**

**Investigations**
- CBC + diff, U&E
- Blood C/S
- Chest X-ray (you may see alveolar or lobar infiltrate with air bronchograms; Round infiltrates may be seen with S. pneumoniae; Diffuse interstitial infiltrates and hyperinflation may be seen with atypical pneumonia such as M. pneumoniae or chlamydial pneumonias)
- Blood gas (If needed)

**Medications**
- Cefuroxime or Cefotaxime or Ceftriaxone, Clindamycin (if aspiration), Azithromycin (school age)
- Severe pneumonia (Vancomycin + Ceftriaxone + Azithromycin)
- Paracetamol
- IVF

**Instructions**
- Keep SPO2 >92%
- NPO if RR >(*) (Don’t Forget IVF)
- CPT + Suction
- Semi-setting position
- If HR > (*) skip ventolin
- If the patient is sick (near station room, PICU)

**BURN**

**Burn degree:**
- First degree burn
- Second degree burn
- Third degree burn

Modified Lund-Browder chart

- Blood gas (If needed)
- RSV serology

**Medications**
- Ventoline may or not be benefit for the patient (<1 y 0.3 ml; >1 y 0.5 ml) diluted in 3ml NS (add 3% saline if no wheezing)
- Consider M.Prednisolone or dexamethasone if there is history suggestive of BA or atopy
- ABx if suspicion of bacterial infection
- Ipratropium bromide (Atrovent) and Pulmicort has not been shown to be effective in the treatment of bronchiolitis
- Moderate to severe cases (Epinephrine Neb)
  * Racemie Epiniphrine Nebulization: 0.05 mL/kg (Max 0.5 ml/dose) diluted in 3 ml of 3% saline, not more frequently than Q1-2h
- IVF (if decrease feeding)

**Instructions**
- Keep SPO2 >92%
- NPO if RR >(*) (Don’t Forget IVF)
- CPT + Suction
- Semi-setting position
- If HR > (*) skip ventolin
- If the patient is sick (near station room, PICU)
Initial management:
- CRM and RBS
- Remove clothes that are hot/burned or exposed to chemicals and jewelry
- Airway and breathing:
  - Give 100% O2 for smoke inhalation
  - Salbutamol for signs of bronchospasm
  - Call PICU and anesthesia for early intubation if oropharyngeal or significant burn
- Circulation:
  - Asses perfusion for signs of shock
  - Elevate limbs
  - 12 lead ECG if electrical burn
  - 2 good IV cannula in uninvolved area
  - Give maintenance + fluid requirement:
    - Parkland formula (for fluid requirement) = \((4 \text{mL} \times \text{wt in kg} \times \text{TBSA} \%)\)
    - Give ⅓ of fluid over 8 hrs and the other ⅔ over 16 hrs of ringer lactate
    - Add D5% to maintenance fluid for children <5 yrs
    - Put urine catheter to calculate urine output (<30 kg: 1-2 mL/kg/hr; >30 kg: 0.5-1 mL/kg/hr)
- Moisturizing the superficial burned area:
  - Silver sulfadiazine: Apply BID. to the burn area until healed; should not be used on the face
  - Neosporin cream: Apply QID to burn area until healed
- Analgesia as indicated (depend on pain score):
  - Morphine 0.1 mg/kg IV/IM/SC q2h PRN: Initial morphine dose of 0.1 mg/kg IV/SC may be repeated q15-20min until pain is controlled, then q2h PRN
  - Codeine 0.5–1 mg/kg/dose PO q4–6h
  - Paracetamol 15 mg/kg/dose PO/PR Q4h PRN
  - NSAID for expected prolonged pain and inflammation eg, Ibuprofen 10 mg/kg/dose q6h PRN
- Tetanus prophylaxis as indicated: tetanus toxoid 0.5 ml IM

Investigations:
- CBC, U&E
- Wound c/s if indicated

- Urine analysis and urine myoglobin for rhabdomyolysis
- Blood gas
- Carboxy Hb and serum lactate level for CO and cyanide poisoning
- Coagulation profile
- Blood group (preserved packed RBCs)
- Imaging as indicated

Instructions:
- Surgical consultation

CARDIOGENIC SHOCK

Pathophysiology:
- Cardiogenic shock occurs when cardiac output is inadequate because of:
  - ↑ cardiac demand (eg, large VSD)
  - ↓ or ineffective contractility (eg, arrythmia or myocarditis)
  - Obstructive (eg, hypertrophic obstructive cardiomyopathy)

Pediatric cardiogenic shock occurs primarily in:
- Neonates with CHD
- Children with myocarditis

Risk factors:
- Infant of diabetic mother is at risk of cardiomyopathy and other CHD
- Birth asphyxia presispode infant to heart failure
- Infant of mothers with autoimmune disease (eg, SLE will lead to congenital heart block)
- Family history of cardiomyopathy and arrhythmias

Initial management:
- ABC
  - Connect the patient to oxygen, avoid 100% O2 in infant as it can induce closure of PDA and increase the circulation of the lungs in older infants
  - Bagging and intubation only as necessary as it may lead to cardiovascular collapse
  - IVF bolus as needed; fluids should be administered slowly and in boluses of 5 to 10 mL/kg
- RBS
  - Improve contractility
    - Correct hypoglycemia, hypocalcemia, and hypokalemia
    - Correct acidosis by sodium bicarbonate
    - Inotropes if needed (Dopamine, dobutamine, Epinephrine)
- Cardiology consultation
- PICU consultation

Investigations:
- CBC+diff
- Electrolyte include LFT and KFT
- Blood gas
- Serum lactate
- Coagulation profile if needed to check if DIC present
- Lactic acid
- CXR to see if there is cardiomegally or pleural effusion
- ECHO
**DIGOXIN TOXICITY (DIGITALIS TOXICITY)**

The diagnosis of cardiac glycoside toxicity: is based upon clinical and ECG finding rather than elevated serum Digoxin level

**Clinical features:** gastrointestinal, renal insufficiency, cardiac, and neurological including visual disturbances

**ECG Digitalis effect:** consists of T wave changes (flattening or inversion), QT interval shortening, scooped ST segments with ST depression in the lateral leads, and increased amplitude of the U waves

**Medication can increase Digoxin level:** Verapamil, Amiodarone, and Quinidine

**Look for symptoms and signs suggestive of acute mesenteric ischemia,** which is a rare complication

SERUM DIGOXIN concentration does not necessarily correlate with toxicity. Some patients asymptomatic with a toxic level and vise versa

**Patients with suspected digitalis toxicity but without significant manifestations or renal disease are placed on cardiac monitoring and observed for approximately six hours.** If they remain asymptomatic and a repeat serum Digoxin concentration is not increasing, they may be discharged (Uptodate)

**Correct the magnesium if needed; calcium administration is contraindicated**

**Initial investigation and management:**
- ABC (look for hypoperfusion)
- CRM (bradycardia)
- RBS

**CELLULITIS**

**Usual etiologies:** GAS, S.aureus (MSSA or MRSA)

**Hospitalize for:** severe infections, limb-threatening infections, immunocompromised status

**Duration of treatment:** 5-7 days

**Investigations**
- CBC + diff, ESR, CRP
- Blood c/s
- Wound or drainage c/s if present
- U/S if abscess is suspected
- Consider x-ray if suspect osteomyelitis

**Medications**
- PO:
  - **Purulent:** clindamycin
  - **Non-purulent:** dicloxacillin or clindamycin if MRSA is suspected
  - **Alternative choices:** Augmentin, cephalaxin, or erythromycin
- IV:
  - Oxacillin/nafcillin
  - Clindamycin or vancomycin if more severe infection to cover MRSA
- IVF if there is decrease oral intake or dryness of skin to maintain good hydration

**Instructions**
- Consider surgical consultation for abscess

**CONGESTIVE HEART FAILURE (CHF)**

CHF: inability of the heart to provide adequate tissue perfusion

**Risk factors:**
- CHD especially left-to-right shunt or left-sided obstruction
- Dilated or hypertrophic cardiomyopathy
- Previous cardiac surgery
- Metabolic or renal disorder

**Important Signs & symptoms:**
- Decrease feeding
- Weight loss
- Decrease exercise tolerance
- Tachycardia
- Hypotension
- Gallop rhythm
- Mottled an cool extremities
- ↑CRT
- Hepatomegally
- Peripheral edema or ascites in older children

**Initial management:**
- ABC
  - Connect the patient to oxygen, avoid 100% O2 in infant as it can induce closure of PDA and increase the circulation of the lungs in older infants
  - Bagging and intubation only if necessary as it may lead to cardiovascular collapse
  - IVF bolus as needed; fluids should be administered slowly and in boluses of 5 to 10 mL/kg
- RBS
- Blood gas

**Investigation:**
- CBC+diff
- Electrolyte + KFT + LFT
- Troponin or creatine phosphokinase level may increased in myocardial inflammation or ischemia
- CXR (cardiomegally, ↑pulmonary vascular markings, pleural effusion, pericardial effusion)
- ECHO
- ECG

**CROUP**

Majority of patients do not require hospitalization

Don’t examine the throat to avoid obstruction of the air way

**Investigations**
- In general, no labs are required
- Neck X-ray AP & lateral if needed

**Medication**
- Budesonide (Pulmicort) nebulization at 2 mg
- Dexamethasone 0.3 - 0.6 mg/kg/dose
- Epinephrine (1:1000) 0.5 ml/kg + 3 ml NS nebulization over 15 min. (Max. 2.5 ml if < 4y; 5 ml if > 4y) can be repeated every 15 – 20 min
- Consider IVF if needed
- If toxic child consider bacterial infection and call PICU
- Activated charcoal if ingestion within 2 hrs
- ECG and repeat frequently (Sinus bradycardia and 1st or 2nd-degree AV blocks are more common in pediatric patients than in adults)
- Electrolyte (hyperkalemia in acute ingestion and hypokalemia in chronic ingestion), KFT, and LFT
- Asses renal output
- Digoxin level at presentation for acute and chronic ingestion, and after 6 hrs for acute ingestion
- Call toxicology centre
- Symptomatic bradycardia or bradyarrhythmia can be treated with Atropine 0.02 mg/kg IV in children if Fab fragments are not immediately available
- Start antibody Fab fragments after toxicologist opinion, The dosing of Fab fragments is based upon the clinical setting (eg, agent and amount ingested; serum Digoxin concentration), one vial binds approximately 0.5 mg of digoxin. If unknown amount start empirical dose as 5–10 vials for children
- Number of vials for digoxin Fab dosing is calculated using the following equation:
  \[ \text{No. of vials} = \frac{[\text{serum digoxin level (ng/mL)} \times \text{patient’s weight (kg)}}{100} \]
- Indications of Fab fragments:
  - Life-threatening or hemodynamically unstable arrhythmia
  - Hyperkalemia (serum potassium >5 to 5.5 mmol/L)
  - Digoxin serum concentration ≥15 ng/mL at any time or >10 ng/mL 6 hr post-ingestion
  - Evidence of end-organ dysfunction from hypoperfusion (eg, renal failure, altered mental status)
- If the event that digoxin Fab fragments are not available, the secondary drugs for the management of ventricular irritability include IV phenytoin (15–20 mg/kg, rate <50 mg/min) or IV lidocaine (1.5 mg/kg) (5-min Emergency)
- Cholestyramine 4 g PO twice daily if Fab fragments is not available (Uptodate)
- Cardiac defibrillation should be reserved for hemodynamically unstable ventricular tachycardia or ventricular fibrillation

**Instructions:**
- PICU consultation

**DKA Investigations**
- RBS
- Blood gas
- Urine dipstick for glucose and ketons
- CBC + diff, U&E
- Blood C/S (if needed)

**HgA1c**
- For newly diagnosed:
  - Thyroid antibodies, TFT, Celiac profile, Insulin antibodies, and Islet antibodies

**Monitoring**
- RBS Q1H
- Blood gas Q2H
- Serum electrolyte Q4H
- ECG (for T wave change)

**Management**
- Keep NPO
- Initial fluid 10 ml/kg of NS over 1 hour
- If compromised circulation start 2nd bolus of NS 10 ml/ kg
- Fluid replacement after bolus, for moderate DKA (ph: 7.1–7.2; Hco3: 5–10) the deficit will be 5–7%, for severe DKA the deficit will be 10%
- Total fluid intake rate ml/h = 1st day maintenance + 2nd day maintenance + (deficit – bolus) ÷ 48 h
- Type of IVF: NS for first 4h, then use ½ NS
- Add D10% to fluid (½ NS) if RBS < 300 mg/dl
- Increase dextrose in the fluid as RBS fall (target RBS 150–200 mg/dl)
- Dextrose can be reached to 10% – 12.5%
- Start insulin infusion after 1h of IVF, at rate of 0.1 units/kg/h
  - Add 10 units of insulin to 100 ml NS to give rate of 1 ml/kg/h
  - Add KCL to IVF (if the pt passed urine, and no renal failure, and insulin started)
    - If K < 3.5 mmol/l add 40 mmol/l
    - If K 3.5 – 5 mmol/l add 30 mmol/l
    - If K 5 – 6 mmol/l add 20 mmol/l
  - Then adjust KCL according to K level
- Correct hypophosphatemia (if needed) by adding KPH to IVF (you may start KCL + KPH)

**Instructions**
- Strict input/output fluid chart
- Neurological status at least Q1H
- Call PICU if neurological deterioration
- Endocrine consultation

**Management after out of DKA**
- Start SC insulin 0.5 – 1 unit/kg/24h
- For newly diagnosed
  - NPH & Reg. regimen 2/3 am, 1/3 pm:
    - A.m 2/3 NPH, 1/3 Regular
    - P.m 2/3 NPH, 1/3 Regular
  - Lantus & Aspart regimen
- ½ total dose Lantus at bedtime
- ½ total dose will be divided to 3 doses Aspart (pre meal)
- For known case: return to his usual doses
- Check RBS pre-meal
- For coma due to hypoglycemia; give glucagon IM/SC 0.03 mg/kg (max 1 mg/dose)

**DRUG INGESTION**

**Investigations**
- RBS
- CBC+diff, U&E, LFT
- Coagulation profile
- Blood gas
- Drug level
- Urine for toxicology screen

**Medication**
- Activated charcoal 1 gm/kg, except for heavy metals (if ↓ level of consciousness give it through NGT)
- Whole bowel irrigation if toxic ingestion of Iron
- Antidote if known medication
- IVF NS bolus if hypotensive
- D10% 2ml/kg if hypoglycemic

**Instruction**
- Vital signs
- Keep SPo2 >92%
- ECG
- CRM
- Call toxicology center
- PICU consultation

**EPISTAXIS**

**Lab studies:** usually not indicated in simple controlled epistaxis

**Management:**
- Keep the head elevated, so the flow of blood back ward into the pharynx (try to avoid aspiration of blood)
- Direct continuous pressure for 5-20 min
- squeeze nose between thumb and side of index finger
- A gauze roll placed between upper lip and gums may help compress superior labial artery

**Medications:**
- Insert soaked gauze with nasal decongestant spray (oxymetazoline or 1:10,000 epiniphrine or phenylphrine) into the naris over the anterior nasal septum for 5-10 min

**Investigations:**
- CBC
- Coagulation profile

**Instructions:**
- ENT consultation

Surgical consultation if needed for possible cautery

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**FEBRILE CONVULSION**

**Investigations**
- CBC + diff, U&E
- Urine analysis & C/S, Blood C/S
- Consider LP (below 1y with deficit vaccine, partially treated, clinical features suggest a possible meningitis or intracranial infection, febrile seizure occur after the 2nd day of illness, febrile status epilepticus, atypical Febrile Seizure)
- CT (if atypical febrile seizure, large head, persistent abnormal neurological examination, and sign & symptoms of ↑ICP “Bradycardia, HTN, and irreg. breathing”)
- Neurological consultation (atypical febrile seizure with abnormal CNS examination, prolonged seizure, focal feature)

**Medications**
- If LP done start ABX (Ceftriaxone + Vanco)
- Paracetamol

**Instructions**
- Diazepam 0.3 mg/kg IV or 0.5mg/kg PR if seizure > 5 min

---

**FEBRILE NEUTROPENIA**

- **Mild to moderate:** fever can be managed as an outpatient with close follow up
- **Severe ANC<500:** should be admitted, isolated and start antibiotic
- **Common organisms should be covered in isolated neutropenia:** Staph aureus, E.coli, Pseudomonas (bacterial), Candida species (fungal).
- **Important finding:**
  - Gingivitis - can be seen with vasculitis independent of neutropenia.
  - Mucosal ulcer - Suggests neutropenia with decreased marrow reserve, especially ulcers with no evidence of exudates
  - Abdominal pain - Suggests neutropenia with decreased marrow reserve
  - Abscess - strong evidence for adequate marrow reserve and ability to deliver neutrophils to tissue
  - Splenomegally - Indicates a chronic inflammatory state and suggests that neutropenia is not benign
  - ↑ ESR - Suggests deep tissue inflammation
  - Monocytosis - significant monocytosis (30 - 50 %) is often seen with congenital neutropenia (cyclic neutropenia, Kostmann syndrome)
  - Dysmorphic features - raise issue of primary marrow failure syndromes

**Investigations**
- CBC+diff, CRP, ESR
- Blood c/s; peripheral and central if it's available
- Urine analysis and c/s
- Peripheral blood smear if > 2 lines in CBC affected
- CSF analysis and C/S if ↓ mental status or meningeal signs (if ↓ PLT; transfuse before LP)
- Stool analysis and c/s if there is diarrhea
- CXR if there is sign and symptoms
- Abdominal u/s if there is abdominal pain
- ANA, C3, C4, anti-DNA: for the presence of collagen disease
- Flow cytometry (CD3/CD16,56,57, immunoglobulins, tetanus titers): if immunodeficiency is suspected
- HIV screen if needed

**Medications**
- **High-risk patients**: Tazocin or cefepime (anti-pseudomonal agent) + Meropenum (for gram +ve and –ve)
- **Un complicated fever (mono therapy regimens)**: Tazocin or Cefepime or Meropenum or Ceftazidime
- **Hemodynamically unstable**: Vancomycin + Aminoglyciside (Gentamicin) + Tazocin or Cefepime or Meropenum
- If the pt has constipation, treat it to prevent peri-rectal abscess

**Instructions**
- Keep in isolation room
- If the pt on any medication can cause Neutropenia, D/C that medication
- Hematology/oncology consultation if needed or bone marrow aspiration indicated

---

### FEVER TO R/O SEPSIS

**Fever**: temperature ≥38.0°C rectally

**Ibuprofen**: is not recommended for children <6m due to limited renal function

**Traumatic CSF**: subtract 1 WBC for every 500 to 1500 RBCs measured in the CSF

**Febrile healthy patient at age of 29-90 days without focal source (uptodate):**

[Diagram]

**Investigations**
- CBC + diff, U&E
- ESR, CRP
- Blood, Urine, and CSF C/S and analysis
- Chest X-ray if there is chest symptoms
- Stool analysis (if there is diarrhea)

**Medications**
- Ampicillin, Cefotaxime or Gentamicin, and antipyretic
- IVF (if decrease feeding)

### GASTROENTERITIS (GE)

**Investigations**
- CBC + diff, U&E
- Blood gas (if needed)
- Stool analysis and C/S
- Rotavirus titer (If needed)

**Medications**
- IVF → maintenance + (deficit – bolus) + ongoing loss
  - Deficit in mL = % dehydration x wt (kg) x 10
- If hypernatremic > 170 contact PICU
- In hypernatremic > 150 correct deficit over 48 hr + maintenance
- Lactose free formula if diarrhea > 2wks
- Zofran (Ondansetron) trial for persistent vomiting

**Instructions**
- BRAT diet
- ORS after each motion (if tolerated orally) by 10 ml/kg

### HEMATURIA

**Investigations**
- CBC + DIFF, U&E (include kidney function test + LFT)
- ESR, CRP
- Peripheral blood smear if needed
- Coagulation profile
- Urine analysis and c/s
- ASOT
- C3, C4
- ANA if SLE is suspected
- Urine for microscopic analysis (RBC cast with glomerulonephritis, WBC cast with pyelonephritis, WBC with cystitis)
- Urine calcium:creatinine ratio for hypercalciuria (>0.2 in children >6 years old; >0.6 in children 6 to 12 months old; >0.8 under 6 months of age); if elevated 24h urine calcium collection (normal: < 4 mg/kg/day)
- Renal u/s if needed
- Audiometry if Alport syndrome is suspected or +ve family history of deafness

**Medication**
- Broad spectrum antibiotic depend on the patient situation if infection is suspected

**Instruction**
- BP measurement & vital signs

### HSP (Henoch-Schonlein purpura)

**Investigations**
- CBC+diff, U&E (include kidney function test and Albumin)
- ESR, CRP
- Coagulation profile if needed
Urine analysis (looking for hematuria)
- Urine dipstick if there is edema (look for protein)
- Stool for occult blood
- Abdominal u/s if needed (intussusception)
- Testicular u/s if torsion is suspected
- IgA level if available
- ASOT & throat c/s if needed

Medication
- Ibuprofen
- Paracetamol IV if no improvement with NSAID
- Prednisone 2 mg/kg/day if severe abdominal pain
- IVF if needed

Instructions
- Surgical consultation if needed
- Nephrology consultation if there is HTN
- Rheumatology consultation if needed
- Observe BP (look for HTN)

**HYDROCARBON INGESTION**

Hydrocarbon ingestion may cause: respiratory depression
Even small amount of hydrocarbon can cause: pneumonitis
Lab testing: usually are not indicated
Discharge the patient if: Minimal symptoms that are stable or improving and normal CXR 6 hr after ingestion

Initial management and investigation:
- ABC (connect to O2, intubate if needed eg, respiratory failure or severe respiratory distress)
- Remove hydrocarbon-soaked clothing
- Don't give activated charcoal
- Call toxicology centre
- NG tube to aspirated liquids if:
  - Massive ingestion
  - Hydrocarbon containing heavy metal
  - Hydrocarbon containing pesticide
  - Hydrocarbon containing camphor
  - Hydrocarbon containing halogens
- Blood gas
- CBC
- Biochemistry + LFT, RFT
- CXR if there is respiratory symptoms, you may repeat it after 6 hr to exclude pneumonitis

Medications:
- Give Ventolin nebulization if there is wheezing
- If there is vomiting give Ondansetron to avoid aspiration of hydrocarbon ingested

**HYPERAMMONEMIA & METABOLIC CRISES**

Hyperammonemia: serum ammonia level >100 micromole/L (1.7 microgram/ml)
An elevated ammonia concentration: ≥120 micromol/L (2.0 microgram/mL) in the newborn and ≥80 micromol/L (1.4 microgram/mL) in older infants and children is neurotoxic and must be treated immediately
- Ammonia concentrations tend to be highest in urea cycle disorders (300 to 1000 micromol/L [5.1 to 17 mcg/mL]) and only moderately elevated or normal in organic acidemias.
- Modest elevations of ammonia occur rarely in mitochondrial disorders or with hepatic dysfunction. The ammonia concentration is usually normal in disorders of carbohydrate metabolism, lysosomal storage disorders, or peroxisomal disorders

Initial investigation and management:
- ABC
- CRM
- RBS, give D10% 2.5 ml/kg bolus if hypoglycemic
  - IV dextrose (with electrolytes) provides energy and prevents catabolism. An infusion rate of 8 to 10 mg of dextrose /kg/min should be adequate to suppress catabolism
  - Insulin as a continuous IV infusion may be administered if necessary to promote anabolism and maintain serum glucose between 100 and 120 mg/dL. A typical dose for insulin in these situations is 0.05 units/kg/hr. The rate should be adjusted based upon blood sugar levels
  - Critical blood samples should be obtained before treatment (if possible)
- Blood gas
- IVF NS bolus 10-20 ml/kg if in shock
- IVF D10% + 1/2 NS + KCL (10-20 mEq/l) at 1.5 – 2 times of maintenance rate
- Keep NPO except in case of MSU continuou synthetic protein formula to prevent cerebral edema
- IV lipid 1-3 g/kg/day (via central line) to give 120-130 kcal/kg/day
- CBC & electrolyte + KFT & LFT ± coagulation profile
- FFP if coagulopathy
- Serum ammonia level (if >100 micromole/L should be repeated immediately, and if >250 micromole/L should go for dialysis)
- Calculate the Anion-gap (metabolic acidosis and ↑Anion-gap is commonly seen in organic acidemias)
- Uric acid (may be high in patients with GSD)
- Examination of the urine, including color, odor, dipstick, analysis, and presence of ketones
- Urine for reducing substances (Children who have nonglucose reducing substances in the urine may have a carbohydrate intolerance disorder [eg, galactosemia, hereditary fructose intolerance HFI] or an amino acid disorder)
- If possible, at the time of the initial evaluation
  - Quantitative plasma amino acids
  - Acylcarnitine profile
  - Lactate
  - Qualitative urine organic acids
- Blood c/s
- Urine c/s
- Start broad spectrum antibiotic

Treatment:
- Infants and Children ≤20 kg:
  - IV Ammonul® 2.5 mL/kg and arginine 10% 6 mL/kg (provides sodium phenylacetate 250 mg/kg, sodium benzoate 250 mg/kg and arginine hydrochloride 600 mg/kg)
  - Note: Pending a specific diagnosis in infants, the bolus and maintenance dose of arginine should be 6 mL/kg. If ASS or ASL are excluded as diagnostic possibilities, reduce dose of arginine to 2 mL/kg/day.

- Children >20 kg:
  - IV Ammonul® 55 mL/m² and arginine 10% 6 mL/kg (provides sodium phenylacetate 5.5 g/m², sodium benzoate 5.5 g/m², and arginine hydrochloride 600 mg/kg)
  - Administer as a loading dose over 90-120 minutes, followed by same dose as a maintenance infusion over 24 hours.
  - Don’t administer sodium in IVF while on IV Ammonul.
  - IV maintenance should be used until oral form is tolerated.
  - If develop vomiting give Zofran.

**Instructions:**
- Metabolic and genetic consultation
- PICU consultation

**HYPERKALEMIA**

<table>
<thead>
<tr>
<th>Hyperkalemia: serum plasma potassium level</th>
<th>ECG findings (depend on the K level):</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;5.5 mEq/L (mmol/L)</td>
<td>- K level= 5.5-6.5: Tall peaked T waves with a narrow base and shortening of the QT interval</td>
</tr>
<tr>
<td></td>
<td>- K level= 6.5-8: Peaked T waves, prolonged PR interval, decreased or disappearing P wave, widening QRS complex</td>
</tr>
<tr>
<td></td>
<td>- K level= &gt;8: Absent P wave, bundle branch block, progressive widening of QRS. This is followed by ventricular fibrillation or asystole</td>
</tr>
</tbody>
</table>

Not all children with hyperkalemia will have ECG finding
Consider PICU consultation

**Investigations:**
- CBC+retic and LDH (if hemolysis is suspected)
- U&E (for K level and assess renal function; if the sample is hemolyzed try to take arterial sample)
- Serum creatine kinase (if muscular injury is suspected)
- Urine analysis and urine electrolyte if needed
- Blood gas
- ECG (12-leads monitor if available)

**Medication:**
- Stop all sources of K (eg, IVF and diet)
  - Stabilize cardiac membrane
- Calcium gluconate 10% solution at a dose of 0.1 mL/kg (Max. 20 mL [2 grams]) per dose IV slow infusion over 5 minutes, may repeat 1 – 2 times after 10 min if ECG changes not improved.

Only for hyperkalemia with significant ECG findings (eg, widening of the QRS complex or loss of P waves, but not peaked T waves alone) or severe arrhythmias thought to be caused by hyperkalemia or in patients with a potassium level greater than 7 mEq/L

- Be aware of calcium extravagation (Avoid scalp vein)
  - Shift potassium intracelluar

- Albuterol nebulized solution: 2.5 mg inhaler Q 1-2 hr for children <25.0 kg; 5 mg inhaler Q 1-2 hr for children >25.0 kg.
- Insulin and glucose: Insulin 0.1 unit/kg (Max. 10 units) to be added to D10% 5 mL/kg infusion over 30 min.
  - Onset of action is 10 to 20 minutes. Only give if significant ECG changes OR confirmed serum potassium ≥7 mEq/L. Don’t forget to monitor RBS
- HCO3: 1 to 2 mEq/kg IV given over 5 to 10 min. May be used even in the absence of acidosis.
  - Note that calcium gluconate solution is not compatible with NaHCO3. Flush lines between infusions
  - Remove potassium
- Resonium (Kayexalate): 1 g/kg/dose PO Q6h or PR Q4-6h.

**HYPERNATREMIA**

<table>
<thead>
<tr>
<th>Hypernatremia: Na level</th>
<th>Urine osmolality</th>
<th>Central or nephrogenic DI</th>
<th>Fractional excretion of sodium (FENa):</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;150 mEq/L</td>
<td>&gt;700 mosmol/kg</td>
<td>&gt;100 mEq/L in salt intoxication</td>
<td>should be &gt;2% in case of salt poisoning and &lt;1% in dehydration (water loss)</td>
</tr>
</tbody>
</table>

**Utility of urine and plasma osmolality in the evaluation of pediatric hypernatremia:**

- FENa = [(urine Na × plasma Cr)/(plasma Na × urine Cr)] × 100

Management:
- ABC
- If developed seizure you may use antiepileptics
- Correct deficit over 48 hr, in addition to maintenance fluid
- Estimating formula to calculate free water deficit:
  - Deficit in L = wt (kg) × 0.6 [1-(145/serum Na)]
  - 1L of DS5% ½ NS = 400 ml of free water
  - 1L of ½ NS = 500 ml of free water
  - 1L of ¼ NS = 750 ml of free water

**Example:**

- Measure Urine and Plasma
- Uosmol < Posmol
- Use Uosmol
- Use Posmol

Urinary concentrating defect
- Diabetes insipidus
- Nephrogenic DI
- Renal diseases
- Genetic diseases

Impact urine concentration
- Gastrointestinal losses
- Increased insensible losses
- Excess sodium intake due to autogenic salt administration or salt poisoning
10 kg child dehydrated with Na level of 160mEq/L with neurological symptoms:

- Free water deficit = $0.6 \times 10 \times [1-(145/160)] = 0.562 \text{ L (x1000= 562 ml)}$
- 562 ml of free water = 1400 ml of D5% ½ NS
- Maintenance fluid = 100 ml \times 10 kg = 1000 ml/24h
- Correction of hypernatremia over 48 hrs = deficit + (2 \times maintenance) / 48 hrs
  = (1400 ml + 2000 ml)/48 hrs = 70 ml/hr of D5% ½ NS

- You can use 2 lines technique (a line with slow correction for deficit water and other line for maintenance fluid)
- For stable children, you should aim to ↓ Na not faster than 12 mEq/L/24 hr or 0.5 mEq/L/hr
- Repeat Na level frequently to ensure appropriate rate of decline (eg, Q4H)
- If cerebral edema developed while correction give 3% saline to reverse the cerebral edema as 4-6 ml/kg
- Urine analysis and electrolyte include Na and Cr at the same time of plasma Na and Cr taken
- CT brain if altered mental status
- If urine osmolality < serum osmolality, give a dose of DDAVP (Desmopressin) as 0.05 mg PO or 0.1 mcg IV; for diagnostic reason (in central DI will ↑ urine osmolality by 50%, and no change in nephrogenic DI)
- If you diagnose DI start DI management after Endocrinologist consultation

**Instruction:**
- PICU consultation if needed

### HYPERTENSIVE CRISSES

**HTN:** either systolic and/or diastolic BP ≥95th percentile measured upon three or more occasions

**Formula to estimate BP for age:**
- Systolic = 90 + (3 \times age in years)
- Diastolic = 50 + (1.5 \times age in years)

**Secondary causes**
- Renal (75%): post-infectious glomerulonephritis, chronic glomerulonephritis, obstructive uropathy, reflux nephropathy, renovascular, haemolytic uraemic syndrome, polycystic kidney disease
- Cardiovascular (15%): coarctation of the aorta
- Endocrine (5%): phaeochromocytoma, hyperthyroidism, congenital adrenal hyperplasia, primary hyperaldosteronism, Cushing syndrome
- Other (5%): neuroblastoma, neurofibromatosis, steroid therapy, raised intracranial pressure

**Stage 1 hypertension (Non-pharmacological treatment if no symptoms):** systolic and/or diastolic BP between the 95th percentile and 5 mmHg above the 99th percentile

**Stage 2 hypertension (need pharmacological treatment):** systolic and/or diastolic BP ≥99th percentile plus 5 mmHg

**Hypertensive urgency:** Severe HTN with BP >99th percentile accompanied by abnormal physical exam and lab findings

**Hypertensive emergency:** is severe HTN with evidence of target organ damage such as altered mental status, seizures, and CHF

**Initial management:**
- Confirm ↑BP by using a proper cuff size
- Take 4 limps BP and check peripheral pulse
- Look for underlying cause

**Investigation:**
- CBC with retic + U&E + KFT
- Microscopic urine analysis and c/s
- Renal u/s
- CXR & ECG for hypertrophy and heart failure
- ECHO (coarctation of aorta)
- CT if there is CNS symptoms or causing triad
- Abdominal u/s or CT if there is abdominal mass
- Urine for toxicology screen

**Treatment:**
- For HTN emergency and urgency, the goal is to ↓ BP by 25% over 8 hrs then gradual correction over 48 hrs to avoid irreversible end organ damage
- HTN secondary to chronic disease should be corrected over 1 to 2 days
- In hypertensive urgency and emergency consult nephrologist to initiate treatment
  - **Hypertensive urgency secondary to chronic disease and tolerate PO:**
  - Hydralazine 0.25 mg/kg/dose (Max dose 25 mg)
  - Labetalol (contraindicated in BA and HF) 0.2-1 mg/kg/dose IV (Max 40 mg/dose); or Hydralazine 0.2-0.6 mg/kg/dose IV (Max dose 20 mg)
  - Followed by;
  - PO anti hypertensive medication
  - **Hypertensive emergency:**
    - ABC, CRM
    - Labetalol (contraindicated in BA and HF) 0.2-1 mg/kg/dose IV (Max 40 mg/dose); or Hydralazine 0.2-0.6 mg/kg/dose IV (Max dose 20 mg)
    - Followed by;
    - Labetalol IV infusion 0.25-3 mg/kg/hr; or Nicardipine 0.5-1 mcg/kg/min, titrate the dose according to BP, increase infusion rate Q15-30 min (Max dose 4-5 mcg/kg/min)
    - Consider Furosemide 1 mg/kg bolus for pts with volume over load

### HYPOCALCEMIA

**Definition:** usually with serum Ca+ < 1.75 mmol/l

**Corrected Ca formula** = [Ca – (Albumin/40)] + 1; or Measured total Ca (mmol/L) + 0.02 (40 - serum albumin [g/L])
Symptomatic if: Carpopedal spasm, inspiratory stridor, or convulsion

Investigations:
- CBC+diff, U&E (include total Ca, ionized Ca, Mg, Phosphorus, KFT, Albumin, ALP)
- PTH
- 25-OH VitD3
- Urine Ca/Creatinine ratio if needed
- ECG (for prolonged QT interval >0.45s)

Medication:
- Asymptomatic
  - Elemental Ca 50 – 150 mg/kg/day PO divided to 4 – 6 hourly; Max 1 g/day
- Symptomatic
  - Ca gluconate 10% IV 2 ml/kg (9 mg elemental Ca/ml) over 1 h as bolus (each 10 ml of 10% Ca gluconate diluted in 40 ml NS) then;
  - Day1: 10% Ca gluconate 8 ml/kg IV infusion; or in 4 divided doses + Ca Sandoz syrup (22 mg Ca/ml) 100 mg/kg/day in 6 divided doses
  - Day2: 10% Ca gluconate 4 ml/kg IV infusion; or in 4 divided doses + Ca Sandoz syrup (as above)
  - Day3: D/C IV Ca gluconate (except in premature or if patient not tolerate oral Ca) + Ca Sandoz syrup (as above)
  - Day4: Ca Sandoz 65 mg/kg/day in 4 divided doses
- Patients with Rickets (↓Ca, ↓ or N Phosphorus): Vit D3 4500 u from the 1st day + Ca Sandoz 1 week then D/C
- Patients with hypoparathyroidism (↓Ca, ↑Phosphorus): 1-α drops (Newborn or infant) or 10 drops (children) from the 1st day + Keep on Ca Sandoz syrup (Manipulate the dose according to serum Ca level)
- Patients with hypomagnesaemia (<0.7 mmol/l): MgS04 50 mg/k over 1 h; then 100 mg/kg/day as infusion or in 4 divided doses

Instruction:
- Always connect to CRM, if HR <70 stop Ca infusion and assess the patient
- Make sure that the IV line is working well to avoid tissue necrosis, and always check IV site
- Don’t use scalp veins

HYPONATREMIA

Causes of hyponatremia:
- GI loss
- Diuretic induced
- Renal salt wasting (geitelman, bartter, cerebral salt wasting, and CAH)
- Skin losses (cystic fibrosis)

Sodium level <125 mEq/L may cause neurological symptoms

Complication of hyponatremia: cerebral edema

Complication of hyponatremia therapy: osmotic demyelination syndrome

Recommended correction rate: 6 to 8 mEq/L for each 24hr period

Management:
- ABC
- CRM
- RBS
  - Hyponatremia with seizure:
    - Correct sodium until symptoms resolved (eg, ceasing of seizure) or Na >125 mEq/L
    - Amount of Na:
      In mEq= 0.6 × wt in kg x (desired Na – actual Na)
      Or;
      1.2 × wt in kg x (desired Na – actual Na)= ... ml of 3% NaCl over 15-20 min
      Another fast calculation

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      Another fast calculation

HYPOGLYCEMIA

Hyoglycemia: definitions of which vary, but serum glucose <40 mg/dL is the most widely accepted definition; or if <70 mg/dl and symptomatic patient.

Initial management:
- ABC
- 100% oxygen
- CRM
  - Conscious and able to drink

- Rapidly absorbed carbohydrates (eg, sweetened juice, tea spoon of honey or tablespoon of sugar)
- Check RBS in 10-15 min; if corrected observe
- If not corrected, go to ↓conscious level management
  - ↓ Conscious level and unable to drink management
    - Glucagon IM/SC 0.03 mg/kg (Max. 1 mg) if IV access is not available
    - IV bolus 2.5 ml/kg of D10%
    - Then IV glucose maintenance infusion at rate of 6-8 mg/kg/min
    - Monitor RBS every 30-60 min; alter Dextrose accordingly until RBS >70 mg/dl then RBS Q2-4h

Investigations:
- Take critical sample during hypoglycemia attack for unexplained cause and recurrent hypoglycemia (5-10 ml blood) for:
  - Insulin
  - C-peptide
  - GH
  - Cortisol
  - Urine for ketones + reducing substance
  - Free fatty acids
  - Pyruvate
  - B-hydroxybutyrate
  - Lactate
  - Total/free carnitine
  - Acylcarnitine
  - Save serum tube
3.5 ml/kg of 3% NaCl over 15-20 min
- Repeat same fluids until seizure stops then recheck Na and go to slow correction
  - **Slow correction:**
  - Recommended correction rate is 6 to 8 mEq/L for each 24hr period
  - Amount of Na (mEq/24hrs) = 0.6 x wt in kg x (desired Na – actual Na)
  - You can use 0.9% Na or 0.45 NS D5%

**Example:**

**10 kg child with seizure and Na level of 115 mEq/L**
Amount of Na= 0.6 x 10 x (125-115)= 120 ml of 3% NaCl over 15-20 min

**Next step after seizures stop (slower correction):**
Amount of Na= 0.6 x 10 x (133 – 125)= 48 mEq/24hr
(1L of 0.9% NS = 154 mEq Na)
= 310 ml of 0.9% NS over 24hr

**Investigations:**
- Cortisol level if suspect CAH
- Urine analysis with specific gravity
- Urine osmolality
- Urine electrolyte
- CSF if meningitis is suspected
- VBG if DKA is suspected
- Albumin level in case of nephritic syndrome
- Consider CT brain in altered mental status or seizure

**Instructions:**
- PICU consultation

**IBUPROFEN TOXICITY**

**Ibuprofen toxicity:** usually asymptomatic and the management is supportive

- **Serious toxicity symptoms:** can occur if the dose is >400 mg/kg
- **If the dose is <100 mg/kg:** symptoms are unlikely to occur
- **Clinical features:** nausea, vomiting, abdominal pain, headache, drowsiness, blurred vision, and ataxia
- **High dose can cause:** ↓BP, apnea, bradycardia, severe metabolic acidosis, renal failure, coma, and seizure
- **Peak effect:** 1-2 hrs in normal doses, may be delayed up to 4 hrs in toxic ingestion, so ibuprofen level is not applicable in acute management
- **Patients at risk:** HF, GI disease, hepatic and renal disease, SLE, and bleeding disorder
- **If taken with paracetamol or aspirin it may cause significant toxicity**

**Initial management and investigation:**
- ABC (in massive dose)
- RBS
- Activated charcoal if within 1 hour of ingestion
- Blood gas
- Sodium bicarbonate if severe metabolic acidosis
- Call toxicology centre
- CBC
- U&E include KFT, LFT, and serum lactate
- Calculate anion gap (↑ with salicylate)
- ECG (prolonged QRS or QTc or arrhythmia)
- Antiemetic and antacid if needed

**IDIOPATHIC THROMBOCYTOPENIC PURPURA (ITP)**

**Acute ITP:** resolves within 12m without relapse (Uptodate)
**Chronic ITP:** persistent for >12m (Uptodate)
**Recurrent ITP:** intermittent after recovery
**Consider BMA before you give Corticosteroid**

**Avoid medications that affect platelet function, such as aspirin, ibuprofen, and cold medications with antihistamines**

**Indications for pharmacological intervention:**
- Life threatening bleeding
- A platelet count <10,000/microL and signs of cutaneous bleeding (bruising, bleeding, or petechiae)
- A platelet count <30,000/microL and signs of moderate bleeding such as mucosal bleeding (“wet” purpura), epistaxis or hematuria
- A new or unexplained headache or neurological change with a very low platelet count <20,000/microL, or after head trauma. Such patients should be treated urgently and aggressively because of the possibility of ICH
- Active children at risk for trauma are usually treated

**Investigations**
- CBC+Diff
- Peripheral blood smear
- ANA if SLE is suspected
- Platelet antibodies
- CT brain if ICH is suspected
- Blood grouping
- HIV, HBV, HBC, CMV, and EBV screen if indicated

**Medication**
- **IVIG:** 94–97% will have an increase in platelet count >20,000/mm3 by 72 hours. The usual dose is 0.8–1 g/kg over 6–8 hours. Response typically peaks after 1 week and lasts 3–4 weeks
- **Anti-Rh D immunoglobulin (patient must be Rh[+] and nonsplenectomized):** 80% respond with platelet counts >20,000/mm3 after 72 hours. Dose is 50–75 mcg/kg IV over 3–5 minutes. Response lasts around 5 weeks (it may ↓ Hgb by 1-3 g/dl)
- **Corticosteroids:** 80% respond with platelet counts over 20,000/mm3 by 72 hours (prednisone at 2 mg/kg per day PO tapered over 2 to 4 weeks is a typical course)
- **Platelet transfusions:** generally not helpful but necessary in life threatening bleeding

**Intracranial pressure (ICP)**

**Cushing triad (signs of ↑ICP):**
- HTN
- Bradycardia
- Irregular respiratory pattern

**Other signs could be present:**
**Iron Toxicity**

*Toxic dose:* 20-60 mg/kg can be associated with no or mild symptoms; ingestion of >60 mg/kg can be associated with a serious toxicity symptoms.

**Indications of laboratory evaluation:**
- Signs of systemic toxicity
- Unknown amount
- Ingestion of >40 mg/kg

**Indications of deferoxamine therapy:**
- Severe symptoms (eg, hypovolemia/shock, lethargy/coma, persistent vomiting or diarrhea)
- Anion gap metabolic acidosis
- Peak serum iron concentration greater than 500 mcg/dL (90 micromol/L)

**Clinical manifestations:**
- GI phase: 30 minutes to 6 hours after ingestion
- Latent, or relative stability, phase: 6 to 24 hours after ingestion
- Shock and metabolic acidosis: 6 to 72 hours after ingestion
- Hepatotoxicity/hepatic necrosis: 12 to 96 hours after ingestion
- Bowel obstruction: 2 to 8 weeks after ingestion

**Supplements contain iron:**
- Ferrous fumarate (33% elemental iron)
- Ferrous gluconate (12% elemental iron)
- Ferrous sulfate, regular (20% elemental iron)
- Ferrous sulfate, dried (30% elemental iron)
- A typical child’s multivitamin tablet with iron contains 10-18 mg of elemental iron. Adult or prenatal vitamins contain up to 65 mg of elemental iron.

**Initial management:**
- ABC
- RBS
- Elevate head of bed 30 degrees
- Put the patient midline with neck straight to maximize venous drainage from the head
- Connect to CRM
- Put cervical collars if needed (trauma)
- Head CT to exclude intracranial bleeding and other causes
- Neurosurgical consultation
- For temporary reduction of ICP give 3% NaCl bolus (2 to 5 ml/kg); serum osmolarity goal of <360 mOsm/L
- Alternatively, you can give Mannitol 0.25-1 g/kg with Max single dose of 12.5g (high dose of mannitol can cause significant hypotension, so consider giving bolus fluid at same time, and remember to place foley cath)
- Try to keep Paco2 at 30-35
- In traumatic brain injury (TBI), consider controlled moderate hypothermia (32°C-33°C)
- In space-occupying lesion (tumors, abscesses), consider dexamethasone to ↓ cerebral edema (after consultation with neurosurgeon)

**Investigations:**
- CBC+diff
- ESR, CRP
- Electrolyte + KFT + LFT
- Toxicology screen if needed
- Blood c/s

*Don’t delay ABx if meningitis is suspected*
GI consultation and follow up for possible complication (pyloric stenosis, intestinal obstruction)

**KAWASAKI**

**Diagnostic criteria**

High fever lasting 5 days or more, + 4 of the following 5 criteria:
- Nonexudative conjunctival injection
- Polymorphous, nonvesicular rash
- Mucosal involvement of the upper respiratory tract that may include erythema, fissures of the lips, crusting of the lips and mouth, or a strawberry tongue.
- Edema or erythema of the hands and feet
- Cervical adenopathy of at least 1.5 cm in diameter, which is often unilateral

**Investigations**
- CBC + diff, U&E, LFT
- ESR, CRP
- ASOT
- Urine analysis and C/S
- Blood C/S
- ECHO (initial then should be repeated after 2 wks then after 6-8 wks)
- ECG (During acute phase may show prolonged PR interval, decreased QRS voltage, flat T waves, and ST changes)

**Medications**
- IVIG 2 g/kg X 1 dose over 10-12h, if symptoms persist consider second dose
- Aspirin 80–100 mg/kg/24 hr PO ÷ Q6h during febrile phase until patient defervesces, then decrease to 3–5 mg/kg/24 hr PO QAM. Continue for at least 8 wk or until both platelet count and ESR are normal. *(Use of aspirin during varicella or influenza infections has been associated with Reye syndrome.)*
- Paracetamol (avoid ibuprofen)

**Instructions**
- Cardiology consultation
- CRM during IVIG and close observation for reaction

**LYMPHADENOPATHY**

- You should assess: location, size, consistency, fixation, and tenderness
- lymph node size >2 cm; abnormal chest radiograph; and lack of ear, nose, and throat symptoms to be correlated with increased risk of malignancy or granulomatous disease (requiring biopsy)
- Consider Hx of contact TB patient or travel to endemic area
- Acute < 2 wks, Sub-acute, Chronic > 1 m
- Avoid glucocorticoids before reaching definite diagnosis, because it can mask the picture of leukemia or lymphoma

**Investigations**
- CBC+diff, U&E, ESR, CRP
- LFT, LDH
- Peripheral blood smear
- Throat c/s
- EBV, CMV, and Toxoplasmosis serology
- B. hensae serology in Hx of cat scratch
- ANA if SLE suspected
- PPD test if TB suspected
- CX ray for hilar lymphadenopathy or mediastinal mass
- Lymph node U/S if abscess is suspected
- Abdominal U/S in inguinal lymphadenopathy if > 2cm and non-tender
- CT if suspect deep abscess or not responding to treatment

**Medications**
- **PO:** Augmentin, clindamycin (if MRSA suspected)
- **Alternative PO:** (dicloxacillin, cephalexime)
- **IV:** oxacillin or ceftazolin; clindamycin if MRSA suspected

**Instructions**
- Surgical consultation if there is collection

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**MASTOIDITIS**

**Clinical diagnoses**
The criteria that are used most frequently to make the diagnosis include:
- Postauricular erythema, tenderness, swelling, fluctuance, or mass
- Protrusion of the auricle
- Otagia
- Fever

**Investigations**
- CBC + diff, ESR, CRP
- Swab c/s if there is discharge or abscess
- CT with contrast or MRI (Sensitive) for Temporal bone if:
  - Extracranial complications (eg, postauricular mass, neck mass, cranial nerve deficits, retroorbital pain, hearing loss, tinnitus, vertigo, nystagmus)
  - Intracranial complications (eg, meningeal signs, cranial nerve deficits, focal neurologic findings, altered level of consciousness)
  - Severe illness or toxic appearance
  - AOM that is not responding to antibiotics (a possible indication of masked mastoiditis)

**Medications**
- 3rd generation cephalosporin for 4 wks
  - Or;
  - Vancomycin For patients without a history of recurrent OM or recent antibiotic therapy
  - Or;
  - Vancomycin + 3rd generation cephalosporin for patients with a history of recurrent OM (last episode within 6 months) or recent antibiotic therapy

**Instructions**
- Surgical consultation if there is abscess
- ENT consultation if needed (for aspiration and drainage of the middle ear for diagnostic and therapeutic process)

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**MENINGITIS**

**Investigations**
- RBS
- CBC + diff, U&E, LFT, CRP

**Medications**
- Urine c/s and analysis
- Blood c/s
- CSF analysis and c/s
- LP should be done after CT if there is any sign & symptoms of ↑ICP “Bradycardia, HTN, and irreg. breathing, or other signs”
- PCR for HSV if suspected

**Instructions**
- Vital signs
- Isolation room
- Contact PICU if neurological deficit or shock not responding to initial resuscitation

---

**NEAR DROWNING (SUBMERSION INJURY)**
If the pt is asymptomatic for 8 h, and all vitals and investigations are normal, can be discharge.

**Poor prognosis if:**
- Submersion >10 min
- Time to effective BLS >10 min
- Resuscitation >25 min
- Water temp >10 C
- Age < 3y
- GCS < 5
- Persistent apnea & need CPR in ER
- ABG < 7.1 on presentation

**Monitoring for**
- Vital signs
- Spo2
- GCS
- Respiratory and CNS examination

**Investigations**
- Initial investigations
  - RBS
  - U&E (include KFT)
  - Blood gas
  - CXR if pulmonary system involved
  - ECG
  - 2ry investigations
  - CBC+diff
  - Coagulation profile
  - Troponin
  - Drug level if needed

**Medication**
- IVF if needed
- Nebulization Salbutamol for bronchospasm
- Antibiotic if pneumonia or submersion in grossly contaminated water
If muscle fasciculations, give IV bolus 25 mg/kg loading dose, followed by 5-8 mg/kg in 2-3 doses (level should be monitored)

Instructions
- Keep SPO2 > 92%
- Vital signs
- Intubate if low GCS, accumulation of PCO2, low PO2, or apnea was noticed
- Consider PICU consultation if needed

Nephrotic Syndrome

Nephrotic syndrome:
- Proteinuria
- Hyperlipidemia
- Hypoalbuminemia <25 g/dl
- Edema

Nephrotic range proteinuria:
- Urine dipstick +3 to +4 of protein
- Spot urine protein/creatinine ratio is >2
- Proteinuria >40 mg/m²/hr (>1g/m²/day)
- 24-hour urine protein shows >50 mg/kg/d
- An early morning urine protein creatinine index >200 mg/mmol (>3.5mg/mg)

Assess for features suggesting not idiopathic NS:
- Age <1y or >12y
- Systemic symptoms of fever, rash, joint pains (SLE).
- Persistent hypertension (can have mild hypertension first 1-2 days)

Microscopic hematuria: present in 10–20% of cases, but the presence of RBC casts more suggestive of glomerulonephritis

Indications of albumin transfusion:
- Intravascular volume depletion
- Severe or symptomatic oedema

If the patient in shock give IV bolus despite presence of edema

Investigations:
- CBC + diff
- Serum electrolyte, RFT, LFT
- Spot urine protein: creatinine ratio or 24 hour urine protein
- Daily urine dipstick
- Lipid profile (↑ total cholesterol, usually >200 mg/dl)
- C3, C4 level (↓ C3 levels are seen in MPGN and postinfectious glomerulonephritis, and ↓ C3 and C4 are seen in patients with SLE nephritis)
- Urine analysis and c/s
- Hepatitis screen
- HIV screen
- Anti-dsDNA, ANA (to r/o SLE)
- ASOT titer to exclude post strept glomerulonephritis

Treatment:
- Prednisolone 60 mg/m² per day as a single dose (Max 60 mg/day) until proteinuria disappears (may take 4 wks), then taper as suitable for the patient stage and situation
- Ranitidine for prednisolone induced gastritis as 2-4mg/kg/dose 12 hrly (Max 150mg per dose)
- Human albumin 20% if indicated as 1 g/kg (5ml/kg) IV over 4-6 hrs with lasix 1 mg/kg mid transfusion, if severe edema you may give another dose of lasix at the end of transfusion (to avoid risk of HTN or pulmonary edema)

Instructions:
- No added salt diet
- Daily weight
- Strict input/output chart
- Reverse isolation
- Nephrology consultation if indicated

Nnj (Neonatal Jaundice)

Investigations
- CBC + diff + retic, U&E, LFT, TSB, Blood film
- BBG + MBG + DCT
- Urine analysis and C/S
- If need exchange transfusion → Cross match, blood reservation

Medications
- Phototherapy
- IVF

Instructions
- TSB Q12h if single or double phototherapy
- TSB Q6h if pt on intensive phototherapy

Organophosphate & Carbamate Poisoning

Mnemonic: "DUMBELLS" ± CNS:
- Diarrhea
- Urination
- Miosis
- Bradycardia, Bronchorrhea, Bronchospasm
- Emesis
- Lacrimation
- Salivation

Healthcare workers must take precautions as they may get exposure

Management:
- ABC
- Oxygen mask 100%
- CRM
- Call toxicology centre
- Intubation if required (Avoid Succinylcholine)
  - Decontamination:
  - If ingestion <1h give Charcoal (1 g/kg; Max 50 g)
  - Aggressive skin and ocular irrigation
  - Bag/ discard clothing
  - Therapy:
  - Atropine (IV 0.05 mg/kg); double the dose if no effect every 3-5 min
  - "Therapeutic end point is until clearance of respiratory secretions & cessation of bronchospasm NOT tachycardia or mydriasis"
  - "Atropine over dose: Fever, Muscular fibrillation, Agitation"
- Treat poor perfusion with bolus IVF
- Inhaled Ipratropium bromide (Atrovent) 0.5 mg; repeat as needed
- Pralidoxime (If muscle fasciculations, respiratory depression, coma) IV bolus 25-50 mg/kg slowly over 30 min; may repeated after 30 min; if severe give continuous infusion 10-20 mg/kg/hr
“Rapid bolus administration may cause cardiac arrest”
- Diazepam (valium) IV 0.1 - 0.2 mg/kg (Max. 10 mg); as prophylactic for Organophosphate agent-induced seizures and repeat if seizure occur; AVOID Phenytoin
- Call PICU

### PARACETAMOL TOXICITY (ACETAMENOPHEN)

<table>
<thead>
<tr>
<th>Toxic single dose:</th>
<th>≥ 150 mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen level should be measured:</td>
<td>4-24 hr after acute ingestion and plotted in the treatment nomogram chart (shouldn’t be used after 24 hr).</td>
</tr>
</tbody>
</table>

**Don’t do gastric lavage and don’t give Ipecac syrup.**

**N-acetylcysteine (NAC):** is most effective when given within 10 hours of acetaminophen overdose, but may still be of benefit in patients who present >24 hours later.

**Initial management**
- Activated charcoal 1 g/kg (Max. 50 g) if < 4 hr of ingestion
- Acetaminophen level if >4 hr & <24 hr of ingestion and plot it in the chart (the result should be plotted before 8 hr from ingestion, if it is not available start NAC)
- Call Toxicology center
- **Start NAC (either oral or IV regimen):**
  - IV (21 hr): dilute with D5% ½ NS
    - *< 20 kg:* 150 mg/kg over 60 min (Max. 15g) dilute in 3 ml/kg
    - Then 50 mg/kg over 4 hr (Max. 5g) dilute in 7 ml/kg
    - Then 100 mg/kg over 16 hr (Max. 10g) dilute in 14 ml/kg
  - *20-40 kg:* 150 mg/kg over 60 min (Max. 15g) dilute in 100 ml
    - Then 50 mg/kg over 4 hr (Max. 5g) dilute in 250 ml

| Then 100 mg/kg over 16 hr (Max. 10g) dilute in 500 ml |
| >40 kg (adult dose) |
  - **Oral (72 hr):** 140 mg/kg loading dose followed by 17 doses of 70 mg/kg Q4H (total dose 1330 mg/kg)
  - To help tolerating, dilute to 5% solution in cola or juice and drink with straw
  - If developed vomiting start Zofran or Metoclopramide
  - Repeat LFT, acetaminophen level, and coagulation profile + INR at the end of NAC
  - **Stop NAC if:**
    - Asymptomatic (eg, no RUQ pain)
    - Acetaminophen concentration is non-detectable
    - AST & ALT normal or significantly decreased if it was elevated

### Investigations
- RBS
- CBC, U&E + LFT
- Coagulation profile + INR
- Blood gas

### Medication
- IVF if needed
- FFP & Vitamin K in coagulopathic if needed

### Instructions
- Consider PICU consultation if needed
- If liver transplantation has been considered refer to specialized centre

### PERI-ORBITAL CELLULITIS & ORBITAL CELLULITIS

- Children < 2 years should be hospitalized for intravenous therapy and very close observation.
- Children between the age of 2 - 5 should be watched closely. Only mild cases may be managed on an outpatient.
- Children > 5 years can usually be treated with an oral regimen if the pt is not ill.

<table>
<thead>
<tr>
<th>Preseptal</th>
<th>Orbital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial erythema and tenderness</td>
<td>Painful eye movements</td>
</tr>
<tr>
<td>Normal eye movements</td>
<td>Orbital pain and tenderness</td>
</tr>
<tr>
<td>Normal vision</td>
<td>Visual impairment</td>
</tr>
<tr>
<td>Preceding superficial trauma</td>
<td>Proptosis</td>
</tr>
<tr>
<td>Eye pain</td>
<td>Chemosis</td>
</tr>
<tr>
<td>Periorbital swelling</td>
<td>Ophthalmoplegia</td>
</tr>
<tr>
<td>Fever</td>
<td>Preceding sinusitis</td>
</tr>
</tbody>
</table>

### Investigations
- CBC + diff, ESR, CRP
- Blood c/s and eye swab c/s if febrile, sick, or presence of abscess
- Urgent CT with contrast (orbital cut and sinuses) if:
Proptosis
- Limitation of eye movements
- Pain with eye movements
- Double vision
- Vision loss
- Edema extending beyond the eyelid margin
- ANC >10,000 cell/microL
- Signs or symptoms of CNS involvement
- Inability to examine the patient fully (usually patients < one year of age)
- Patients who do not begin to show improvement within 24 to 48 hours of initiating appropriate therapy

Medications
- You should cover s.aureus, group A strept, MRSA, and anerobic organisms
  - PO: (7 – 10 days)
    - Clindamycin 30-40 mg/kg/day TID-QID, Max. 1.8 grams per day
  - Or;
    - Augmentin 45 mg/kg/day Q12h + Trimethoprim-sulfamethoxazole (for MRSA) 8-12 mg/kg/day Q12h (of Trimethoprim component)
  - IV
    - Cefotaxime or ceftriaxone + oxacillin or clindamycin or vancomycin
      - Paracetamol if needed
      - IVF if ↓ feeding

Instructions
- Urgent ophthalmology consultation if suspect orbital cellulitis
- If intracranial extended; urgent neurosurgery consultation

PLEURAL EFFUSION

Pleural effusion types:
- Transudative: Increased hydrostatic and/or decreased oncotic pressure results in leak of fluid (eg, hypoalbuminemia, liver cirrhosis)
- Exudative: Damage to the pleural surface alters its ability to filter pleural fluid with compromise of lymphatic drainage (eg, pneumonia)

Medication & management:
- Thoracocentesis or tube thoracostomy if needed (PICU)
- Ceftriaxone + Azithromycin + Clindamycin or Vancomycin (Harritlane)
- IVF if needed

RAPID SEQUENCE INTUBATION (RSI)
Emergent intubations can be performed with or without sedation and paralysis.
RSI: is generally preferred because it is more successful and safer than intubation without sedation and paralysis for patients with:
- Varying levels of consciousness
- Active protective airway reflexes
- And/or a full stomach

Sedation and paralysis are unnecessary prior to intubation for some patients, such as those who are in cardiac arrest or already deeply comatose

Laryngoscope size:
- Miller (straight blade):
  - #00-1 for premature to 2 months
  - #1 for 3 months to 3 years
  - #2 for > 3 years
- Macintosh (curved blade):
  - #2 for > 2 years
  - #3 for > 8 years

ETT size & depth:
- Size = (Age/4) + 4
- Depth = ETT size × 3

Preoxygenation
- High O2 concentration
- Use non-rebreathing mask for at least 3 min for spontaneously breathing child
- Bag-mask ventilation for apnic or desaturating child

Preparation
- Check equipment and function
- AMPLE: allergy, medications, past medical, last meal, and events
- Identify your RSI’s medications depend on the patient’s condition

Pretreatment
- Atropine 0.02 mg/kg IV (Min 0.1 mg – Max 0.5 mg; if no IV access can be given IM)
  - All children ≤ 1y
  - children < 5 years receiving succinycholine
  - > 5 y receiving a 2nd dose of succinylcholine
- Lidocane 1.5 mg/kg IV (Max 100 mg) give it 2-3 min before intubation
  - Good choice for ↑ ICP

Sedation
- Ketamine 1 to 2 mg/kg IV (if no IV access, can be given IM dose: 3 to 7 mg/kg); used in:
  -
- Bronchospasm and septic shock
- Use with caution in ↑ ICP
  - **Etomidate 0.3 mg/kg IV; used in:**
    - ↑ ICP or head injury
    - ↓ BP
    - Don’t use routinely with septic shock
    - Neuroprotective
  - **Midazolam 0.2 to 0.3 mg/kg (Max dose 2 mg, onset of effect needs 2-3 min); used in:**
    - Status epilepticus
    - It may induce unconsciousness
- **Paralytic**
  - **Succinylcholine 2 mg/kg IV for neonate and young child; 1 to 1.5 mg/kg IV for older children** (if IV access not available can be given IM 3 to 5 mg/kg); **Avoid in:**
    - Neuromuscular disease
    - Organophosphate poisoning
    - 48 to 72 h after burn
    - Pre existing hyperkalemia
    - Malignant hyperthermia
    - Crush or denervation injuries
  - **Rocuronium 1 mg/kg IV; used in case of contraindicated Succinylcholine**

**Protection & Positioning**
- **Sniffing position**
- **Cricoid pressure**

**Placement & Confirmation**
- Co2 detector or end tidal Co2
- Detection and ascultation

**Post intubation management**
- CXR for tracheal tube placement
- Infusion sedation
  - **Midazolam**
    - Infant and child: 0.05–0.15 mg/kg/dose IV Q1–2 hr PRN
    - Continuous IV infusion (Initial doses, titrate to effect):
      - Neonate: ≤32 wk’ gestation: 0.5 mcg/kg/min
      - ≥32 wk’ gestation: 1 mcg/kg/min
      - Infant and child: 1–2 mcg/kg/min
      - **Fentanyl**
        - 1 mcg/kg/hr
      - Paralysis if needed

**RHEUMATIC FEVER**

**Criteria**

**Major criteria:**
- Migratory arthritis 70%
- Carditis 50%
- Sydenham corea 15%
- Erythema marginatum 10%
- Subcutaneous nodules 2-10%

**Minor criteria**
- Fever
- Arthralgia
- ↑ ESR & CRP
- Prolonged PR interval

**Investigations**
- Throat C/S
- ASO titer
- CBC + diff, U&E
- ESR, CRP
- ECHO
- ECG
- CXR (may show cardiomegally)

**Medications**
- Penicillin G (Benzathine) for GAS
  - >1 mo and <27 kg: 600,000 units/dose IM × 1
  - ≥27 kg and adult: 1.2 million units/dose IM × 1
- Oral penicillin V (phenoxymethyl penicillin)
  - ≤27 kg: 250 mg BID - TID for 10 days
  - If >27 kg: 500 mg BID - TID for 10 days
- Amoxicillin 50 mg/kg/day PO (maximum 1g per day) BID-TID for 10 days.
- Aspirin 60 to 100 mg/kg/day Q6h for 2-6 wks
- For moderate to severe ill pt with carditis or CHF; start prednisone 2 mg/kg/day until ESR normalize (taper over a 2-4-wks period)
- Cardiologist will start digoxin with precaution due to inflamed heart if needed

**Instructions**
- Cardiology consultation

**SALICYLATE TOXICITY**

**Toxic dose:** <300 mg/kg associated with mild symptoms, 300-400 mg/kg is associated with moderate toxicity, and >500 mg/kg could be associated with death due to severe CNS toxicity and shutting down the cardiorespiratory system.

Most patients show signs of intoxication when the plasma concentration exceeds 30 to 50mg/dl (300 to 500 mg/L, 2.2 to 3.6 mmol/L).

**Symptoms:** tachypnea, tinnitus, nausea, vomiting, acid-base abnormalities (respiratory alkalosis, metabolic acidosis, and high anion gap); in Severe cases hyperthermia, altered mental status, pulmonary edema.

**Always check acetaminophen dose in formula contains acetaminophen.**

**Initial investigation and management:**
- ABC (try to avoid intubation as possible to prevent worsening acidemia and salicylate distribution to the brain)
- RBS, vital signs, and give oxygen
- CBC, U&E, LFT, and KFT
- Coagulation profile + INR
- Blood gas and calculate anion gap (repeat Q2H until acid base status stabilized)
- IVF and dextrose, add KCL 20-40 mEq/L if hypokalemia
- Salicylate level (repeat Q2H until it is declining)
- Urine analysis (urine pH)
- Acetaminophen level if needed
- Call toxicology centre
- CXR if respiratory symptoms
- ECG if hypokalemia

Treatment:
- Activated charcoal 1 g/kg for the 1st dose (Max. 50 g/kg), then 0.5 g/kg Q2-4h if still high level of salicylate or still symptomatic.
- Antiemetic if there is vomiting after 1st dose of charcoal
- Alkaline urine to enhance salicylate excretion (optimum urine pH 7.5–8.5):
  - Give bicarbonate infusion 1mmol/kg/hr, after initial slow bolus of 2mmol/kg
  - sodium bicarbonate 8.4% 1–10 mEq/kg/24 hr PO ÷ Q1D
  - dose should be titrated to desired urinary pH
  - If you give NaHCO3; repeat K level, RBS, and blood gas Q1H
- Hemodialysis if:
  - Persistent CNS disturbance (eg, coma, seizures) or persistent focal neurologic signs
  - Pulmonary or cerebral edema
  - Renal insufficiency that interferes with salicylate excretion
  - Intractable acidosis
  - Clinical deterioration despite aggressive and appropriate supportive care (eg, worsening metabolic acidosis or the development of respiratory acidosis)
  - Plasma salicylate concentration >100 mg/dL (1000 mg/L, 7.2 mmol/L) in the setting of acute ingestion or plasma salicylate concentration >60 mg/dL (600 mg/L, 4.3 mmol/L) in the setting of chronic salicylate

**SCORPION STING**

Scorpion sting: symptoms begin within minutes and may persist to 72 hrs
Scorpion venom: is neurotoxic, caused by prolonged opening of Na channels

Signs & symptoms:
- Local pain
- Altered mental status
- Agitation
- Involuntary muscle contractions
- Blurred vision
- Seizure
- Hypersalivation

**SEPTIC SHOCK**

Evaluation for baby with shock:
- Fever
- Tachycardia and bradycardia

- Tachycardia is typical but bradycardia may occur
- HTN initially then hypotension
- Nystagmus
- Tongue fasciculation

**Grades of envenomation:**
- Grade I: Local pain and/or paresthesias at site
- Grade II: Local pain and pain and/or paresthesias at a remote site
- Grade III: Either cranial/autonomic or somatic skeletal neuromuscular dysfunction
- Grade IV: Both cranial/autonomic and somatic skeletal muscle dysfunction

**Initial management:**
- ABC
- Call toxicology center for type of venom and dosage
- Supportive care
- Grade I and II:
  - Oral analgesia (ibuprofen or paracetamole)
  - Tetanus prophylaxis 0.5 ml IM
- Grade III and IV:
  - Polyvalent scorpion antivenom (scorpion antivenom used in Saudi Arabia)
  - Tetanus prophylaxis
  - Treat HTN and hypotention by IV fluid and pressor therapy with dopamine if needed
  - Treat severe agitation by benzodiazepine
- Treat the pain depend on pain score:
  - Local anesthesia (Lidocaine, maximum single dose 5 mg/kg)
  - Ibuprofen
  - Paracetamole
  - Morphine (0.1 mg/kg IV/IM/SC q2h PRN):
    - Initial morphine dose of 0.1 mg/kg IV/SC may be repeated q15–20min until pain is controlled, then q2h PRN
  - Fentanyl (1–2 μg/kg IV q2h PRN):
    - Initial dose of 1 μg/kg IV may be repeated q15–20min until pain is controlled, then q2h PRN

**Investigations:**
- No need for investigation in grade I and II
- CBC
- Electrolyte include KFT and LFT
- Urinalysis
- CK and urine myoglobin in severe agitated patient
- Blood gas in respiratory distress
- CXR for respiratory symptoms
- ECG
Mottled skin and cold extremities
- ↓ urine output and signs of dehydration
- CRT > 3 seconds
- Hypotension (late sign)
- ↓ mental status
- Hypothermia (especially neonates)

Management:
- ABC’s include bolus fluids and O2
- RBS
- Blood gas
- CBC+diff
- ESR, CRP
- Electrolyte + KFT + LFT
- Blood c/s
- Urine analysis and c/s
- Other cultures if indicated
- Choose of ABx:
  - For infant 0-28 days start Ampicillin + Cefotaxime or Gentamicin ± Vancomycin
  - Vancomycin + Cefotaxime or Ceftriaxone
  - Consider Gentamicin for UTI. Clindamycin or Metronidazole if suspect GI is the source of infection
  - In immunosuppressed patient give Vancomycin + Cefipime or Ceftazidime to cover Pseudomonas
  - For patients who received broad spectrum antibiotic recently you may start Vancomycin + Meropenum
  - If fungul infection is suspected (eg, fever not improved with broad spectrum ABx and immunocompromised patient) you may add Amphotericin B
- Lactic acid
- Coagulation profile if needed to exclude DIC
- Observe urine output
- CRM

Fluid refractory hypotenstive shock:
- Dopamine IV infusion 1-20 mcg/kg/minute; titrate to desired response
  - Low dosage: 1-5 mcg/kg/minute, increased renal blood flow and urine output
  - Intermediate dosage: 5-15 mcg/kg/minute, increased renal blood flow, heart rate, cardiac contractility, cardiac output, and blood pressure
  - High dosage: >15 mcg/kg/minute, alpha-adrenergic effects begin to predominate, vasoconstriction, increased blood pressure
- If no response after you reach dopamine 10 you may add epinephrine infusions (initial starting dose 0.05 to 0.1 mcg/kg/min, titrate to response up to 1.5 mcg/kg/min)

Warm shock:
- Norepinephrine infusion starting at 0.03 to 0.05mcg/kg/minute

Sickle Cell Disease with Fever

Child with SCD complain of fever > 38.5 C
Criteria for admission:
- <2 yrs
- Temp > 40 C
- WBC > 30,000 or < 5000
- Hgb ≤ 5 g/dl
- History of previous episode of bacteremia
- Hyodynamically unstable or meningitis
- ACS, painful crises, aplastic crises, or splenic sequestration

Investigations
- CBC +diff+ retic, CRP
- U&E
- Blood c/s
- Urine analysis and c/s if needed
- CSF analysis and c/s if needed
- CXR if pulmonary system involved

Medication
- Ceftriaxone as empirical antibiotic
- Vancomycin if suspected meningitis or thermodynamically unstable
- Clindamycin if allergic to cephalosporin
- Add Macrolides antibiotic if ACS is suspected (ex. Azithromycin)
- IVF
- Packed RBC transfusion if needed

Instruction
- Monitoring of O2 saturation
- Hemodynamic monitoring

Sickle Cell Disease with Vasooclusive Crisis (No Fever)

Investigations
- CBC+Diff+retics
- U&E, RFT, LFT, LDH
- CRP
- X-ray if Osteomyelitis is suspected (initially may not show abnormality), should be repeated after 1-2 wks
- Bone scan or MRI if Osteomyelitis is suspected

Medication
- Paracetamol 15 mg/kg PO or IV Q4-6h (Max single dose 60 mg)
- Ibuprofen 10 mg/kg/dose Q6-8h (Max 400 mg/day)
- Morphine for moderate to severe pain Q3-4h (<6m: 0.05-0.1 mg/kg IV; >6m: 0.1-0.2 mg/kg IV)
- If you give morphine you may add Metoclopramide as 0.1–0.2 mg/kg/dose Q6-8H IV/IM/PO (Max. dose: 0.8 mg/kg/24 hr);
- Premedicate with diphenhydramine to reduce extrapyramidal symptoms as 1–2 mg/kg/dose Q6-8H IV/IM/PO
- IVF (maintain good hydration)
- Folic acid 1 mg PO OD
- Warm packs to the affected area
- Packed RBCs if needed

Snake Bite
**Vital sign changes include:** hypotension and tachycardia

**Sign & symptoms you may find:**
- Progressive pain at the site of wound
- Slurred speech, paresthesias, weakness, cranial nerve palsy
- Ecchymotic skin and discoloration
- Necrotic tissue damage at the site of wound

**Usually no need for antibiotics prophylaxis**

**Initial management:**
- ABC
- Let the patient rest and minimize movement (muscle contractions will lead to more venom absorption)
- Don’t remove clothes
- Symptomatic treatment
- **Call toxicology centre for type of venom and dosage**

**Medication:**
- Polyvalent Snake Antivenom (fractions of the immunoglobulins raised against the venoms of six terrestrial Saudi snakes)
- Bivalent Naja/Walterinnesia Snake Antivenom (fractions of the immunoglobulins raised against the venoms of the Arabian cobra "Naja haje arabicus" and the black desert cobra "Walterinnesia aegyptia")
- Tetanus toxoid given to all patients with snake bite if tetanus booster is needed 0.5 ml IM

**Investigations:**
- Coagulation profile (↑PT/INR, DIC picture)
- CBC (thrombocytopenia)
- Electrolyte include KFT and LFT
- Creatine phosphokinase
- ECG
- X-ray at the site of wound to assess for fangs retained in the skin

**Instructions:**
- If compartment syndrome occurs, consult the surgeons for possible faciotomy (most cases of compartment syndrome reponde to antivenom)

**STATUS EPILEPTICUS**

**Investigations**
- RBS
- CBC+diff, U&E, LFT, ESR, CRP
- Blood gas
- Blood c/s
- Urine analysis and c/s
- CSF analysis and c/s
- CT if needed
- Anticonvulsant level
- Urine toxicology screen

**Management**

- **First 5 minutes**
  - Stabilize patient & initial investigation
  - Assess airway, breathing, circulation, and vital signs.
  - Administer oxygen, Obtain IV or IO access.
  
- **5-15 minutes**
  - Start pharmacological therapy

**When IV access is unavailable:**
- Rectal diazepam 0.5 mg/kg, Max. 20 mg
- IM midazolam 0.1 to 0.2 mg/kg, Max. 10 mg
- Buccal midazolam 0.2 mg/kg, Max. 10 mg

- If IV access available:
  - Diazepam (Valium), 0.2–0.5 mg/kg IV; Max. <5 y/o: 5 mg, >5 y/o: 10 mg
  - Lorazepam (Ativan), 0.05–0.1 mg/kg IV/IM, Max. 2 mg
  * May repeat lorazepam or diazepam 5–10 min after initial dose

- **15-25 minutes**
  - If seizure persists, load with one of the following:
    - Phenytoin 15–20 mg/kg IV at rate not to exceed 1 mg/kg/min to avoid cardiovascular collapse (under CRM, ECG, BP checking)
    - Fosphenytoin 15–20 mg PE/kg IV/IM at 3 mg PE/kg/min via peripheral IV line (maximum 150 mg PE/min)
    - Phenobarbital 15–20 mg/kg IV at rate not to exceed 1 mg/kg/min

- **25-40 minutes**
  - If seizure persists:
    - Levetiracetam 20–30 mg/kg IV at 5 mg/kg/min; or valproate 20 mg/kg IV at 5 mg/kg/min
    - May give phenobarbital at this time if still seizing at 5 minutes
    - Additional phenytoin or fosphenytoin 5 mg/kg over 12 hr for goal serum level of 10 mg/L
    - Additional phenobarbital 5 mg/kg/dose every 15–30 min (maximum total dose of 30 mg/kg; be prepared to support respirations)

- **40-60 minutes**
  - Intubate and ventilate with sedation (ex. Midazolam infusion)

**Medication**
- IVF if needed
- Broad spectrum antibiotics if needed
- Anticonvulsant medication depend on the patient situation (Ex. Diazepam PRN, if the patient missed his dose can be continuo on same medications)

**Instructions**
- Neurology consultation if needed

**SUPRAVENTRICULAR TACHYCARDIA (SVT)**

**In SVT:** the heart rates in infants generally range from 220 to 320 beats/minute and in older children range from 150 to 250 beats/minute

**ECG finding in SVT:** Narrow QRS complex (≤ 0.09 s) + Absence or abnormal P wave + P-R cannot be identified

**WPW:** can present with SVT (Short PR interval and a delta wave)

**Management**
- ABC
- Oxygen
- CRM
- ECG – 12 leads if available
  - Hemodynamically stable
- Vagal maneuver (but DON’T delay therapy)

**Infant:** ice water bag over face above the nose 15 – 30 sec, or you may use rectal stimulation by thermometer

**Child:** bearing down or blowing into occluded straw 15 – 20 sec (valsalva maneuver)

- **Adenosine** IV 0.1 mg/kg (Max. 6 mg) as rapid injection (over 1-2 sec) followed by normal saline flush 10 ml; if no response after 2 min, give another dose as 0.2 mg/kg (Max. 12 mg); if no response after 2 min repeat the dose
- If no response consider cardioversion
  - Hemodynamically unstable
- If IV access available give Adenosine while preparing cardioversion (Don’t delay it)
- Synchronized cardioversion 0.5 - 1 J/kg; if no response give 2 J/kg
  - Sedate if needed (but don’t delay cardioversion), use Ketamine IV 1 - 2 mg/kg or IM 3 – 7 mg/kg (for > 3m of age)

**Note:** Electrodes / paddles should not be positioned over implanted devices or medication transdermal patches. The skin must be dry. Remove any metal jewelry from the chest or neck area.

- If no response give Amiodarone IV as blous 5 mg/kg over 20-60 min (repeat boluses until response or Max. total 15 mg/kg); then continuous infusion 0.4-0.6 mg/kg/hr

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**TRICYCLIC ANTIDEPRESSANT OVERDOSE**

**Serum TCA level:** do not help to guide therapy.

**In case of seizure:** treat with benzodiazepine (Don’t give phynetoin).

Acute TCA ingestions of 10 to 20 mg/kg lead to significant CVS and CNS toxicity

**Clinical features:**
- CNS: Sedation, coma, seizures
- CVS: Tachycardia, hypotension, conduction abnormalities
- Anticholinergic: Dilated pupils, dry mouth, absent bowel sounds, urinary retention

**ECG changes in severe poisoning:**
- QRS duration >100 msec
- Deep S wave in leads I, AVL; tall R wave in lead AVR
- R wave in AVR >3 mm; R/S ratio in AVR >0.7
- Rightward deflection of the terminal 40 msec of the QRS complex

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**Initial investigation and management:**
- **ABC**
  - Many patients require intubation
  - Connect to oxygen as needed
  - IVF bolus
- **RBS**
- **CRM, pulse oximetry**
- **ECG frequently** (around Q1-2H)
- **TCA level** (not very helpful, it indicates the use of TCA, but not over dose)
- If within 2 hours of ingestion give activated charcoal 1 g/kg (Unless bowel obstruction, ileus, or perforation is suspected)
- **U&E, KFT, and LFT**
- **Call toxicology centre**

**Treatment:**
- Sodium bicarbonate if the patient developed widening QRS >100 msec, as 1 to 2 mEq/kg as rapid IV push through large bore IV catheter, then repeat ECG and see the response
- If QRS narrows after bolus sodium bicarbonate, begin continuous infusion (150 mEq of sodium bicarbonate in 1 liter of D5W to run at twice the maintenance fluid rate per hour in children)
- If no response to sodium bicarbonate in ECG you can add magnesium sulphate as 1 to 2 g over 15 min or faster if cardiac arrest

**Instructions**
- **PICU consultation**

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**URINARY TRACT INFECTION (UTI)**

**Investigations**
- CBC + diff +, U&E
- Urine analysis and C/S
- Blood C/S
- Urine dipstick for nitrate and leukocytes
- Renal U/S if:
  - Any pt < 2 yrs with first febrile UTI
- Recurrent UTI
- Any age with family Hx of (renal disease, poor growth, HTN)
- Not respond to appropriate antibiotic
  - Urgent renal U/S if (seriously ill child, poor urine outflow, abdomen or bladder mass, septicemia, failure to respond to treatment after 48h, and infection other than E.coli)
  - MCUG if:
    - Children of any age with two or more febrile UTIs
    - Children of any age with a first febrile UTI and:
      - Abnormal renal U/S
      - Atypical organism (other than E.coli)
      - Poor growth or hypertension

**Medications**
- Cefotaxime if < 3 months
- Ceftriaxone IV or Augmentin PO if > 3 months
- You can use other choice (Ampicillin and Gentamicin)
- For unwell pt ensure good hydration with IVF
- Paracetamol
**MEDICATION'S DOSES**

### ACYCLOVIR
HSV encephalitis (duration of therapy: 14–21 days):

- Birth–3 mo:
  - <35 wk postconceptional age: 40 mg/kg/24 hr + Q12 hr IV × 14–21 days
- ≥35 wk postconceptional age:
  - 60 mg/kg/24 hr + Q8 hr IV × 14–21 days
- 3 mo–12 yr:
  - 60 mg/kg/24 hr + Q8 hr IV

### ADENOSINE

**Supraventricular tachycardia:**
- Neonate: 0.05 mg/kg by rapid IV push over 1–2 seconds; may ↑ dose by 0.05 mg/kg increments Q2 min to max. of 0.25 mg/kg.
- Child: 0.1–0.2 mg/kg (initial max. dose: 6 mg) by rapid IV push over 1–2 seconds; may ↑ dose by 0.05 mg/kg increments Q2 min to max. of 0.25 mg/kg (up to 12 mg), or until termination of SVT. Max. subsequent single dose: 12 mg.

### AMIKACIN

**Neonates:** See the following table:

<table>
<thead>
<tr>
<th>Postconceptional Age (wk)</th>
<th>Postnatal Age (days)</th>
<th>Dose (mg/kg/dose)</th>
<th>Interval (hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;29</td>
<td>0–7</td>
<td>18</td>
<td>18–48</td>
</tr>
<tr>
<td>29–33</td>
<td>8–28</td>
<td>15</td>
<td>15–36</td>
</tr>
<tr>
<td>34–37</td>
<td>&gt;28</td>
<td>15</td>
<td>15–24</td>
</tr>
<tr>
<td>≥38</td>
<td>&gt;7</td>
<td>15</td>
<td>15 (18–24)</td>
</tr>
</tbody>
</table>

**Infant and child:** 15–22.5 mg/kg/24 hr + Q8 hr IV/IM

### AMOXICILLIN

**Neonate to ≤3 mo:** 20–30 mg/kg/24 hr + Q12 hr PO
- Child: 25–50 mg/kg/24 hr + Q8–12 hr PO

High dose (resistant Streptococcus pneumoniae): 80–90 mg/kg/24 hr + BID PO
**Max. dose:** 2–3 g/24 hr

### AMPICILLIN

**Neonate (IM/IV):**

- <7 days:
  - <2 kg: 50–100 mg/kg/24 hr + Q12 hr
  - ≥2 kg: 75–150 mg/kg/24 hr + Q8 hr
- Group B streptococcal meningitis: 200–300 mg/kg/24 hr + Q8 hr
- ≥7 days:
  - <1.2 kg: 50–100 mg/kg/24 hr + Q12 hr
  - 1.2–2 kg: 75–150 mg/kg/24 hr + Q8 hr
  - >2 kg: 100–200 mg/kg/24 hr + Q6 hr

**Group B streptococcal meningitis:** 300 mg/kg/24 hr + Q4–6 hr

**Infant/child:**

- Mild/moderate infections:
  - IM/IV: 100–200 mg/kg/24 hr + Q6 hr
  - PO: 50–100 mg/kg/24 hr + Q6 hr
  - max. PO dose: 2–3 g/24 hr
- Severe infections: 200–400 mg/kg/24 hr + Q4–6 hr IM/IV
  - * Max. IV/IM dose: 12 g/24 hr

### ATROPINE (ANTICHOLINERGIC)

**Pre-intubation dose:**
- Neonate: 0.01–0.02 mg/kg/dose IV (over 1 min)
- Child: 0.01 mg/kg/dose IV; max. 0.4 mg/dose; may repeat Q4–6 hr PRN

**Cardiopulmonary resuscitation/bradycardia:**
- Neonate: 0.01–0.03 mg/kg/dose IV Q10–15 min PRN up to a total max. of 0.04 mg/kg; Administer IV over 1 min.
- Child: 0.02 mg/kg/dose IV Q5 min × 2–3 doses PRN; max/dose: 0.5 mg

**Organophosphate or Carbamate poisoning IV/IM:**
- 0.05–0.1 mg/kg Q5–10 min until oral secretions terminate

### AUGMENTIN

**Infant 1–<3 mo:** 30 mg/kg/24 hr + Q12 hr PO (recommended dosage form is 125 mg/5 mL suspension)
- Child ≥3 mo:
  - TID dosing: 20–40 mg/kg/24 hr + Q8 hr PO
  - BID dosing: 25–45 mg/kg/24 hr + Q12 hr PO

### AZITHROMYCIN

**Community-acquired pneumonia [≥26 mo]:**

- 5-day regimen:
  - 10 mg/kg PO on day 1 (max. dose: 500 mg), followed by 5 mg/kg/24 hr PO once daily (max. dose: 250 mg/24 hr) on days 2–5

**Pertussis:**
- Infant < 6 mo:
  - 10 mg/kg/dose PO once daily × 5 days
- ≥6 mo:
  - 10 mg/kg/dose (max.: 500 mg) PO × 1, followed by 5 mg/kg/ (max.: 250 mg) PO once daily on days 2–5

### BACTRIM (Sulfamethoxazole/Trimethoprim)

Doses based on TMP component.

**Minor/moderate infections (PO or IV):**
- Child: 8–12 mg/kg/24 hr + BID

**Severe infections (PO or IV):**
- Child and adult: 20 mg/kg/24 hr + Q6–8 hr

**UTI prophylaxis:**
- Child: 2–4 mg/kg/24 hr PO once daily

### CALCIUM GLUCONATE

**Maintenance/hypocalcemia:**
- Neonate: IV: 200–800 mg/kg/24 hr + Q6 hr
- Infant: IV: 200–500 mg/kg/24 hr + Q6 hr
- PO: 400–800 mg/kg/24 hr + Q6 hr
- Child: 200–500 mg/kg/24 hr IV or PO + Q6 hr

### CEFEPIME cephalosporin (4th generation)

**Neonate:**
- <14 days: 60 mg/kg/24 hr + Q12 hr IV/IM
  - ≥14 days: 100 mg/kg/24 hr + Q12 hr IV/IM

**For meningitis or Pseudomonas infections, use 150 mg/kg/24 hr + Q8 hr IV/IM**

**Child ≥2 mo:**
- 100 mg/kg/24 hr + Q12 hr IV/IM

**Meningitis, fever, and neutropenia, or serious infections:**
- 150 mg/kg/24 hr + Q8 hr IV/IM
  - Max. dose: 6 g/24 hr

* Good activity against Pseudomonas aeruginosa and other gram-negative bacteria, plus most gram-positives [MRSA].

### CEFOTAXIME

**Neonate:** IV/IM:

**Postnatal age ≤7 days:**
- <2 kg: 100 mg/kg/24 hr + Q12 hr
- ≥2 kg: 100–150 mg/kg/24 hr + Q8–12 hr

**Postnatal age >7 days:**
- <1.2 kg: 100 mg/kg/24 hr + Q12 hr
Given via nebulizer over IM/IV:

PO:

Child:

>7 days: 100–200 mg/kg/24 hr + Q6–8 hr IV/IM.

Higher doses of 150–225 mg/kg/24 hr + Q6–8 hr have been recommended for infections outside CSF due to penicillin-resistant pneumococci.

Meningitis:

200 mg/kg/24 hr + Q6 hr IV/IM. Higher doses of 225–300 mg/kg/24 hr + Q6–8 hr, in combination with vancomycin (dosed at CNS target levels), have been recommended for meningitis due to penicillin-resistant pneumococci.

Max. dose: 12 g/24 hr

CEFTAZIDIME cephalosporin (3rd generation)

Neonate (IV/IM):

Postnatal age ≤ 7 days:

<2 kg: 100 mg/kg/24 hr + Q12 hr

≥2 kg: 150–150 mg/kg/24 hr + Q8–12 hr

Postnatal age > 7 days:

<1.2 kg: 150 mg/kg/24 hr + Q12 hr

≥1.2 kg: 150 mg/kg/24 hr + Q8 hr

Infant (>1 mo) and child: 100–150 mg/kg/24 hr + Q8 hr IV/IM; max. dose 6 g/24 hr

CEFTRIAXONE

Infant (>1 mo) and child:

Mild/moderate infections: 50–75 mg/kg/24 hr + Q12–24 hr IM/IV; max. dose 2 g/24 hr

Meningitis (including penicillin-resistant pneumococci):

100 mg/kg/24 hr IM/IV + Q12 hr; max. dose 2 g/dose and 4 g/24 hr

Acute otitis media: 50 mg/kg IM + 1; max. dose 1 g

CEFURUXIME

IM/IV (Max. 9 g/day):

Neonate: 50–100 mg/kg/24 hr + Q12 hr

Infant (>3 mo)/child: 75–150 mg/kg/24 hr Q8 hr

PO (3m-12y): 30 mg/kg/day + Q12h (Max. 1 g/day)

CHARCOAL ACTIVATED

1g/kg/once PO

Don’t use in: Iron tablets, Cyanide, Lithium, Alcohol

CLARYTHROMICIN

Pertussis (≥1 mo): 15 mg/kg/24 hr PO + Q12 hr × 7 days; max. dose 1 g/24 hr

IV route is not recommended for <12y

CLINDAMYCIN

Neonate:

IV/IM: 5 mg/kg/dose with the following dosage intervals:

≤7 days:

≤2 kg: Q12 hr

>2 kg: Q8 hr

>7 days:

<1.2 kg: Q12 hr

1.2–2 kg: Q8 hr

>2 kg: Q6 hr

Child:

PO: 10–30 mg/kg/24 hr + Q6–8 hr; max. dose 1.8 g/24 hr

IM/IV: 25–40 mg/kg/24 hr + Q6–8 hr; max. dose 4.8 g/24 hr

CRYOPRECIPIRATE

It can be administered every 6 hours as needed at a dose of 10 mL/kg per infusion. Should be rh & ABO compatible.

Cryoprecipitate has higher concentrations of factor VIII and fibrinogen, and can be used to correct hypofibrinogenemia.

DEXAMETHASONE

Croup & BA: 0.6 mg/kg/dose PO/IV/IM × 1, max. dose 16 mg/24 hr

Airway edema: 0.5–2 mg/kg/24 hr IV/IM + Q6 hr (begin 24 hr before extubation, and continue for 4–6 doses after extubation)

Anti-inflammatory: 0.08–0.3 mg/kg/24 hr PO, IV, IM + Q6–12 hr

DIAZEPAM (VALIUM)

Sedative/muscle relaxant:

IM/IV: 0.04–0.2 mg/kg/dose Q2–4 hr; max. dose 0.6 mg/kg within an 8-hr period

PO: 0.12–0.8 mg/kg/24 hr + Q6–8 hr

Status epileptics:

Neonate: 0.3–0.75 mg/kg/dose IV Q15–30 min × 2–3 doses; max. total dose: 2 mg.

Child > 1 mo: 0.2–0.5 mg/kg/dose IV Q15–30 min; max. total dose < 5 yr, 5 mg; ≥ 5 yr, 10 mg.

May repeat dosing in 2–4 hr as needed.

DICLOXACILLIN

Child (<40 kg): Mild/moderate infections: 12.5–50 mg/kg/24 hr PO QID; Severe infections: 50–100 mg/kg/24 hr PO QID Max: 2 g/24 hr.

Child (≥40 kg): 125–500 mg/dose PO Q6 hr; max. dose 2 g/24 hr

DIPHENHYDAMINE (ANTIHISTAMINE)

Severe allergic reaction (anaphylaxis)/PO/IM/IV:

Child: 1–2 mg/kg/dose Q6 hr; usual dose: 5 mg/kg/24 hr + Q6 hr; Max. dose: 50 mg/dose and 300 mg/24 hr

* Contraindicated with acute attacks of asthma; Use with caution in infants and young children, and do not use in neonates

DOBUTAMINE

Continuous IV infusion (all ages): 2.5–15 mcg/kg/min

Max. dose: 40 mcg/kg/min

DOPAMINE

Low dose: 2–5 mcg/kg/min IV; increases renal blood flow; minimal effect on heart rate and cardiac output

Intermediate dose: 5–15 mcg/kg/min IV; increases heart rate, cardiac contractility, cardiac output, and to a lesser extent, renal blood flow

High dose: >20 mcg/kg/min IV; α-adrenergic effects are prominent; decreases renal perfusion.

Max. dose recommended: 20–50 mcg/kg/min IV

EPINEPHRINE (ADRENALIN)

Cardiac uses:

Asystole and bradycardia:

- Neonate: 0.01–0.03 mg/kg of 1:10,000 solution (0.1–0.3 mL/kg) IV/ET Q2–5 min PRN

- Infant and child: 0.01 mg/kg of 1:10,000 solution (0.1 mL/kg) IO/IV; max. dose 1 mg (10 mL). Subsequent doses Q3–5 min PRN should be the same

All ET doses: 0.1 mg/kg of 1:1000 solution (0.1 mL/kg) ET Q3–5 min IV drip (all ages): 0.1–1 mcg/kg/min ; titrate to effect.

Croup (Racemic Epinephrine):

<4 yr: (using 2.25% solution): 0.05 mL/kg/dose up to a max. dose of 0.5 mL/dose, diluted to 3 mL with NS; Given via nebulizer over 15 min PRN but not more frequently than Q1–2 hr.
24 yr: 0.5 mL/dose diluted to 3 mL with NS via nebulizer over 15 min Q3–4 hr PRN

**Hypersensitivity reactions:**

Child: 0.01 mg/kg/dose IM/SC up to a max. dose of 0.5 mg/dose Q20 min–4 hr PRN.

EpiPen or EpiPen Jr, administer only via IM route using following dosage: <30 kg: 0.15 mg, ≥30 kg: 0.3 mg

**ERYTHROMYCIN**

**Oral:**

- Neonate
  - <1.2 kg: 20 mg/kg/24 hr + Q12 hr PO
  - ≥1.2 kg: 0–7 days: 20 mg/kg/24 hr + Q12 hr PO
  - >7 days: 1.2–2 kg: 30 mg/kg/24 hr + Q8 hr PO
  - ≥2 kg: 30–40 mg/kg/24 hr + Q6–8 hr PO

- Chlamydial conjunctivitis and pneumonia: 50 mg/kg/24 hr + Q6 hr PO × 14 days; max. dose 2 g/24 hr

- Child: 20–50 mg/kg/24 hr + Q6 hr IV; max. dose: 4 g/24 hr

- Pertussis: 40–50 mg/kg/24 hr + Q6 hr PO × 14 days (max. dose 2 g/24 hr); use azithromycin for infants <1 mo old.

**FLAGYL (METRONIDAZOLE)**

Infant/child/adult: IV/PO: 30 mg/kg/24 hr + Q6 hr; max. dose: 4 g/24 hr

- Amebiasis:
  - Child: 35–50 mg/kg/24 hr PO + TID × 10 days

- Giardiasis:
  - Child: 15 mg/kg/24 hr PO + TID × 5 days; max. dose: 750 mg/24 hr

- Anaerobic infection:
  - Neonate, PO/IV:
    - <7 days:
      - <1.2 kg: 7.5 mg/kg/dose Q48 hr
      - 1.2–2 kg: 7.5 mg/kg/dose Q24 hr
      - ≥2 kg: 15 mg/kg/24 hr + Q12 hr
    - ≥7 days:
      - <1.2 kg: 7.5 mg/kg Q24 hr
      - 1.2–2 kg: 15 mg/kg/24 hr + Q12 hr
      - ≥2 kg: 30 mg/kg/24 hr + Q12 hr

- Other parasitic infections:
  - Infant/child: 15–30 mg/kg/24 hr PO + Q8 hr

**FLEET ENEMA**

2–4 yr: 33 mL enema (half of Fleet Pedia-Lax) × 1

5–11 yr: 66 mL enema (Fleet Pedia-Lax) × 1

**FRESH FROZEN PLASMA (FFP)**

FFP can be administered every 12 to 24 hours at a dose of 10 to 15 mL/kg per infusion. Should be rh & ABO compatible.

Give furosemide 1 mg/kg oral if tolerated, or IV half-way through.

FFP contains all clotting factors except platelets. Used in severe clotting factor deficiencies with active bleeding or in combination with vitamin K to achieve rapid reversal of effects of warfarin.

**GENTAMICIN**

**Contraindicated:**

Child: 7.5 mg/kg/24 hr + Q8 hr

**GLYCEMIC (OSMOTIC LAXATIVE)**

**Constipation:**

- Neonate: 0.5 ml/kg/dose rectal solution PR as an enema once daily PRN or half of infant suppository PR once daily PRN

Child < 6 yr: 2–5 mL rectal solution PR as an enema or 1 infant suppository PR once daily PRN

>6 yr–adult: 5–15 mL rectal solution PR as an enema or 1 adult suppository PR once daily PRN

**HYDRALAZINE**

**Hypertensive crisis**

Child: 0.1–0.2 mg/kg/dose IM or IV Q4–6 hr PRN; max. dose 20 mg/dose. Usual IV/IM dosage range is 1.7–3.5 mg/kg/24 hr

**Chronic hypertension**

Infant and child: Start at 0.75–1 mg/kg/24 hr PO + Q6–12 hr (max. dose 25 mg/dose)

**IBUPROFEN**

Infant and child (≥6 mo): Analgesic/antipyretic: 5–10 mg/kg/dose Q6–8 hr PO; max. dose 40 mg/kg/24 hr

**IVIG (IV IMMUNE GLOBULIN)**

**Kawasaki:**

2 g/kg administered as infusion over 8 to 12 hours (uptodate)

**General guidelines for administration:** (FROM HARRITLANE)

- IV: Begin infusion at 0.01 mL/kg/min, double rate every 15–30 min, up to max. of 0.08 mL/kg/min.

- If adverse reactions occur, stop infusion until side effects subside, and may restart at rate that was previously tolerated.

**KCL (POTASSIUM CHLORIDE)**

**Hypokalemia:**

PO: 1–4 mEq/kg/24 hr + BID–QID. Monitor serum potassium.

**IV (CLOSELY MONITOR SERUM K):** 0.5–1 mEq/kg/dose given as an infusion of 0.5 mEq/kg/hr × 1–2 hr; max. IV infusion rate: 1 mEq/kg/hr. This may be used in critical situations (i.e., hypokalemia with arrhythmia).

- Max. peripheral IV solution concentration: 40 mEq/L

**KETAMINE**

**Sedation:** PO: 5 mg/kg × 1

**IV: 0.25–1 mg/kg**

- Contraindicated in elevated ICP, hypertension

- Preferred in bronchospasm

**LACTULOSE (DUPHLAC)**

**Constipation:** Child: 1–3 mL/kg/24 hr PO + BID; max. dose 60 mL/24 hr

**Contraindicated in galactosemia, Use with caution in DM**

**LASIX (FURESOMIDE)**

Mid transduction dose 1 mg/kg/dose IV

IM, IV:
Neonate: 0.5–1 mg/kg/dose Q8–24 hr; max. dose 2 mg/kg/dose
Infant and child: 1–2 mg/kg/dose Q6–12 hr

PO:
Infant and child: Start at 2 mg/kg/dose; may increase by 1–2 mg/kg/dose no sooner than 6–8 hr after the previous dose. Max. dose: 6 mg/kg/dose. Dosages have ranged from 1–6 mg/kg/dose Q12–24 hr.

Continuous IV infusion:
Infant and child: Start at 0.05 mg/kg/hr and titrate to effect.

LORAZEPAM
Status epilepticus:
Neonate, infant, child, and adolescent:
0.05–0.1 mg/kg/dose IV over 2–5 min.
May repeat dose in 10–15 min. Max. dose: 4 mg/dose.

Anxiolytic/sedation:
Infant and child:
0.05 mg/kg/dose Q4–8 hr PO/IV; max. dose is 2 mg/dose.
May also give IM for preprocedure sedation.

MAGESIUM SULFATE (MgSO4)
When given IV be aware of hypotension and respiratory depression
Hypomagnesemia or hypocalcemia:
IV/IM: 25–50 mg/kg/dose Q4–6 hr × 3–4 doses; repeat PRN; max. single dose: 2 g
PO: 100–200 mg/kg/dose QID PO
moderate to severe reactive airway disease (bronchodilator):
Child: 25–75 mg/kg/dose (max. dose: 2 g) × 1 IV over 20 min

MANNITOL
Intracranial pressure (ICP), reduction: IV: 0.25–1 g/kg/dose infused over 20–30 minutes; repeat as needed to maintain serum osmolality <300–320 mOsm/kg

MEBENDAZOLE (VERMOX)
>2 yr: Pinworms: 100 mg PO × 1, repeat in 2 wk if not cured

MEROPENUM
Neonate (IV):
- Non-CNS intraabdominal infections with meropenem
  MIC ≤4 mcg/mL:
  <32 wk’ gestation:
  ≤14 days old: 20 mg/kg/dose IV Q12 hr
  ≥14 days old: 20 mg/kg/dose IV Q8 hr
  ≥32 wk’ gestation:
  ≤14 days old: 20 mg/kg/dose IV Q8 hr
  ≥14 days old: 30 mg/kg/dose IV Q8 hr
- Non-CNS intraabdominal infections with meropenem
  MIC 4–8 mcg/mL (moderately resistant):
  >30 wk’ gestation and >7 days: 40 mg/kg/dose IV Q8 hr

Infant ≥ 1–3 mo (IV):
- Non-CNS intraabdominal infections with meropenem
  MIC ≤4 mcg/mL: 20–30 mg/kg/dose Q8 hr
- Meningitis: 40 mg/kg/dose Q8 hr

Infant ≥ 3 mo, child, and adolescent (IV):
- Skin and subcutaneous tissue infections: 30 mg/kg/24 hr
  + Q8 hr; Max.: 1.5 g/24 hr
- Intraabdominal and mild/moderate infections, and fever/neutropenia empirical therapy: 60 mg/kg/24 hr + Q8 hr; Max.: 3 g/24 hr
- Meningitis, severe infections, cystic fibrosis pulmonary exacerbations: 120 mg/kg/24 hr + Q8 hr. Max.: 6 g/24 hr

METHYLprednisolone
Asthma exacerbations

Child ≤ 12 yr (IM/IV/PO):
- 1–2 mg/kg/24 hr ÷ Q12 hr (max. dose: 60 mg/24 hr).
- Higher alternative regimen of:
  1 mg/kg/dose Q6 hr × 48 hr, followed by 1–2 mg/kg/24 hr
  (max. dose: 60 mg/24 hr)

Anti-inflammatory/immunosuppressive:
PO/IM/IV: 0.5–1.7 mg/kg/24 hr ÷ Q6–12 hr

Status Asthmaticus
2 mg/kg once, then 2 mg/kg/24 h ÷ Q6 h

METOCLOPRAMIDE (ANTIEMETIC)
Gastroesophageal reflux (GER) or GI dysmotility:
0.1–0.2 mg/kg/dose up to QID IV/IM/PO; max. dose: 0.8 mg/kg/24 hr

Antiemetic, Premedicate with diphenhydramine to reduce EPS (extrapyramidal symptoms):
1–2 mg/kg/dose Q2–6 hr IV/IM/PO

MIDAZOLAM
Sedation for procedures:
- IV:
  6 mo–5 yr: 0.05–0.1 mg/kg/dose over 2–3 min. May repeat dose PRN in 2–3 min intervals up to a max. total dose of 6 mg.
  6–12 yr: 0.025–0.05 mg/kg/dose over 2–3 min. May repeat dose PRN in 2–3 min intervals up to a max. total dose of 10 mg
  PO:
  ≥6 mo: 0.25–0.5 mg/kg/dose × 1. Max. dose: 20 mg.
  Sedation with mechanical ventilation:
  Intermittent:
  0.05–0.15 mg/kg/dose IV Q1–2 hr PRN
  Continuous IV infusion (initial doses, titrate to effect):
  Neonate: ≤32 wk’ gestation: 0.5 mcg/kg/min
  ≥32 wk’ gestation: 1 mcg/kg/min
  Infant and child: 1–2 mcg/kg/min

* Cardiovascular monitoring is recommended

MORPHINE
Titrated to effect.

Analgesia/tetralogy (cyanotic) spells:
Neonate: 0.05–0.2 mg/kg/dose IM, slow IV, SC Q4 hr
Neonatal opiate withdrawal: 0.08–0.2 mg/kg/dose PO Q3–4 hr PRN
Infant 1–6 mo:
PO: 0.08–0.1 mg/kg/dose Q3–4 hr PRN
IV: 0.025–0.03 mg/kg/dose Q2–4 hr PRN

Infant > 6 mo and child:
- PO: 0.2–0.5 mg/kg/dose (initial max. dose: 15–20 mg/kg/dose) Q4–6 hr PRN (immediate release) or 0.3–0.6 mg/kg/dose Q12 hr PRN (controlled release)
- IM/IV/SC: 0.1–0.2 mg/kg/dose Q2–4 hr PRN; max. initial dose: infant: 2 mg/dose; 1–6 yr: 4 mg/ dose; 7–12 yr: 8 mg/dose

Continuous IV infusion and SC infusion: Dosing ranges, titrate to effect.
Neonate (IV route only): 0.01–0.02 mg/kg/hr
Infant and child:
Postoperative pain: 0.01–0.04 mg/kg/hr
Sickle cell and cancer: 0.04–0.07 mg/kg/hr

MYCOSTATIN (NYSTATIN)
Oropharyngeal candidiasis:
Preterm infant: 0.5 mL to each side of mouth QID
Term infant: 1 mL to each side of mouth QID
Child: Oral suspension: 4–6 mL, swish and swallow QID

OMEPRAZOLE
Child (≥1 yr): Esophagitis, GERD, or ulcers: Start at 1 mg/kg/24 hr
PO ÷ once daily–BID (max. dose: 20 mg/24 hr)

OXACILLIN
NEONATE: IM/IV
≤7 days:
<1.2 kg: 50 mg/kg/24 hr + Q12 hr
1.2–2 kg: 50–100 mg/kg/24 hr + Q12 hr
≥2 kg: 75–150 mg/kg/24 hr + Q8 hr

>7 days:
<1.2 kg: 50 mg/kg/24 hr + Q12 hr
1.2–2 kg: 75–150 mg/kg/24 hr + Q8 hr
≥2 kg: 100–200 mg/kg/24 hr + Q6 hr

INFANT AND CHILD (IM/IV):
100–200 mg/kg/24 hr + Q4–6 hr (max. dose: 12 g/24 hr)

PACKED RBC'S
Generally 10–15 mL/kg over 4 hr; Max. 20 mL/kg.
Give furosemide 1 mg/kg oral if tolerated, or IV half-way through.
When to transfuse? If hgb < 6 g/dl; or > 6 g/dl and symptomatic.
Must be ABO and RhD compatible with the recipient.
If previous reactions to blood products have occurred, premedicate with chlorphenamine (oral or IV), if severe with hydrocortisone 4 mg/kg IV.
Each unit must be used within 4 hr once removed from fridge.

PARACETAMOL (ACETAMINOPHEN)
PO/PR: 10–15 mg/kg/dose PO/PR Q4–6 hr; max. dose: 90 mg/kg/24 hr.
IV: Child (≥2–12 yr) < 50 kg: 15 mg/kg/dose Q6 hr, OR 12.5 mg/kg/dose Q4 hr IV; Max. 75 mg/kg/24 hr.

PHENOBARBITONE (PHENOBARBITAL)
Status epilepticus:
Loading dose, IV: 15–20 mg/kg/dose (max. loading dose: 1000 mg) in a single or divided dose. May give additional 5 mg/kg doses Q15–30 min to a max. total of 40 mg/kg.

Maintenance dose, IV/PO: Monitor levels.
Neonate: 3–5 mg/kg/24 hr + once daily–BID
Infant: 5–6 mg/kg/24 hr + once daily–BID
Child 1–5 yr: 6–8 mg/kg/24 hr + once daily–BID
Child 6–12 yr: 4–6 mg/kg/24 hr + once daily–BID

Preoperative sedation (child): 1–3 mg/kg/dose IM/IV/PO × 1. Give 60–90 min before procedure.

PHENOTYIN
Status epilepticus:
Loading dose: (all ages) 15–20 mg/kg IV Max.: 1500 mg/24 hr
Maintenance for seizure disorders (initiate 12 hr after administration of loading dose):
Neonate: Start with 5 mg/kg/24 hr + Q12 hr PO/IV. Usual range is 4–8 mg/kg/24 hr PO/IV + Q8–12 hr.
Infant/child: Start with 5 mg/kg/24 hr + BID–TID PO/IV. Usual dose ranges are (doses divided BID–TID):
6 mo–3 yr: 8–10 mg/kg/24 hr
4–6 yr: 7.5–9 mg/kg/24 hr
7–9 yr: 7–8 mg/kg/24 hr
10–16 yr: 6–7 mg/kg/24 hr

PLATELET TRANSFUSION
10 mL/kg of normally concentrated platelet product.
A unit should be infused over a period of not more than 30 minutes. Should be rh and ABO compatible.
10 mL/kg will increase platelet count by about 50,000/μL.
When to transfuse? If plt < 50 with bleeding or risk factor; or < 20 without bleeding (For non-oncology pt)

PRENIDONE
2 mg/kg/24 hr PO + once daily–BID × 5–7 days. Max.: 80 mg/24 hr

RANITIDINE
Neonate:
PO: 2–4 mg/kg/24 hr + Q8–12 hr; IV: 2 mg/kg/24 hr + Q6–8 hr
≥1 mo–16 yr:
Duodenal/gastric ulcer:
PO:
Treatment: 4–8 mg/kg/24 hr + Q12 hr; max. dose: 300 mg/24 hr
Maintenance: 2–4 mg/kg/24 hr + Q12 hr; max. dose: 150 mg/24 hr
IV/IM: 2–4 mg/kg/24 hr + Q6–8 hr; max. dose: 200 mg/24 hr
GERD/erosive esophagitis:
PO: 5–10 mg/kg/24 hr + Q8–12 hr. GERD max. dose: 300 mg/24 hr;
erosive esophagitis max. dose: 600 mg/24 hr
IV/IM: 2–4 mg/kg/24 hr + Q6–8 hr; max. dose: 200 mg/24 hr

SODIUM BICARBONATE (NaHCO3)
Correction of metabolic acidosis: Calculate patient’s dose with the following formulas.
Neonate, infant and child:
HCO3 (mEq) = 0.3 × weight (kg) × base deficit (mEq/L), OR
HCO3 (mEq) = 0.5 × weight (kg) × [24 – serum HCO3 (mEq/L)]

- For direct IV administration (cardiac arrest) in neonates and infants, use the 0.5 mEq/mL (4.2 %) concentration or dilute the 1 mEq/mL (8.4 %) concentration 1:1 with sterile water for injection and infuse at a rate no greater than 10 mEq/min. The 1 mEq/mL (8.4 %) concentration may be used in children and adults for direct IV administration.
- For IV infusions (for all ages), dilute to a max. concentration of 0.5 mEq/mL in dextrose or sterile water for injection, and infuse over 2 hr using a max. rate of 1 mEq/kg/hr.
Sodium bicarbonate should not be mixed with or be in contact with calcium, norepinephrine, or dobutamine.

TAMIFLU (OSELMAIVIR)
Full-term neonate:
<14 days old: 3 mg/kg/dose PO once daily × 5 days
≥14 days old: 3 mg/kg/dose PO BID × 5 days

Weight (kg)
Age (months) Dosage for 5 days Volume of Oral Suspension (6 mg/mL)
<3 12 mg PO BID 2 mL
3–5 20 mg PO BID 3.3 mL
6–11 25 mg PO BID 4.2 mL
Child < 1–12 yr:
<15 12 mg PO BID 2 mL
15–23 15 mg PO BID 1.5 mL
≥23 20 mg PO BID 2 mL

TAZOCIN (Piperacillin/tazobactam)
Neonate: 100 mg/kg/dose IV at the following intervals:
≤1 kg:
≤14 days old: Q12 hr
15–28 days old: Q8 hr
≥1 kg:
≤7 days old: Q12 hr
8–28 days old: Q8 hr
<2 mo: 300–400 mg/kg/24 hr + Q6 hr
2–9 mo: 240 mg/kg/24 hr + Q8 hr
≥9 mo: 300 mg/kg/24 hr + Q8 hr; max. dose: 16 g/24 hr

VANCOMYCIN
Age 1 mo–12 yr:
General Dosage: 15 mg/kg/dose Q6 hr
CNS Infections, Endocarditis, Osteomyelitis, Pneumonia, and MRSA Bacteremia: 20 mg/kg/dose Q6 hr

ZOFTRAN (ONSANSETRON)
PO (6 mo–10 yr and ≥8 kg; use oral disintegrating tablet):
- 8–15 kg: 2 mg × 1
- >15 and ≤30 kg: 4 mg × 1
- >30 kg: 8 mg × 1

IV (≥1 mo): 0.15–0.3 mg/kg/dose × 1; max. dose: mg/dose
These collections are only for educational purpose and not intended to direct care of any specific patient.

None of these collections can be superior or an alternative for the opinion of the experienced and licensed health care professional.

For any comments or suggestions, please contact me via:

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.. Thank You ..