Medical Handbook for Limited Resource Settings

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Parasites Without Borders, Inc. NY

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Introduction

When one practices medicine in their home country there are standards of care and guidelines often established by societies and organizations. Many look to the World Health Organization when practicing abroad and in limited resource countries. Many WHO guidelines can be found online such as the WHO Model Prescribing Information: Drugs used in Bacterial Infections (http://apps.who.int/medicinedocs/en/d/Js5406e/9.2.html). It is important and can create for a better dynamic when interacting with local providers to be aware of any country specific guidelines that may be created and published for a particular country. These may be created by societies or organizations in a particular country or even by the country's Health Ministry (e.g., Uganda Clinical Guidelines https://www.health.go.ug/content/uganda-clinical-guidelines-2016).

Two major features of practicing in limited resource settings are usually a limited number of available diagnostic tests and a limited medication formulary. Included in this handbook are examples of basic tests that might be available as well as a few examples of basic formularies. In many countries there are 'required' medications and these may be stocked despite no obvious local need. Selecting medications and management algorithms often involve complex decisions based on finite and often limited pharmacy budgets and the local availability and cost of medications. Deciding to stock, prescribe and dispense the latest name brand antihypertensive for an elderly individual with a slightly elevated blood pressure may result in not having malaria medications for a critically ill child.

The following executive summaries are a starting point for the understanding, diagnosis and treatment of common presentations one is likely to encounter in low resource setting as well as specific diseases. The final decisions regarding how these presentations and diseases are approached and managed should however be based on the judgement of a medical profession familiar with the local epidemiology, customs, and standards of care in a particular region.

Several aspects of this guide will serve only as the foundation of further judgement on the part of the clinician. As far as dosing recommendations, if the dosing is 3x/day a clinician will need to communicate with the patient or caregiver regarding if this is 3 times per day with meals, every 8 hours or is a maximum per day. Not only does this aspect of care require judgement but it also is greatly improved by understanding the cultural context. In certain cultures, 3 meals are customary while in others a morning and evening meal are the norm with a late morning break for tea. Another area where cultural sensitivity is critical are issues surrounding family planning. If one administers an intramuscular contraceptive in a women's shoulder below the area covered by the shirt sleeve and then affixes a band aid over the site the patient's privacy may be compromised with negative consequences. Recommending Co-trimoxazole (trimethoprim-sulfa) to a patient with a urinary tract infection in Sub-Saharan Africa might seem to make perfect sense while a patient might be confused and upset as the widespread use of this as a prophylactic medication in the HIV-infected population has led to this medication being viewed as an 'HIV medication'.

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^{0} Fahrenheit	^{0} Celsius
105	40.6
104.5	40.3
104	40
103.5	39.7
103	39.4
102.5	39.2
102	38.9
101.5	38.6
101	38.3
100.5	38.0
100	37.8
99.5	37.5
99	37.2
98.5	37
98	36.7
97.5	36.4
97	36.1

1. Fever

Introduction

Fever is a common symptom that prompts individuals to come for medical attention. Fever can be a sign of a serious or minor infection and fever itself can be a cause of complications such as febrile confusions (particularly in children) or confusion (particularly in adults). The identification of fever should prompt a consideration of any causes that would benefit from specific treatment. Fever is specifically a symptom and not a diagnosis itself.

Clinical Disease

A history, exam and available diagnostic tests based on suspected causes can address what is a very broad differential with certain causes of variable likelihood based on associated symptoms, local epidemiology, age of patient and season. As this is not truly a disease but rather a symptom it is appropriate to set a threshold for determining which level of temperature elevation requires therapy. Some experts and guidelines use a cut off of 102 ^{0}F or 38.9 ^{0}C.

Diagnosis

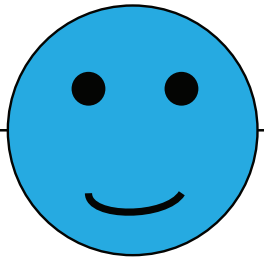
Although there is some controversy, the report by patients or caregivers of a fever is usually reliable. Although normal body temperature varies between men and women, time of day and person to person, (normal range oral 35.7-37.7, tympanic 35.4-37.8, rectal 34.4-37.8, axillary 35.5-37.0) a fever is generally defined as a temperature $\geq$ 38 ^{0}C. Axillary may underestimate core temperature. The diagnosis of fever generally falls into the following categories

- Malarial febrile illness
- Non-malarial febrile illness
  - Infant (within first month of life)
  - Child
  - Adult

Treatment

Always address the cause of fever and then treat fever as a secondary issue. Consider nonpharmacological approached such as removing some clothes, increasing fluid intake (breast feeding for the young), application of a damp cloth. Use lower doses of medications as lower fluid intake is often common. Avoid ibuprofen with Chicken pox!

- **Infant/Child (< 3 years of age no aspirin risk of Reye syndrome)**
  - **(1st line) Paracetamol/acetaminophen 15mg/kg PO 3x/day**
  - **(2nd line and only if age > 6 months) Ibuprofen 5mg/kg PO 3x/day**
- **Adult**
  - **(1st line) Paracetamol/acetaminophen 500-1,000mg PO 3x/day**
  - **(2nd line) Ibuprofen 200-400mg PO 3x/day**

0	no pain	
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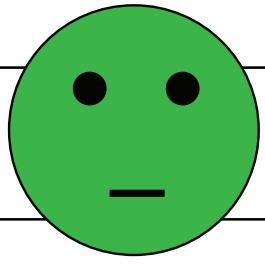
2	mild	
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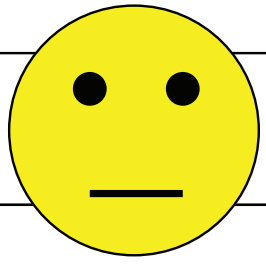
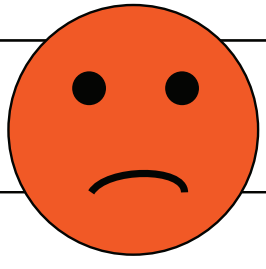
4	moderate	
5	distracting	
6	distressing	
7	unmanageable	
8	intense	
9	severe	
10	incapacitating	

2. Pain (Musculoskeletal/Neuropathic)

Introduction

There is a tremendous burden of musculoskeletal pain throughout the world from osteoarthritis, prior injuries as well as repetitive tasks that individuals perform as part of their activities of daily living. Many situations do not allow for significant modifications to the activities causing pain as resources can be limited and alternatives not clearly available. The increasing incidence of diabetes has brought with an increase in neuropathic pain.

Clinical Disease

Musculoskeletal pain may be crudely divided into joint centered (skeletal) complaints versus those that are more related to pain in the muscles (musculo-). While most causes are 'benign' or not a sign of a more serious disorder it is important to recognize patients with warning signs.

Diagnosis

The challenge of the clinician is to differentiate discomfort due to specific issues such as osteoarthritis, prior trauma and overuse injuries from those with deformity, acute infection or malignancy. A careful history and exam are required despite what may seem like a straightforward problem.

Treatment

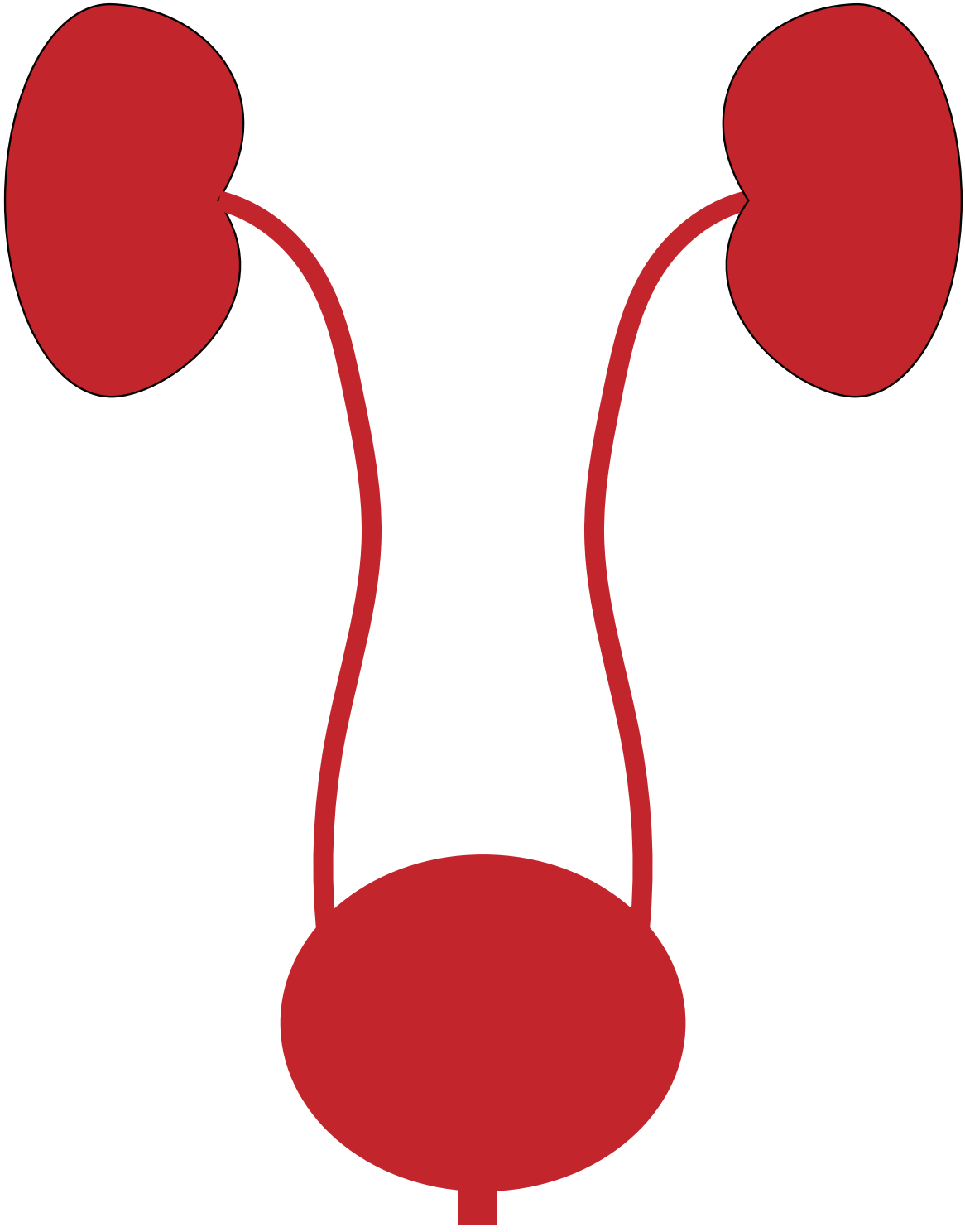
Gastritis, renal issues, risk of ulcers and often limited daily fluid intake care should be taken with NSAID use and limited durations and low doses should be used when risk for using NSAIDs is considered acceptable.

Musculoskeletal pain (always focus on precipitants and teach appropriate exercises, stretches and educate about nonpharmacological therapies such as warmth and cooling)

- **Infant/Child (< 3 years of age no aspirin due to risk of Reye syndrome)**
  - **(1st line) Paracetamol/acetaminophen 15mg/kg PO 3x/day**
  - **(2nd line or if acute or inflammatory-avoid chronic use and only if age > 6 months) Ibuprofen 5mg/kg PO 3x/day**
- **Adult**
  - **(1st line) Paracetamol/acetaminophen 500-1,000mg PO 3x/day**
  - **(2nd line of if acute or inflammatory-avoid chronic use) Ibuprofen 200-400mg PO 3x/day**

Neuropathic pain

- **Adult**
  - **(1st line) Amitriptyline 12.5-25mg PO QHS (start low)**



3. Urinary Tract Infections

Introduction

Not all reports of urinary discomfort are due to urinary tract infections (UTIs) as very concentrated urine may be irritating and urethritis due to sexually transmitted pathogens can cause discomfort. Because this complaint is often not due to a UTI having urine test strips are critical for having guidance in determining which patients will benefit from antibiotics. Associated 'systemic' symptoms and signs such as 'loin pain', back pain, malaise, nausea, vomiting and fever as well as pregnancy status need to be considered.

Clinical Disease

Urinary discomfort and/or increased urinary frequency without systemic manifestations is a simple uti. Systemic symptoms or signs supports the diagnosis of pyelonephritis with different treatment recommendations.

Diagnosis

Urinary symptoms and a positive urinalysis are required to make the diagnosis. Urinary discomfort with a negative urine leukocyte test is not an indication for antibiotics. Recognition of systemic symptoms or signs supports the diagnosis of pyelonephritis if there is a positive urinalysis with different treatment recommendations.

Treatment

(with regional differences is resistance rates recommendations vary by locale) Severely ill patients, young children, and those unable to tolerate oral medications should be evaluated for referral to a high level of care and one should consider IV or IM Ceftriaxone 1-2grams x1.

Simple UTI

- **Child (≤1 year of age)**
  - **Amoxicillin 125mg PO 3x/day x 3 days**
- **Child (1-4 years of age)**
  - **Amoxicillin 250mg PO 3x/day x 3 days**
- **Child (5-11 years of age)**
  - **Amoxicillin 500mg PO 3x/day x 3 days**
- **Adult (>11 years old) (*non-pregnant*)**
  - **Amoxicillin 500mg PO 3x/day x 3 days**
  - **Cefalexin 500mg PO 2x/day x 3 days**
  - **Co-trimoxazole (trimethoprim-sulfa) 160/800mg PO 2x/day x 3 days**
- **Adult (>11 years old) (*pregnant-do not use ciprofloxacin or TMP-Sulfa*)**
  - **Amoxicillin 500mg PO 3x/day x 5 days**
  - **Cefalexin 500mg PO 3x/day x 5 days**

Pyelonephritis

- **Adult/Child *(non-pregnant*)**
  - **(1st line) Ciprofloxacin 500mg PO 2x/day x 5 days**
  - **(2nd line) Cefalexin 500mg PO 3x/day x 10-14 days**
- **Adult ((>11 years old) *(pregnant)***
  - **Cefalexin 500mg PO 3x/day x 10-14 days**
  - ***-consider IV ceftriaxone and referral for possible admission to hospital***

4. Pharyngitis

Introduction

Although the majority of cases of pharyngitis are viral a number of cases are due to Group A *Streptococcus* (GAS) which if untreated can lead to acute rheumatic fever as well other complications such as abscesses, otitis media, or invasive disease.

Clinical Disease

GAS symptoms such as sore throat, fever, and general malaise usually only last 3-5 days. Viral pharyngitis can have variable durations. Antibiotics should not be used just because it lasts 'too long' but only for cases where GAS is likely.

Diagnosis

A scoring system (Joachim Score – sensitivity/specificity 88%/35%) has been developed to aid in diagnosis. The WHO has suggested a simplified approach with recommendations for treating all children with pharyngitis, exudates, and tender cervical lymph nodes. The WHO approach has a lower sensitivity. A *rapid antigen test for GAS can be a very helpful point of care test.*

JOACHIM SCORE	POINTS
Age < 35 months	**1**
Age 36-59 months	**2**
Age >60 months*	**3**
Tender cervical lymph nodes	**1**
Headache	**1**
Petechiae on palate	**1**
Abdominal pain	**1**
Sudden onset (<12 hours)	**1**
Conjunctivitis	**-1**
Coryza (nasal inflammation)	**-1**
Diarrhea	**-1**
Total Score (< 2 vs ≥ 3)	

***-modified score where 15-45 y.o. 0 points**
>45 y.o. -1 points

Treatment

- **Child (less than 15 years old) (<40 kg)**
  - **(1st line) Penicillin VK (phenoxymethylpenicillin) 12.5mg/kg PO 4x/day x 10 days**
  - **(2nd line) Amoxicillin 250mg PO 3x/day x 10 days**
  - **(3rd line) PCN allergy-azithromycin 500mg PO 1x/day x 3 days**
- **Child (≤ 15 years old) (>40)**
  - **(1st line) Penicillin VK (phenoxymethylpenicillin) 500mg-1,000mg PO 4x/day x 10 days**
  - **(2nd line) Amoxicillin 500mg PO 3x/day x 10 days**
  - **(3rd line) PCN allergy-azithromycin 500mg PO 1x/day x 3 days**
- **Adult (> 15 years old)-*not considered at risk for Rheumatic Fever* so *only treat in limited cases***
  - **(1st line) Penicillin VK (phenoxymethylpenicillin) 500mg-1,000mg PO 4x/day x 10 days**
  - **(2nd line) Amoxicillin 500mg PO 3x/day x 10 days**
  - **(3rd line) PCN allergy-azithromycin 500mg PO 1x/day x 3 days**

5. Ear pain (Otitis Media/Otitis Externa)

Introduction

Ear infections can range from external infections due to bacteria and fungi to deeper infections involving the middle ear. These infections can present acutely or develop into chronic conditions.

Clinical Disease

Acute inflammation of the external ear canal (acute otitis externa) can be triggered by trauma or the presence of a foreign object. This can be mild with clear drainage or become infected with purulent discharge. Infection of the middle ear (otitis media) presents as unilateral ear pain often with fever. Chronic suppurative middle ear infections can develop and last more than 2 weeks in a minority of cases.

Diagnosis

Diagnosis requires visualization of the external ear canal and visualization of the tympanic membrane (TM) using an otoscope. If wax obscures the view this can be mechanically removed or dissolved away by pouring a small amount of vegetable oil into the external ear canal at night for a few days.

Treatment

Acute otitis externa

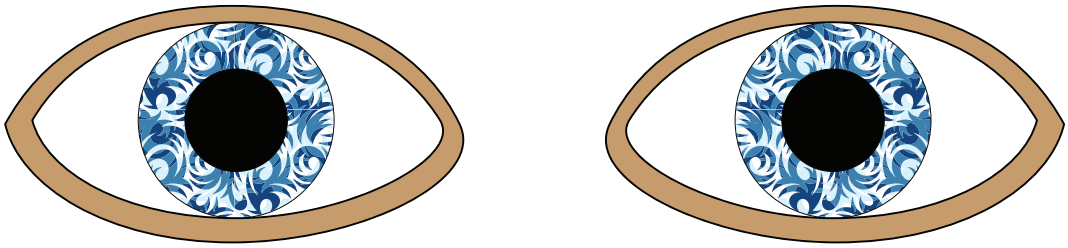
- **Local treatment with a dry ear wick**
- **Ofloxacin 0.3% 10 drops into affected ear 1x/day for 10 days**

Acute otitis media

- **Child (≤1 year of age)**
  - **Amoxicillin 125mg PO 3x/day x 7 days**
  - **Azithromycin 10mg/kg PO x 3 days**
- **Child (1-4 years of age)**
  - **Amoxicillin 250mg PO 3x/day x 7 days**
  - **Azithromycin 10mg/kg PO x 3 days**
- **Child (5-11 years of age)**
  - **Amoxicillin 500mg PO 3x/day x 7 days**
  - **Azithromycin 10mg/kg PO x 3 days**
- **Adult (>11 years old)**
  - **Amoxicillin 1,000mg PO 3x/day x 7 days**
  - **Azithromycin 500mg PO x 3 days**

Chronic suppurative otitis media

- **Local treatment with a dry ear wick**
- **Ofloxacin 0.3% 10 drops into affected ear 1x/day for 10 days**



6. Eye complaints (Cataracts/Pterygium/Conjunctivitis)

Introduction

The prevention of blindness and visual impairment are priorities in all settings. Cataracts are the cause of blindness in many cases worldwide and surgery is the only treatment. Vitamin deficiency, untreated bacterial infection (e.g., trachoma), onchocerciasis, trauma, diabetic complications and glaucoma contribute in varying to impairment of vision to various degrees dependent populations and geographical location.

Clinical Disease

Individuals may seek medical attention due to visual impairment, pain, discharge, or for other reasons with eye issues noted incidentally. While cataracts are painless other eye issues can cause discomfort, drainage, regional swelling and localized pruritis.

Diagnosis

Cataracts can be directly visualized with an ophthalmoscope, or noted with loss of the red-light reflex. Determination of whether there is interference with vision is part of the diagnostic evaluation. Pterygium is triangular growth of tissue extending from the medial aspect of the nasal conjunctiva. Triggered by dust, sun exposure, wind and other irritants. Conjunctivitis is inflammation of the conjunctiva that can present as clear discharge from allergic or viral causes and purulent drainage from bacterial infections.

Treatment

Cataracts

- **Surgical removal is the only treatment and is indicated when vision is impaired**
- **Use of sunglasses and hats can prevent progression and development**

Pterygium

- **Surgical removal is the only treatment and is indicated when vision is impaired**
- **Use of sunglasses and hats can prevent progression and development**

Allergic/Viral conjunctivitis

- **(Adults) Loratadine 10mg PO Q-day x 3 days**

Bacterial conjunctivitis

- **Ofloxacin 0.3% 1-2 drops in affected eye every 4 hours for first day then 4x/day for 5 days**

7. Lower Respiratory Tract Infections (Pneumonia)

Introduction

Pneumonia (PNA) continues to be a major cause of mortality throughout the world and is one of the situations where proper management may reduce mortality by as much as 70%. It is important to distinguish bacterial pneumonia that can benefit from antibiotics from upper respiratory infections and tuberculosis.

Clinical Disease

The typical presentation for PNA is the acute onset of cough and difficulty breathing for less than 2 weeks in duration (fever is not an efficient criterion per the WHO). *In many settings, a duration of symptoms for more than 2 weeks prompts consideration of tuberculosis.*

Diagnosis

In addition to a proper history a careful and reliable physical examination is essential in situations where imaging is not available. The diagnosis is based on respiratory symptoms with evidence of focal airspace disease but with the unreliability of this the WHO recommends using 'fast breathing'.

Age	Normal Resp Rate	Fast Breathing(WHO)	Normal Heart Rate
0-2 months	**35-55/min**	**>60**	**110-160/min**
2-12 months	**30-40/min**	**>50**	**110-160/min**
2-5 years	**20-30/min**	**>40**	**95-140/min**
5-12 years	**15-20/min**	**>30**	**80-120/min**
> 12 years	**12-16/min**	**>30**	**60-100/min**

Treatment

Typical (non-severe PNA)

- **Child (≤1 year of age)**
  - **Amoxicillin 125mg PO 3x/day x 3 days**
- **Child (1-4 years of age)**
  - **Amoxicillin 250mg PO 3x/day x 3 days**
- **Child (5-11 years of age)**
  - **Amoxicillin 500mg PO 3x/day x 3 days**
- **Adult (>11 years old)**
  - **(1st line) Amoxicillin 1,000mg PO 3x/day x 3 days**
  - **(2nd line) Cefalexin 500mg PO 2x/day x 3 days**

Severe (chest indrawing, unable to eat, convulsions, difficult to wake, malnourished)

- **Child (<1mo of age)**
  - **(1st line) Ceftriaxone 50mg/kg IV/IM Q-day**
  - **(2nd line) Penicillin G 50,000 units/kg IV (lasts 4 hours)**
- **Child (>1 mo-11 years of age)**
  - **(1st line) Ceftriaxone 50mg/kg IV/IM Q-day**
  - **(2nd line) Penicillin G 50,000 units/kg IV (lasts 4 hours)**
- **Child/Adult**
  - **(1st line) Ceftriaxone 1-2 grams IV/IM Q-day**
  - **(2nd line) Penicillin G 4 million units IV (lasts 4 hours)**

8. Upper Respiratory Infections (URIs)

Introduction

URIs (the common cold) are common, a frequent reason patients seek medical attention and generally due to viral infection. URI symptoms, however, can be the early symptoms of what will later become a bacterial process. Typical URI complaints may also be reported in cases of sinusitis, otitis media, or a more serious infection such as influenza or measles.

Clinical Disease

URIs are self-limited unless bacterial superinfection occurs. Antibiotics play no positive role in the setting of a URI.

Diagnosis

Confident diagnosis of a URI requires the clinician to rule out lower respiratory infection (no fast breathing or focal findings on auscultation or imaging), otitis media, sinus infections, or a more serious infection whose early symptoms are similar to a URI (influenza, measles, pharyngitis). Duration past several weeks or seasonal return of symptoms suggest allergic etiologies.

Treatment

Antibiotics play no positive role in the setting of a URI and it is not clear that any attempts at symptomatic management can help make patients more comfortable. Antihistamines have no benefit in younger patients and limited if any impact on older patients. Education about seeking medical care with any worrisome symptoms or failure of symptoms to resolve is critical. Also consider"

- **Treating fever (see fever treatment recommendations)**
- **Encourage increased fluid intake**
- **Encourage plenty of rest**
- **Consider nasal suction for infants/ nasal irrigation or steam for adults**
- **Consider recommending sleeping with head elevated**
- **Discuss use of hot beverages and/or hard candy/lozenges**
- **Educate about need to return for medical attention if localization (sinus pain, ear pain), significant worsening, or persistence past 2 weeks**

GOLD Criteria for COPD Severity

GOLD 1	**Mild**	**$FEV_1 \geq 80\%$**
GOLD 2	**Moderate**	**$50\% \leq FEV_1 < 80\%$**
GOLD 3	**Severe**	**$30\% \leq FEV_1 < 50\%$**
GOLD 4	**Very Severe**	**$FEV_{1} < 30\%$**

mMRC Dyspnea Scale

GRADE 0	Shortness of breath only with strong exertion
GRADE 1	Shortness of breath when walking on level ground or slightly uphill
GRADE 2	Needing to walk slower than others and needing to take breaks
GRADE 3	Needing to stop after 100 meters or after a few minutes on level ground
GRADE 4	Unable to leave the house or shortness of breath with dressing and undressing

9. Chronic Obstructive Pulmonary Disease (COPD)/Asthma

Introduction

Chronic respiratory diseases continue to be a major health challenge as they can be caused and or exacerbated by indoor air pollution (certain styles of indoor cooking), outdoor air pollution, occupational exposures, and tobacco. The goals in management are to monitor and manage chronic aspects of the disease as well as acute exacerbations

Clinical Disease

COPD is more than just a smoker's cough and can lead to death and disability. Asthma attacks can leave a person struggling to breath and in addition to an acute risk of death can interfere with a person's ability to attend school or work.

Diagnosis

For children under 5 the diagnosis is most challenging as they are usually unable to perform spirometry testing and one may need to rely on characteristic symptoms or the improvement of symptoms or the 'musical wheezing' with treatment. In older patients (>5 y.o.) of reversible airflow obstruction establishes the diagnosis and helps to assess severity. COPD is diagnosed with demonstration of airflow obstruction ($FEV_1/FVC < 0.70$) while asthma required demonstration of a reversible component. *Spirometry is the preferred method and thus a spirometer is a useful piece of equipment.*

Treatment

(In most cases working with patients and their caregivers to construct an action plan is critical as access to medical care and health literacy may be limited. For effective delivery of inhaler medications to the lungs, rather than just the mouth, the use of spacers is highly recommended. These can often be constructed with the patient using used cups, plastic bottles or other available materials. Many patients and clinicians are not familiar with proper use of inhalers so the use of spacers and education can have a significant impact.)

Asthma without evidence of acute infection

- **Child/Adult (in some areas oral beta-agonists are still used but unclear if benefit outweighs side-effects)**
  - **Trigger avoidance in all patients**
  - **(step one-intermittent symptoms ≤ 2 days /week, no exacerbations in last year requiring steroids) can treat with short acting beta agonist inhaler (salbutamol) 1-2 inhalations q4-6 hours as needed**
  - **(step two-persistent symptoms > 2 days /week, or exacerbations in last year requiring steroids) can add inhaled corticosteroid (beclomethasone) if <12 years of age 1-2 inhalations 2x/day and if ≥ 12 then up to 4 puffs 2x/day (Education on proper use is key! High risk of oral candidiasis)**
  - **(step one-intermittent symptoms ≤ 2 days /week, no exacerbations in last year requiring steroids) can treat with short acting beta agonist inhaler (salbutamol) 1-2 inhalations q4-6 hours as needed**
  - **(persistent symptoms on corticosteroids and short acting beta-agonist inhaler) can add long acting beta agonist inhaler (salmeterol or formoterol) 1-2 inhalations 2x/day but consider referral**

COPD without evidence of acute infection

- **Child/Adult (in some areas oral beta-agonists are still used but unclear if benefit outweighs side-effects)**
  - **Trigger avoidance in all patients/reduction of causes of lung deterioration-smoke/pollution, oxygen when needed if available, exercise (pulmonary rehab)**
  - **(Minimal symptoms) can treat with short acting beta agonist inhaler (salbutamol) or antimuscarinic agent (ipratropium) 1-2 inhalations q4-6 hours as needed**
  - **(More significant symptoms) can add long acting beta agonist inhaler (salmeterol or formoterol) 1-2 inhalations 2x/day but consider referral**

Asthma exacerbation without evidence of acute infection (*rarely use antibiotics in asthma*)

- **Child/Adult**
  - **Prednisolone 1mg/kg 1-2x per day up to 30mg/day for 5 days (always give an observed dose of ivermectin 200mcg/kg PO x1 before steroids in any area with strongyloidiasis)**
  - **Consider nebulizer therapy and oxygen as needed**
  - **(severe cases) Intravenous dexamethasone 0.3-0.6mg/kg/day x 5 days**

COPD exacerbation *with* evidence of acute infection (fever or change in sputum)

- **Adult**
  - **Prednisolone 1mg/kg 1-2x per day up to 30mg/day for 5 days (always give an observed dose of ivermectin 200mcg/kg PO x1 before steroids in any area with strongyloidiasis)**
  - **Plus antibiotics (1st line) Doxycycline 100mg PO 2x/day x 4 days**
  - **Plus antibiotics (2nd line) multiple other antibiotics can be used based on local bacteria and resistance rates (azithromycin/clarithromycin, trimethoprim-sulfamethoxazole, cephalosporins)**
  - **Consider nebulizer therapy and oxygen as needed**
  - **(severe cases) Intravenous dexamethasone 0.3-0.6mg/kg/day x 5 days**

10. Diarrhea/Dehydration

Introduction

Proper treatment of diarrhea has had a phenomenal impact on mortality throughout the world. Proper use of oral hydration solution and limiting the use of antibiotics to only those cases where there is a significant likelihood of benefit is recommended. An important distinction is between non-bloody diarrhea and dysentery (bloody diarrhea).

Clinical Disease

Although there are non-communicable causes of diarrhea the majority of acute cases are infectious. Always consider inflammatory bowel disease, malignancy, and other noninfectious causes. Non-bloody diarrhea is usually self-limited and in general the recommendations are to focus on hydration status. Bloody diarrhea (dysentery) may be caused by shigella (acute) and less commonly by amoebae (often more chronic), and other agents. Many people drink limited amounts of water per day compounding this issue.

Diagnosis

Diarrhea is defined as 3 or more liquid stools per day. Hydration status can be assessed by history (frequency of urination, color of urine, diaper change frequency), physical (rapid heart rate, increased respiratory rate, dry mucous membranes, skin turgor) and laboratory tests (concentrated urine-high specific gravity, high hematocrit).

Treatment

Most rehydration can be done with orally but in severe cases IV hydration should be used.

Non-bloody diarrhea (hydration and no antibiotics unless cholera suspected)

- **Child (≤2 months of age)**
  - **Increased breast feeding if breast fed**
  - **ORS (oral rehydration solution) 20mg/kg per hour**
- **Child (2-6 months of age)**
  - **Zinc supplements 10mg 1x/day for 10 days**
  - **ORS (oral rehydration solution) 20mg/kg per hour**
- **Child (6 months-5 years of age)**
  - **Zinc supplements 20mg 1x/day for 10 days**
  - **ORS (oral rehydration solution) 20mg/kg per hour**
- **Adult**
  - **Zinc supplements 20mg 1x/day for 10 days**
  - **ORS (oral rehydration solution) up to 2 liters per day**

Bloody diarrhea (in addition to rehydration if required)-recommended to treat for shigellosis and only then consider amoebic dysentery

- **Child/Adult**
  - **(1st line) Azithromycin 10mg/kg PO 1x/day x 3 days**
  - **(2nd line) >25kg Cipro 500mg PO 2x/day x 3 days**

11. Gastritis and Reflux

Introduction

Many cases of heartburn and gastritis are a consequence of patient behaviors such as smoking, alcohol ingestion, drinking of coffee or eating spicy and acidic foods. Certain medications such as NSAIDs can make these problems worse.

Clinical Disease

Helicobacter pylori is very prevalent throughout the world, proper diagnostics are often limited and very high reinfection rates in limited resource settings complicate the decision to treat for *H. pylori*.

Diagnosis

In most settings the history is the foundation to the diagnosis with typical burning symptoms after meals radiating to the chest being categorized as likely gastroesophageal reflux (GERD), pain relieved by eating suggest ulcer or gastritis and any blood in stool, black stools, or weight loss serve as warning signs.

Treatment

(any patients with blood in stool, black stools, or weight loss need referral)

Acute Gastritis

- **Dietary advice, calcium carbonate (TUMS) 500mg 1-2 PO 3-4x/day as needed**
- **(moderate to severe) Omeprazole 20-40mg PO Q-day with food for 5 days**

Chronic Gastritis/GERD

- **Dietary advice, calcium carbonate (TUMS) 500mg 1-2 PO 3-4x/day as needed**
- **(moderate and severe) Omeprazole 20-40mg PO Q-day with food for 30 days**

Chronic Gastritis/GERD with warning signs

- **Omeprazole 40mg PO Q-day AND**
- **Referral for further evaluation**

12. Abdominal Pain- (intestinal spasms/constipation/bloating)

Introduction

Abdominal pain can be due to benign as well as serious life-threatening processes that require surgical intervention.

Clinical Disease

Specific syndromes such as helminth infections, GERD, gastritis, infectious diarrhea and others are discussed in separate sections but often patient suffer from chronic or more acute discomfort with any specific primary process that requires or responds to therapy.

Diagnosis

Only after a very careful exclusion of other causes should a clinician feel comfortable with the diagnosis of intestinal spasms or constipation.

Treatment

(any patients with blood in stool, black stools, or weight loss need referral)

Intestinal spasms without constipation

- **Dietary advice to avoid any precipitants**
- **(Adults) Dicyclomine 20mg PO up tot 4x/day as needed for 5 days**

Constipation and bloating

- **Dietary advice-increased fluid intake, increased fruit intake**
- **(Adults/Children >11 years of age) Docusate sodium 100-200mg PO 1-2x/day (short course)**

13. Headache (Tension/Migraine)

Introduction

Migraine and tension-type headaches are perhaps the most prevalent neurological disorder in both resource rich and limited resource settings. Primary headache disorders are one of the top 10 causes of disability-adjusted life years (DALYs) as they peak in persons 20-50 years of age.

Clinical Disease

Headache disorders can present as migraines (often throbbing or pulsatile with associated nausea and or vomiting), tension type (often bilateral and few associated symptoms), or secondary (primary issue may be hypertension, infection, dehydration or other etiology)

Diagnosis

The diagnosis of primary headache disorders can be time consuming as it requires a full history and examination to rule out the possibility that this is secondary to another disorder. Few patients have compelling indications for imaging or lumbar puncture but primary headache disorders, although prevalent, are diagnoses of exclusion. In many parts of the world there is limited fluid intake so many headaches can be addressed just by increasing the patients daily fluid intake.

Treatment

Tension type headache (always encourage increased fluid intake and avoidance of triggers)

- **Infant/Child (< 3 years of age no aspirin risk of Reye syndrome)**
  - **(1st line) Paracetamol/acetaminophen 15mg/kg PO 3x/day**
  - **(2nd line) Ibuprofen 5mg/kg PO 3x/day**
- **Adult**
  - **(1st line) Paracetamol/acetaminophen 500-1,000mg PO 3x/day**
  - **(2nd line) Ibuprofen 200-400mg PO 3x/day**

Migraine headache (Acute)

- **Child (> 5 years of age)**
  - **Ibuprofen 5mg/kg PO up to 3x/day**
- **Adult (≥ 18 years of age) *-limited access to triptans in most resource limited settings***
  - **Ibuprofen 400mg PO and metoclopramide 10mg PO, may repeat every 8 hours**
  -

Migraine headache (Chronic-preventative medications)

- **Child**
  - **(1st line) Amitriptyline 1mg/kg up to 25mg PO at bedtime**
  - **(2nd line) Atenolol 1mg/kg up to 50mg PO at bedtime**

- **Adult**
  - **(1st line) Atenolol 25-50mg PO at bedtime**
  - **(2nd line) Amitriptyline 25mg PO at bedtime**

14. Seizures

Introduction

Seizures of medical concern need to be differentiated from benign febrile seizures of childhood that although frightening are benign. Seizures are more common than most might think with approximately a lifetime risk for the population of ~10% over an individual's lifetime. When a patient presents with a 'first' seizure about 1/3 of these are provoked by an acute event. Epilepsy is when there are more than one unprovoked seizures more than 24 hours apart.

Clinical Disease

With the frequency and benign nature of febrile seizures the first query should be whether the seizure occurred in the context of fever. Acute provoked symptomatic seizures may be caused by a number of disturbances (e.g., fever, hypo- or hyperglycemia, withdrawal or acute intoxication). Epilepsy is a chronic condition with recurrent seizures if left untreated. In many parts of the world the most common cause of seizures is neurocysticercosis.

Diagnosis

When possible, a neurologist should evaluate the patient to determine the likelihood of recurrences and the appropriateness of long-term anti-seizure medications. Causes of an acute provoked seizure should be addressed and a distinction needs to be made between these and epilepsy.

Treatment

Often one is continuing medication started by a neurologist but if initiating therapy them start at lowest dose and slowly increase until seizures are controlled. Monitor for side-effects such as excessive nystagmus, dizziness, sedation, nausea, constipation, and pruritis with dose reductions if required.

- **Child (5-11 years of age)**
  - **Carbamazepine 2.5-10mg/kg PO BID**
- **Child (12-17 years of age)**
  - **Carbamazepine 100-600 mg PO BID**
- **Adult (≥ 18 years of age)**
  - **Carbamazepine 200-800 mg PO BID**

15. Impetigo

Introduction

This superficial golden crusted infection caused by *staphylococcus aureus* (70%) as well as *streptococcal* spp. is a major issue in the tropics as well as in high resource settings.

Clinical Disease

Individuals often suffer from inflamed uncomfortable areas on the face (around nose, mouth, on scalp) but this can spread to the limbs, and trunk. A subset of patients will develop abscesses or fungal infections. This can also complicate other primary skin processes (e.g., scabies infection or tinea.)

Diagnosis

Diagnosis is purely visual but one must distinguish between localized, complicated-widespread, and secondary impetigo or impetigo with secondary infection. If present also treat other issue.

Treatment

Localized uncomplicated (no clear benefit to systemic antibiotics)

- **Cleaning 2x/day with soap and water**
- **Topical antibacterial cream 2-3x/day for 3-5 days or until resolved**
- **Keep areas dry, clean and do not scratch**

Complicated (arrange for follow up if possible and use antibiotics with efficacy against *staphylococcus aureus*)

- **Child (≤11 years of age)**
  - **Cloxacillin 12.5mg/kg up to 500mg PO 4x/day x 7 days**
  - **Cefalexin 12.5mg/kg up to 500mg PO 4x/day x 7 days**
  - **Sulfamethoxazole-trimethoprim 20mg/4mg up to 800/160 PO 2x/day x 7 days (MRSA)**
- **Adult (>11 years old)**
  - **Cloxacillin 500mg 4x/day x 7 days**
  - **Cefalexin 500mg PO 4x/day x 7 days**
  - **Sulfamethoxazole-trimethoprim 800/160 (DS) PO 2x/day x 7 days (MRSA)**

16. Cellulitis

Introduction
This infection of the subcutaneous tissue is usually due to common gram-positive bacterial inhabitants of the skin (mostly *streptococcus* spp.)

Clinical Disease
Cellulitis can present as superficial erythema with a distinct margin (erysipelas) or as a purulent infection (concerning for *staphylococcus aureus*).

Diagnosis
Diagnosis is purely visual (unless there is a purulent area to drain and send for culture) but one must distinguish between non-purulent and purulent as purulent cellulitis shifts the concern form mostly *streptococcus* spp. to include *staphylococcus aureus*. (I+D - incision and drainage).

Treatment

Non-purulent cellulitis

- **Child (≤1 year of age)**
  - **Amoxicillin 125mg PO 3x/day x 7 days**
  - **Cefalexin 12.5mg/kg up to 500mg PO 4x/day x 7 days**
- **Child (1-4 years of age)**
  - **Amoxicillin 250mg PO 3x/day x 7 days**
  - **Cefalexin 12.5mg/kg up to 500mg PO 4x/day x 7 days**
- **Child (5-11 years of age)**
  - **Amoxicillin 500mg PO 3x/day x 7 days**
  - **Cefalexin 12.5mg/kg up to 500mg PO 4x/day x 7 days**
- **Adult (>11 years old)**
  - **Amoxicillin 1,000mg PO 3x/day x 7 days**
  - **Cefalexin 500mg PO 2x/day x 7 days**

Purulent cellulitis (with or without obvious abscess formation) (w/abscess I+D required)

- **Child (≤11 years of age)**
  - **Cloxacillin 12.5mg/kg up to 500mg PO 4x/day x 7 days**
  - **Cefalexin 12.5mg/kg up to 500mg PO 4x/day x 7 days**
  - **Sulfamethoxazole-trimethoprim 20mg/4mg up to 800/160 PO 2x/day x 7 days (MRSA)**
- **Adult (>11 years old)**
  - **Cloxacillin 500mg 4x/day x 7 days**
  - **Cefalexin 500mg PO 4x/day x 7 days**
  - **Sulfamethoxazole-trimethoprim 800/160 (DS) PO 2x/day x 7 days (MRSA)**

17. Purulent Dermatitis

Introduction

This superficial golden crusted infection caused by *staphylococcus aureus* as well as streptococcal spp. is a major issue in the tropics as well as in high resource settings.

Clinical Disease

Individuals often suffer from inflamed uncomfortable areas on the face (around nose, mouth, on scalp) but this can spread to the limbs, and trunk. A subset of patients will develop abscesses or fungal infections. This can also complicate other primary skin processes (e.g., scabies infection or tinea.)

Diagnosis

Diagnosis is purely visual but one must distinguish between localized, complicated-widespread, and secondary impetigo or impetigo with secondary infection. If present also treat other issue.

Treatment

Localized uncomplicated (no clear benefit to systemic antibiotics)

- **Cleaning 2x/day with soap and water**
- **Topical antibacterial cream 2-3x/day for 3-5 days or until resolved**
- **Keep areas dry, clean and do not scratch**

Complicated (arrange for follow up if possible and use antibiotics with efficacy against *staphylococcus aureus*)

- **Child (≤11 years of age)**
  - **Cloxacillin 12.5mg/kg up to 500mg PO 4x/day x 7 days**
  - **Cefalexin 12.5mg/kg up to 500mg PO 4x/day x 7 days**
  - **Sulfamethoxazole-trimethoprim 20mg/4mg up to 800/160 PO 2x/day x 7 days (MRSA)**
- **Adult (>11 years old)**
  - **Cloxacillin 500mg 4x/day x 7 days**
  - **Cefalexin 500mg PO 4x/day x 7 days**
  - **Sulfamethoxazole-trimethoprim 800/160 (DS) PO 2x/day x 7 days (MRSA)**

18. Non-purulent Dermatitis

Introduction

It is always challenging to identify a rash in the tropics as due to inflammation and not infection as the application of topical steroids or failure to treat an infection properly can lead to severe problems as it is not always easy for a person to return for medical care.

Clinical Disease

Non-purulent or inflammatory dermatitis certainly occurs frequently in limited resource settings.

Diagnosis

Diagnosis is mainly focused on evaluating for a primary infectious process such as bacterial, fungal or parasitic and only treating as an inflammatory condition if this is not the case. An empiric trial with application of a cream to a limited localized area can be part of the careful diagnostic process.

Treatment

Localized uncomplicated

- **Start with application of locally available lotions (e.g., coconut oil, vegetable oil, calamine lotion)**
- **Topical hydrocortisone 1% 2x/day for 3-5 days or until resolved (start with small test area)**
- **Keep areas clean and do not scratch**

More significant and irritating

- **Start with application of locally available lotions (e.g., coconut oil, vegetable oil, calamine lotion)**
- **Topical hydrocortisone 1% 2x/day for 3-5 days or until resolved (start with call test area)**
- **Keep areas clean and do not scratch**
- **Diphenhydramine (liquid or tablets) (frequently causes drowsiness)**
    - **Child (2-6 years of age) 6.25mg PO 4x/day as needed**
    - **Child (6-12 years of age) 12.5mg PO 4x/day as needed**
    - **Child/Adult (>12 years of age) 25-50mg PO 4x/day as needed**

19. Fungal Skin Infections

Introduction

Superficial fungal skin rashes are very common in the tropics and include the same range of manifestations as clinicians see in temperate climes (e.g., athlete's foot, tinea corporis, tinea capitus, tinea versicolor)

Clinical Disease

Individuals often suffer from uncomfortable areas on various aspects of the body. A subset of patients will develop abscesses or fungal infections. These infections can also be complicated by other skin processes (e.g., impetigo, cellulitis)

Diagnosis

Diagnosis is mostly visual with a characteristic scaly rash. Dermoscopy can aid in the diagnosis but the availability of microscopic examination of skin scrapings is usually limited.

Treatment

Tinea pedis/tinea corporis/tinea versicolor

- **Cleaning 2x/day with soap and water**
- **Clotrimazole cream 1% apply 2-3x/day for 7 days**
- **Keep areas dry, clean and do not scratch**

Tinea capitis (all modalities if possible)

- **Consider shaving if culturally appropriate and possible AND**
- **Clotrimazole cream 1% apply 2-3x/day for 7 days AND**
- **Griseofulvin (expensive but only proven effective option)**
    - **Children (<12 years old) 10mg/kg up to 500mg PO Q-day x 6 weeks**
    - **Adults/Children (>12 years old) 500mg PO Q-day x 6 weeks**

20. Scabies

Introduction

Scabies skin rashes are very common throughout the world and cause a great degree of discomfort for the affected individual as well as family and close contacts who also may be at risk or already infected as well.

Clinical Disease

Individuals often suffer from severe pruritis that is notably worse at night. Affected areas can also become superinfected with bacteria or fungi.

Diagnosis

Skin scraping and microscopic identification of scabies mites, eggs or feces. Dermoscopy can be helpful to visualize burrows, mites and identification of 'delta wing' sign and also to direct scrapings.

Treatment

- **Topical application of permethrin (1%) cream - leave on entire body including under the nails for 8–14 hours, rinse off and repeat 1–2 weeks later if needed, 30 g typically required to cover entire body**
- **In severe cases or with wide distribution one may also or instead use ivermectin 200 mcg/kg PO x1 (3mg tablets so ~5 tablets for a 70 kg adult) with a second treatment on day 8 if live lice detected.**

21. Lice

Introduction
Lice can affect the head, the body or the pubic areas.

Clinical Disease
Individuals often lack any symptoms or report pruritis

Diagnosis
Visualization of lice or eggs in the hair or seams of garments. The wet combing technique increases sensitivity for detection of lice attached to hair.

Treatment
(avoid drug therapy in pregnancy)

Head lice (increasing number of options with increasing age)

- **Manual removal of lice using the wet combing technique can be performed**
- **(>2 months of age) - permethrin (1%) cream rinse leave on hair for 10 minutes, rinse off and repeat 9 days later**
- **(> 6 months of age) benzyl alcohol (5%) lotion leave on hair for 10 minutes, rinse off and repeat 7 days later, > 6 months of age ivermectin (0.5%) topical lotion leave on hair for 10 minutes, rinse off,**
- **(> 2 years of age) pyrethrins (0.33%) with piperonyl butoxide (4%) lotion apply to dry hair and leave on hair for 10 minutes, rinse off and repeat 9 days later.**
- **(> 6 years of age) – malathion (0.5%) lotion leave on hair for 8–12 hours then wash off, may repeat in 9 days**
- **(>15kg individuals only) Oral treatment with ivermectin 200–400 mcg/kg PO x1 (3 mg tablets so ~5–6 tablets for a 70 kg adult) with a second treatment on day 8 if live lice detected**

Body lice (live on clothes and not the body)

- **Thoroughly bath patient and wash clothing in heated water >149 ° F/>65 ° C, occasionally topical therapy with permethrin (5%) cream to entire body and left on for 8–10 hrs. Low potency topical steroids may be used for symptomatic relief.**
- **(>15kg individuals only) Ivermectin 200–400 mcg/kg PO x1 may have a transient impact on body lice infestation**

Pubic lice (should pursue ontact tracing as these are sexually transmitted)

- **Manual removal of lice using the wet combing technique can be performed Topical application of pediculicides (for age >2 months of age) – permethrin (1%) cream rinse, leave on affected areas for 10 minutes, pyrethrins (0.33%) with piperonyl butoxide (4%) lotion apply to affected areas and leave on hair for 10 minutes**
- **(>15kg individuals only) Ivermectin 250 mcg/kg PO x1 (3mg tablets so ~5–6 tablets for a 70 kg adult) repeated 1–2 weeks later**

SIRS Criteria for Children

AGE	HEART RATE	RESP RATE	WBC ($10^3/mm^3$)	SYS BP
0-7 days	>180 or <100	>50	>34	<59
7-30 days	>180 or <100	>40	>19.5 of <5	<79
1-12 months	>180 or <90	>34	>17.5 of <5	<75
1-5 years	>140	>22	>15.5 of <6	<74
5-12 years	>130	>18	>13.5 of <4.5	<83
12-18 years	>110	>14	>11 of <4.5	<90

SIRS Criteria for Adults

TEMPERATURE	>38^{0}C (100.5^{0}F) or <36^{0}C (96.8^{0}F)
HEART RATE	>90 beats per minute
RESP RATE	>20 breaths per minute of $PaCO_2$ <32 mHg
WBC ($10^3/mm^3$)	>12 or <4 or >10% bands (immature forms)

22. Sepsis

Introduction

Sepsis is a severe inflammatory response triggered by a presumed or documented infection that results in injury to a body's own tissues and organs. Early recognition and treatment do appear to reduce mortality and morbidity.

Clinical Disease

Individuals may present with a combination of increased respiratory rate, altered mentation, decreased blood pressure, and evidence of specific organ dysfunction (e.g., decreased platelets, elevation of bilirubin, worsening of kidney function (reduced urine output), hypoxemia, hypoglycemia).

Diagnosis

Sepsis can be diagnosed by recognizing fast breathing, tachycardia and altered mental status and then severity can be assessed by evaluation of degree of end organ dysfunction.

Treatment

An initial ABCDE and G approach

- **Assess airway and address hypoxemia**
- **Breathing (assess respiratory rate and chest wall movements)**
- **Circulation (establish IV access if required and administer Iv fluids)**
- **Disability (assess level of consciousness)**
- **Exposure (expose skin and look for bleeding, rashes and measure temperature)**
- **And Glucose (measure blood sugar**

Antibiotics

- **Child (<1mo of age)**
  - **(Ceftriaxone 50mg/kg IV/IM Q-day (increase to BID for CNS)**
  - **Add metronidazole for anaerobic coverage**
  - **Add Ciprofloxacin for atypical or pseudomonas coverage**
- **Child (>1 mo-17 years of age)**
  - **Ceftriaxone 50mg/kg IV/IM Q-day (increase to BID for CNS)**
  - **Add metronidazole for anaerobic coverage**
  - **Add Ciprofloxacin for atypical or pseudomonas coverage**
- **Child/Adult (>17 years of age)**
  - **Ceftriaxone 2 grams IV/IM Q-day (increase to BID for CNS)**
  - **Add metronidazole for anaerobic coverage**
  - **Add Ciprofloxacin for atypical or pseudomonas coverage**

23. Sexually Transmitted Infections (STIs) (Male)

Introduction

It is estimated that each day there are perhaps 1 million STIs contracted including syphilis, gonorrhea, chlamydia, herpes, and HIV.

Clinical Disease

Individuals often present with ulcers, discharge or concerns after what they perceive as a high-risk encounter. Untreated infections not only are a risk for the community but can lead to a number of complications for the individual. Many individuals are asymptomatic while actively transmitting STIs.

Diagnosis

In many regions access to testing is limited and a syndromic approach is used. HIV and syphilis testing are often available. The main syndromes are: urethral discharge, acute scrotal swelling and genital ulcers. Painful genital ulcers may be due to HSV. All individual with STIs should have syphilis and HIV testing.

Treatment

Urethral discharge (Gonorrhea and Chlamydia-TREAT FOR BOTH, also consider Trichomonas)

- **Gonorrhea/Chlamydia**
  - **Ceftriaxone 250mg IM x1 PLUS Azithromycin 1-gram PO x 1**

- **Trichomonas**
  - **Metronidazole 500 mg PO BID x 7 days**
  - **Tinidazole 2 g PO x1**

Scrotal swelling-acute (localized to epididymis-Gonorrhea and Chlamydia-*E. coli* in older men)

- **Gonorrhea/Chlamydia**
  - **Ceftriaxone 250mg IM x1 PLUS Azithromycin 1-gram PO x 1**

Genital ulcer (Syphilis and based on local prevalence: chancroid, granuloma inguinale, or LGV)

- **Syphilis (In acute - syphilis serology will often be negative)**
  - **(Acute) Benzathine penicillin G 2.4 million IU IM x1**
  - **(Acute) (alternative/nonpregnant) Doxycycline 100mg PO BID x 15 days**
  - **(Acute) (alternative/nonpregnant) Tetracycline 500mg PO QID x 15 days**

  - **(Late) Benzathine penicillin G 2.4 million IU IM x 3 Q-week**
  - **(Late) (alternative/nonpregnant) Doxycycline 100mg PO BID x 30 days**
  - **(Late) (alternative/nonpregnant) Tetracycline 500mg PO QID x 30 days**

  - **(Neuro) Aqueous PCN 4 million units IV q 4 hours x 14 days**
  - **(Neuro) Benzathine penicillin G 1.2 million IU IM/probenecid 500mg PO QID x 14 days**
  - **(Neuro) (alternative/nonpregnant) Doxycycline 100mg PO BID x 30 days**
  - **(Neuro) (alternative/nonpregnant) Tetracycline 500mg PO QID x 30 days**

- **Chancroid**
  - **Cipro 500mg PO BID x 3 days**
  - **Erythromycin 500mg PO QID x 7 days**
  - **Azithromycin 1-gram PO x1**
  - **(alternative) Ceftriaxone 250mg IM x1**

- **Granuloma inguinale (treat until all lesions healed)**
  - **Azithromycin 1-gram PO x1 then 500mg PO Q-day**
  - **Doxycycline 100mg PO BID**
  - **Erythromycin 500mg PO QID**
  - **Tetracycline 500mg PO QID**
  - **TMP/Sulfa 80/400mg 2 tabs PO BID**

- **LGV (no clinical trial so recommendations based on expert opinion)**
  - **Doxycycline 100mg PO BID**
  - **Erythromycin 500mg PO QID**
  - **(alternative-nonpregnant) Tetracycline 500mg PO QID x 14 days**

- **HSV (painful and perhaps vesicular-for primary infection)**
  - **Acyclovir 400mg PO TID x 7 days**
  - **Famciclovir 250mg PO TID x 7 days**
  - **Valacyclovir 1,000mg PO BID x 7 days**

24. Female Pelvic/Vaginal Complaints

Introduction

Pelvic and vaginal complaints are a significant reason for women to seek medical attention. These can range from fairly benign and easily treatable to life threatening. Beyond the basic complaints that are addressed here there are many more complicated medical issues that fall under maternal, reproductive, or women's health that benefit from involvement of a clinician expert in these areas.

Clinical Disease

Individuals often present with ulcers, discharge, pain or concerns after what they perceive as a high-risk encounter. Untreated infections not only are a risk for the community but can lead to a number of complications for the individual. Many individuals are asymptomatic while actively transmitting STIs.

Diagnosis

In many regions access to testing is limited and a syndromic approach is used. HIV and syphilis testing are often available. The main syndromes are: vaginal discharge, lower abdominal pain and genital ulcers. Painful genital ulcers may be due to HSV. All individual with STIs should have syphilis and HIV testing. (Exam can be very informative.)

Treatment

Vaginal discharge (Gonorrhea and Chlamydia-TREAT FOR BOTH, also consider Trichomonas, Candidiasis, and bacterial vaginosis)

- **Gonorrhea/Chlamydia**
  - **Ceftriaxone 250mg IM x1 PLUS Azithromycin 1-gram PO x 1**

- **Trichomonas**
  - **Metronidazole 500 mg PO BID x 7 days**
  - **Tinidazole 2 g PO x1**

- **Candida Vaginitis**
  - **Fluconazole 150mg PO x 1**
  - **Clotrimazole Cream 1% intravaginal Q-day x 7-14 days**

- **Bacterial Vaginosis**
  - **Metronidazole 500 mg PO BID x 7 days**
  - **Tinidazole 2 g PO x1**

Lower Abdominal/Pelvic Pain *consider ectopic pregnancy*

- **Gonorrhea/Chlamydia (Gonorrhea and Chlamydia)**
  - **Ceftriaxone 250mg IM x1 AND Azithromycin 1-gram PO x 1**

- **Pelvic Inflammatory Disease (consider hospital referral)**
  - **Ceftriaxone 250mg IM x1 AND Doxycycline 100mg PO BID x 14 days AND Metronidazole 500mg PO BID x 14 days**

Genital ulcer (Syphilis and based on local prevalence: chancroid, granuloma inguinale, or LGV)

- **Syphilis (In acute - syphilis serology will often be negative)**
  - **(Acute) Benzathine penicillin G 2.4 million IU IM x1**
  - **(Acute) (alternative/nonpregnant) Doxycycline 100mg PO BID x 15 days**
  - **(Acute) (alternative/nonpregnant) Tetracycline 500mg PO QID x 15 days**
  - **(Late) Benzathine penicillin G 2.4 million IU IM x 3 Q-week**
  - **(Late) (alternative/nonpregnant) Doxycycline 100mg PO BID x 30 days**
  - **(Late) (alternative/nonpregnant) Tetracycline 500mg PO QID x 30 days**
  - **(Neuro) Aqueous PCN 4 million units IV q 4 hours x 14 days**
  - **(Neuro) Benzathine penicillin G 1.2 million IU IM/probenecid 500mg PO QID x 14 days**
  - **(Neuro) (alternative/nonpregnant) Doxycycline 100mg PO BID x 30 days**
  - **(Neuro) (alternative/nonpregnant) Tetracycline 500mg PO QID x 30 days**
- **Chancroid**
  - **Cipro 500mg PO BID x 3 days**
  - **Erythromycin 500mg PO QID x 7 days**
  - **Azithromycin 1-gram PO x1**
  - **(alternative) Ceftriaxone 250mg IM x1**
- **Granuloma inguinale (treat until all lesions healed)**
  - **Azithromycin 1-gram PO x1 then 500mg PO Q-day**
  - **Doxycycline 100mg PO BID**
  - **Erythromycin 500mg PO QID**
  - **Tetracycline 500mg PO QID**
  - **TMP/Sulfa 80/400mg 2 tabs PO BID**
- **LGV (no clinical trial so recommendations based on expert opinion)**
  - **Doxycycline 100mg PO BID**
  - **Erythromycin 500mg PO QID**
  - **(alternative-nonpregnant) Tetracycline 500mg PO QID x 14 days**
- **HSV (painful and perhaps vesicular-for primary infection)**
  - **Acyclovir 400mg PO TID x 7 days**
  - **Famciclovir 250mg PO TID x 7 days**
  - **Valacyclovir 1,000mg PO BID x 7 days**

25. Family Planning

Introduction

Access to family planning is considered by many to be a fundamental right for the realization of a person's well-being and freedom from the consequences of unintended pregnancy. In every place in the world there are important social and religious aspects to family planning.

Approaches

Counseling and education form the cornerstone of family planning. There are behavioral, pharmacological, mechanical and surgical approaches that an individual might select to use in an attempt to prevent unintended pregnancy. These different approaches have variable success rates, different risks and aspects that make them more or less acceptable to different populations.

Behavioral

- **Abstinence**
- **Fertility awareness (calendar and symptom methods)**

Pharmacological

- **Oral Contraception (Combined, Progestin-Only, Emergency)**
- **Injectable Contraception (Different preparations in different regions)**
  - **Medroxyprogesterone Acetate 150mg (1ml) IM every 3 months**
- **Patch**
- **Vaginal Ring**

Mechanical

- **Condoms**
- **Diaphragms**
- **Cervical Caps**
- **Vaginal Ring**

Surgical

- **Vasectomy**
- **Female sterilization**

26. Parasitic Helminths

Introduction

A large percentage of the world's population is infected with one or more parasites. Soil transmitted helminths (STHs), Ascaris, Hookworm, and Whipworm, are responsible for a large number of chronic infections and are the subject of many mass drug administration campaigns throughout the word.

Approaches

Although many parasitic infections have specific presentations, ways in which they can be diagnosed and specific recommended therapies, many are treated by regular mass administration of antihelminthic medications to populations by governmental and nongovernmental organization. Knowledge of the local practices is important in deciding if the local clinic organization will be orchestrating this campaign or if it is already being done on a regular basis by another organization.

Targeted Therapy

- **Child (6months to 2 years of age) - may repeat Rx in 1 week in severe cases**
  - **Albendazole 200mg PO x1 (x 3 days for hookworm)**
- **Adult/Child (>2 years of age) - may repeat Rx in 1 week in severe cases**
  - **Albendazole 400mg PO x1 (x 3 days for hookworm)**

Scheduled Anthelmintic Approach

- **Child (6months to 2 years of age)**
  - **Albendazole 200mg PO x 1 every 3-6 months**
- **Adult/Child (>2 years of age)**
  - **Albendazole 400mg PO x 1 every 3-6 months**

27. Diabetes Mellitus

Introduction

Most cases of Diabetes Mellitus treated in limited resource settings are type II as type I usually requires a higher level of resources to manage insulin therapy. The introduction of Diabetes management to limited resource care represented a shift from acute to chronic care medicine and requires a commitment to ongoing care and a longitudinal investment in the patient.

Clinical Disease

Although in more resource rich areas diabetes is often diagnosed at an early and asymptomatic stage, diabetes in other settings can present symptomatically with visual disturbance, polyuria and dehydration.

Diagnosis

Diagnosis is based on three elevated blood glucose measurements on three separate days. (Consecutive days in certain national guidelines.)

- **Random blood sugar of ≥ 200mg/dL or 11.1 mmol/L**
- **Fasting blood sugar of ≥ 126mg/dL or 7.0 mmol/L**

Treatment

Although it would make sense to address lifestyle such as diet and exercise there may be limited options for individual and medication may be necessary. Focus not only on controlling blood sugars but also on risks for cardiac events, neuropathy complications, kidney issues, and infections. Diabetic foot care is particularly critical.

- **Oral medication**
  - **(1st line) Metformin 500mg PO Q-day up to a maximum of 850mg PO TID**
  - **(2nd line) Sulfonylurea – (e.g., Glibenclamide 5mg PO Q-day up to a maximum of 15mg PO Q-day (this is usually added to metformin but introduces the risk of hypoglycemia)**
- **Injectable Insulin**
  - **Insulin in various formulation can be successfully and safely used with proper monitoring but the costs associated with insulin and needed supplies including test strips can be significant**

28. Hypertension

Introduction

Hypertension is usually a chronic disease leading to cardiovascular, renal and other complications after many years of poor or no treatment.

Clinical Disease

Although most patients will be asymptomatic patients may report: headache, blurry vision, chest pain or shortness of breath with exertion.

Diagnosis

The diagnosis is based on recording elevated blood pressures on three separate occasions. The threshold for making the diagnosis and deciding that this is hypertension that should be treated vary.

Treatment

Thresholds for treatment vary widely based on resources, life expectancy, responsiveness to different agents based on population, comorbidities and access to laboratory testing. In populations with limited access to water diuretics may be a poor choice. In salt sensitive populations in Sub-Saharan Africa a diuretic coupled with salt restriction may be the most effective therapy. Although ACE-I are recommended in diabetics this class of medicine presents risks when used without access to laboratory monitoring. Below are suggested approaches in two different contexts but many suggest consideration of comorbidities in selecting agents and the WHO does make a point of the fact that there are 'compelling indications' for specific medications such as renal disease, CHF and cardiac disease.

Isolated Island Population Limited Water Intake

- **(1st line) Amlodipine 5mg PO 1x/day up to 10mg PO 1x/day**
- **(2nd line) Enalapril 10mg PO each evening max 20mg/day**
- **(3rd line) Atenolol 50mg PO each evening**

Sub-Saharan Africa

- **(1st line) Diuretic (e.g., hydrochlorothiazide 12.5-25mg\bendroflumethiazide 2.5-5mg PO Q-day)**
- **(2nd line) Nifedipine 10 mg PO BID up to 20mg PO BID**
- **(3rd line) Lisinopril 5mg PO Q-day up to 20mg PO Q-day**
- **(4th line) Atenolol 50mg PO each evening**

29. Congestive Heart Failure (CHF)

Introduction

The majority of deaths in the world are due to non-communicable diseases with cardiovascular disease continuing to be the leading cause of death in the world. Although ischemic causes are the most common etiology in many part of the world, in certain parts of the world Chagas Disease (caused by a parasitic infection) is the leading cause of CHF. In other parts of the world rheumatic heart disease is a leading cause of valvular disease leading to CHF.

Clinical Disease

The presentation in different settings may vary and in many parts of the world the threshold for seeking medical attention is often the inability to perform their required work. A patient may report they have trouble breathing while trying to work or walk up a hill. Swollen edematous legs may be ignored as this might not interfere with their ability to complete their day's work.

Diagnosis

Although making this diagnosis by ultrasound is ideal, in many settings access to an ultrasound machine, a competent technician to perform the test and a clinician skilled in interpreting the images is not available. Diagnosis by ultrasound is ideal but this diagnosis can be made clinically based on symptoms and physical signs such as an elevation of the jugular venous pressure, auscultation of basilar pulmonary crackles, observation of dependent pitting edema, and presence of an S3 gallop.

Treatment

Non-pharmacological

- **Diet-healthy nutrient rich diet with weight reduction in obese patients**
- **Salt-avoid added salt and consistent low salt consumption can improve symptoms and greatly simplify diuretic use**
- **Fluid-consistent intake can help manage volume and sodium levels**
- **Alcohol-advise against excessive intake and complete abstinence in cases of alcohol related cardiomyopathy**
- **Smoking-strong recommendations for cessation**
- **Exercise-regular consistent exercise should be encouraged**
- **Vaccination-vaccination, particularly pneumococcal and influenza, can have positive impacts**

Pharmacological

- **Beta blockers**
  - **Metoprolol tartrate 12.5-100mg PO BID (start low and slowly increase)**
- **ACE-I**
  - **Enalapril 2.5mg PO Q-day then up to 20mg PO BID (lower doses if no lab monitoring)**
- **Diuretics**
  - **Hydrochlorothiazide 12.5-50mg PO Qam (may go as high as 200mg/day with caution**
  - **Furosemide IV or PO start at 20mg then can increase as needed**

30. Stroke (Cerebral Vascular Accident)

Introduction

The majority of strokes occur in individuals over the age of 55 with 75% occurring in patients over the age of 65. The demographics in many parts of the world being such that a great majority of the population is young and only a minority are of an age that puts that at highest risk for a stroke. As conditions improve the expectation is that the number of patients at risk will increase

Clinical Disease

Two phases of stroke are the acute phase when a patient presents with the onset of symptoms and the second phase is the chronic phase that follows this acute period. The two priorities in the chronic phase are working to decrease the disability associated with the acute event and a focus on prevention of a second event. The acute presentation is characterized by an abrupt loss in neurological function (e.g., localized loss of motor function, Vision disturbance, inability to speak).

Diagnosis

Diagnosis is often clinical but in certain settings imaging such as CT and MRI can be available and confirm or suggest alternative diagnoses. Even if such technologies are not immediately available it is critical to find out about the possibility of transporting your patient to a facility that does have this capability. The period of time from presentation to confirmation and the ability to distinguish a hemorrhagic from an ischemic stroke can impact management.

Treatment

Acute

- **Thrombolytic therapy- in certain settings where the resources are available to diagnose and handle the possible complications, thrombolytic therapy may be utilized (stroke centers). If available the window for this therapy is limited to within 4.5 hours from onset of symptoms and a knowledge of regional access to such a resource is critical to explore prior to encountering this issue.**
- **Antithrombotic therapy- initiation of aspirin in the first 48 hours is recommended if no contraindications present**
- **Fluids – correcting dehydration which is common in the setting of acute stroke is recommended (if oral hydration is being considered then aspiration risk needs to be assessed**
- **Glycemic control-hyper or hypoglycemia may complicate stroke**
- **Aspiration risk assessment-dysphagia is common and many patients will be at risk for aspiration**
- **Fever – associated with a doubling of acute mortality so a source should be sought, treated if necessary and normal temperature maintained**
- **Blood pressure- although no specific agent is preferred improved outcomes are associated with blood pressure control below 180/105 and a 15% reduction in blood pressure in the first 24 hours is recommended.**

Chronic-mitigating disability

- **Prognosis-the range of what to expect can range from death shortly after a stroke to almost complete recovery. Most will survive with the majority of survivors having moderate to severe impairments**
- **Rehabilitation/Recover-Often started one or two days after a stroke, rehabilitation can help restore the ability to perform activities of daily living such as eating, walking, dressing and selfcare**

Chronic-secondary prevention

- **Blood pressure-control may reduce the risk of future events**
- **Diabetes mellitus-control may reduce the risk of future events**
- **Smoking-cessation should be strongly encouraged**
- **Dyslipidemia-control may reduce the risk of future events**
- **Physical activity-increased activity and limited sitting can lower risks**
- **Antithrombotic therapy–aspirin 81mg PO Q-day**

31. Heart Attack (Acute Myocardial Infarction)

Introduction

A heart attack or acute myocardial infarction (AMI) is when there is damage to the heart muscle due to inadequate blood supply relative to demand. This may be due to acute blockage of one of the vessels supplying blood to the heart caused by plaque disruption, an increase in demand that cannot be matched by increased perfusion, or several other less common mechanisms. This is to be distinguished from sudden cardiac death due to an arrhythmia but is still one of the most common problems throughout the world.

Clinical Disease

Chest pain is the most common primary complaint for a person suffering an AMI. The quality of the pain is generally a pressure or tightness in the left chest. There may be radiation to the arm or jaw. Patients may have difficulty breathing, sweating and a feeling of anxiousness.

Diagnosis

Although the diagnosis can be made clinically, having and electrocardiogram and laboratory testing can greatly assist in confirming one's clinical suspicions as well as classifying the type of AMI and monitoring for arrhythmias. The diagnosis should be as expedited as possible so that directed treatment can be initiated.

Treatment

Acute

- **Reperfusion-Coronary angioplasty/fibrinolytic therapy- in certain settings where the resources are available to diagnose and handle the possible complications, angioplasty or fibrinolytic therapy may be utilized. A knowledge of regional access to such resources is critical to explore prior to encountering this issue.**
- **Antiplatelet therapy- initiation of aspirin in the first 48 hours is recommended if no contraindications present**
- **Nitrates-if available may be given but may precipitated a drop in blood pressure**
- **Beta-blockers-(e.g., metoprolol 25mg PO BID)**

Chronic\Secondary Prevention

- **Antiplatelet therapy-continuation of aspirin is recommended if no contraindications present**
- **Beta-blockers-(e.g., metoprolol 25mg PO BID)**
- **Blood pressure-control may reduce the risk of future events (ACE-I preferred agent after beta-blockers)**
- **Diabetes mellitus-control may reduce the risk of future events**
- **Smoking-cessation should be strongly encouraged**
- **Dyslipidemia-control may reduce the risk of future events**
- **Physical activity-increased activity and limited sitting can lower risks**
- **Congestive heart failure management-see this section**

32. Palpitations

Introduction

The report of palpitations is very common in patients presenting to medical care and although usually benign can be due to a serious etiology. About half of the time palpitations are caused by a primary cardiac issue such as an arrhythmia or a valvular disorder. Other causes such as psychological, endocrine and caffeine make up many of the other etiologies. This complaint represents a challenge in rationally approaching a problem that is usually benign but not limiting resources as to miss a potentially concerning underlying disease.

Clinical Disease

Patient's present with a subjective report of feeling an irregular heartbeat, a forceful best, a rapid heartbeat, a fluttering or a pause in the heartbeat. More concerning symptoms such as near or complete loss of consciousness may be reported. Patients with psychiatric causes may report feeling tingling in the fingers or lips.

Diagnosis

Diagnosis can be challenging as patients usually present after an episode rather than during an episode. Physical exam and history can sometimes help to identify valvular disorders or characteristic patterns such as the irregularly irregular rhythm of certain arrhythmias. A 12-lead electrocardiogram (ECG) only rarely helps with the diagnosis while longer monitoring with a rhythm strip can be helpful but is not often available. Portable ECGs are making this test more available.

Treatment

The management of palpitations is ideally based on the specific etiology. If due to anxiety one should focus on threating this issue. If benign then reassurance is better than any specific medication. In rare situations betablockers may indicated.

33. Malaria

Introduction

Malaria is a mosquito-borne infection caused by protozoa of the genus *Plasmodium* (\plaz-MODE-ee-um\). Humans are commonly infected by four species of the parasite*: P. falciparum* (\fal-SIP-pah-rum\)*, P. vivax* (\VYE-vax\)*, P. ovale* (\OO-va-leh\), and *P. malariae* (\ma-ler-EE-ay\). A fifth species, *P. knowlesi*, (\n-OH-l-z-eye\) has been added to this list of human malaria. For much of human history, malaria has been a major cause of human morbidity and mortality. In 2017 alone there were 200 million cases and over 400,000 deaths.

Clinical Disease

The most pronounced clinical manifestations of adult-onset malaria are periodic chills and fever, usually accompanied by frontal headache, fatigue, abdominal discomfort, and myalgia. Fever may persist for several days before the typical periodicity develops. In contrast, young children often present with non-specific symptoms, including fever, cough, vomiting, and diarrhea. Symptoms of malaria usually first appear 10–15 days after the bite of the infected mosquito, although delays of several months in the onset of symptoms and the appearance of parasites in peripheral blood are common, particularly for some strains of *P. vivax* found in temperate zones. Patients undergoing chemoprophylaxis may not develop any symptoms until they stop taking the drug. The classic pattern of clinical disease consists of paroxysms of chills and fever, reaching 41 °C and lasting six hours, followed by sweating and defervescence.

Diagnosis

Thick and thin blood smears
Antibody-based rapid diagnostic tests
NAAT
Mutation-specific PCR

Staging:

Uncomplicated malaria (not having a feature of severe)
Severe malaria
- Decreased level of consciousness
- Unable to sit or stand without assistance
- Convulsions (more than 2 in <24 hours)
- Acidosis or bicarbonate <15 mmol/L
- Hypoglycemia (specific cutoffs)
- Anemia (specific cutoffs)
- Renal impairment (Cr >3 mg/dL or BUN >20 mmol/L
- Jaundice (bilirubin >3 mg/dL)
- Pulmonary edema (observable with chest X-ray, hypoxemia, tachypnea)
- Significant bleeding
- Shock
- *P. falciparum* parasitemia >10%

Treatment

Chloroquine-Sensitive Uncomplicated Malaria (not having a feature of severe)

- Chloroquine
  - Adults 1 g PO x1 then 500 mg at 6, 24, and 48 hours
  - Children 10 mg/kg followed by 5 mg/kg of the base on same schedule
- Hydroxychloroquine
  - Adults 800 mg x1, then 400 mg at 6, 24, and 48 hours
  - Children 10 mg/kg x1, then 5 mg/kg at 6, 24, and 48 hours

Chloroquine-Resistant Uncomplicated Malaria (not having a feature of severe)

- Artemisinin combination therapy (schedule based on specific combination-see table below)
- Atovaquone-proguanil (adults) 4-tablets PO Q-Day x 3 days
- Quinine plus (doxycycline, or tetracycline, or clindamycin) quinine 650 mg PO TID for 3–7 days plus second agent for 7 days
- Mefloquine 3-tablets PO x1, then 2 tablets 6 hours later

Treatment of Complicated Malaria

- Artemisinin derivatives
  - Artesunate IV (preferred) >20 kg 2.4 mg/kg IV x1 then at 12 hours, 24 hours, then daily, if <20 kg 3 mg/kg IV same schedule
  - Artemether IM 3.2 mg/kg IM x1 then 1.6 mg/kg Q-day
- Quinine/Quinidine based
  - Quinidine gluconate 10 mg/kg IV x1 then continuous infusion 0.0125 mg/kg/min
  - Plus, doxycycline or clindamycin for 7 days

Treatment to Prevent Malaria Relapse (Hyponozoites)

- Primaquine – 30 mg (of base) 2-tablets PO Q-day for 2 weeks

Consider broad spectrum antibiotics (~10% coinfected)/Exchange transfusion not recommended

Table.1

Medication	Forms available	Weight (kg)-Dose(mg)
Artemether-lumefantrine	20/120mg 40/240mg	<15kg 20/120, 15-25kg 40/240, 25-35kg 60/360, ≥35kg 80/480 (PO BID x 3 days)
Artesunate-amodiaquine	25/67.5mg 50/135mg 100/270mg and separate tablets	<9kg 25/67.5, 9-18kg 50/135, 18-36kg 100/270, ≥36kg 200/540 (PO Q-day x 3 days)
Artesunate-mefloquine	25/55mg 100/220mg and separate tablets	<9kg 25/55, 9-18kg 50/110, 18-30kg 100/220, ≥30kg 200/440 (PO Q-day x 3 days)
Artesunate-sulfadoxine-pyrimethamine	Artesunate(A) 50mg and SP 500/25mg	<10kg SP-250/12.5 PO x1 day#1+A-25 PO Q-day x 3days, 10-25kg SP-500/25 PO x1 day#1+A-50 PO Q-day x 3days, 25-50kg SP-1000/50 PO x1 day#1+A-100 PO Q-day x 3days, ≥50kg SP-1500/75 PO x1 day#1+A-200 PO Q-day x 3days
Dihydroartemisinin-piperaquine	20/160mg 40/320mg and separate tablets	<8kg 20/160, 8-11kg 30/240, 11-17kg 40/320 17-25kg 60/480, 25-36kg 80/640, 36-60 120/960, 60-80kg 160/1280, >80kg 200/1600 (PO Q-day x 3days)

34. HIV/AIDS (Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome)

Introduction

HIV/AIDs caused by infection with the human immunodeficiency virus type I and type II is currently one of the top causes of death and disability throughout the world with very significant differences in regional prevalence rates. In most of the world this a disease spread by heterosexual relations but in certain populations same sex relations, intravenous drug use and contaminated blood contribute to the spread of the virus. HIV targets and individuals T-cells and leads to destruction and depletion of these cells. Major collaborative international efforts have been brought to combat this disease and significant numbers of individuals in limited resource parts of the world no have access to testing and effective therapy.

Clinical Disease

Although the hope is that the majority of individuals will be diagnosed before the appearance of symptoms through screening programs, even in high resource settings with mandated testing many individuals come to medical attention when symptomatic and already have significant and permanent impacts on their immune system. Weight loss, infections due to common pathogens (e.g., tuberculosis, bacterial, fungal, viral, parasitic) and infections due to opportunistic pathogens (e.g., toxoplasmosis, pneumocystis, Cryptococcus) are often what brings patients to medical attention.

Diagnosis

Diagnosis is through serological testing or direct detection of the virus. In most parts of the world, even in limited resource regions, rapid testing has been made available.

Treatment

In most limited resource parts of the world treatment of HIV/AIDS is provided by the government with the assistance of international organizations. Treatment is usually protocol driven with a standard first line three drug cocktail and a standard second line three drug cocktail. There is a constant effort to simplify the treatment of HIV/AIDs and in many cases a single pill may be taken containing 3 different medications. An example of a common first line treatment might be tenofovir/lamivudine/efavirenz (a nucleoside inhibitor (NRTI) based regimen with a non-nucleoside inhibitor (NNRTI)) and a common second line treatment might be tenofovir/lamivudine plus lopinavir/ritonavir (a nucleoside inhibitor (NRTI) based regimen with a protease inhibitor (PI)). There is a principle of using 3 drugs with the first two being of the nucleoside inhibitor (NRTI) class and the third being in general a nucleoside inhibitor (NRTI), a protease inhibitor (PI), or an integrase inhibitor (INSTI).

Regular monitoring to assure control of virus is critical as symptom-based adjustment has been shown to be a very unreliable way to manage anti-HIV medications.

35. Tuberculosis

Introduction

It has been suggested that in the course of human history more individuals have died from tuberculosis than any other single pathogen including malaria. An important feature of tuberculosis is that it is a significant risk for healthcare workers.

Clinical Disease

Although tuberculosis can present in a large number of ways, the majority of clinical cases of tuberculosis are pulmonary and may be recognized due to the characteristic weight loss or cough lasting longer than 2 weeks with or without blood tinged sputum.

Diagnosis

Diagnosis is often done by a regional designated laboratory often at a hospital. Older techniques of sputum microscopy with culture are increasing being replaced by cassette based rapid amplification testing using platforms such as GeneXpert MTB/Rif which generate results in about 9-minutes with an estimated cost just under about $10 US.

Treatment

In most limited resource parts of the world, as well in the developed world, treatment of tuberculosis is either provided by the government or directly observed and monitoring with or without the assistance of international organizations. Treatment is usually protocol driven with a standard first line four drug cocktail for 2 months followed by 4 months on a a standard two medication regimen. Isoniazid, rifampin, pyrazinamide and ethambutol are the usual standard 4 drugs and then the last 4 months most patients take only isoniazid and rifampin. With increasing drug resistance rates in many regions, problems with patient drug intolerance and complicated disease with large lung cavities there will be patients that require different antimicrobials and different durations of therapy.

WHO Dengue Definition

Probable Dengue (acute febrile illness in the correct context with ≥ 2 criteria)

- Headache
- Retro-orbital pain
- Myalgia
- Arthralgia
- Rash
- Hemorrhagic manifestations (tourniquet test)
- Leukopenia

And

- Supportive serologies

Confirmed Dengue

- Isolation of virus
- ≥4-fold rise in IgG or IgM from paired sera
- Positive dengue virus antigen
- Positive Nucleic Acid Amplification Test (NAAT)

36. Dengue

Introduction

As many as 400 million Dengue infections occur each year with about ¼ of these resulting in illness. The virus is spread by the bite of an infected mosquito and illness begins 3-14 days after the bite.

Clinical Disease

Over time the different manifestations of Dengue have been divided into different categories to aid the clinician in not only making the diagnosis but also in identifying the patients at highest risk. Based on the 2009 WHO classification a patient may present with 'Dengue without warning signs' and have fever, headache, eye pain, muscle or joint pain, nausea/vomiting, leukopenia, and perhaps a positive tourniquet test*. A rash (described as white islands in a sea of red) appears late as fever resolves and symptoms improve. Alternately a patient may present with 'Dengue with warning signs' and have lethargy, abdominal pain, mucosal bleeding, persistent vomiting, hepatomegaly, fluid accumulation (e.g., pleural effusions, ascites), increase in hematocrit and rapid decrease in platelet count. The highest risk patients present with 'Severe Dengue' characterized by severe bleeding, severe plasma leakage (shock, fluid accumulation causing respiratory distress), and severe organ involvement (AST or ALT $\geq$1000 units/L, impaired consciousness, organ failure).

Dengue is characterized by several stages. The first stage is referred to as the febrile stage and lasts 3-7 days often ending with the appearance of the characteristic rash. The second stage is the critical phase and begins right around the time the fever ends, the rash appears and is when a small proportion of patients develop a systemic leak syndrome that may include shock, bleeding and organ impairment. During this phase platelets may drop to below 20,000 cells/mm^3. For patients that survive the critical phase a convalescent phase follows; leading in most cases to full recovery.

Diagnosis

The diagnosis is usually clinical based on the above presentation but can be verified by NS1 antigen testing, viral amplification or serological testing. IgM becomes positive only after 4 days of illness and IgG does not become positive until 10-14 days after the onset of acute symptoms.

Treatment

There is currently no direct antiviral treatment for Dengue. Although the WHO and other organizations have published guidelines for treatment, there are variations between guidelines and there has not been any large scale well controlled prospective validation of any treatment approaches including recommendations regarding which patients to hospitalize. One of the most import aspects of treatment is educating the patient regarding avoidance of NSAIDs. It is recommended that fever be controlled with paracetamol (acetaminophen). Volume needs to be monitored and controlled, often with IV fluids in severe cases. Bleeding may require transfusions.

*Tourniquet test (Rumpel-Leede capillary fragility test) 1-apply blood pressure cuff and inflate to half way between systolic and diastolic blood pressure, 2-keep at this pressure for 5 minutes, 3-wait 2 minutes after releasing the pressure and count the number of petechiae in a square inch --positive if >10 petechiae


GASTRO
NEURO
FEMALE

37. Hepatitis (A, B, C)

Introduction

The most common causes of infectious hepatitis are hepatitis A, hepatitis B, and hepatitis C. While hepatitis A is a purely acute disease both hepatitis B and hepatitis C have both acute and chronic manifestations. Hepatitis B and hepatitis C chronic infection can lead to cirrhosis, liver failure and cancer. While there is a vaccine to prevent hepatitis A and hepatitis B, there is currently no vaccine for hepatitis C. Hepatitis A is acquired via fecal oral exposure. Hepatitis B and hepatitis C are spread through body fluids (e.g., blood, semen) and can be acquired sexually, via blood exposures of from an infected mother.

Clinical Disease

Acute hepatitis A usually lasts weeks to a few months with full recovery being the norm although death and long-term health impacts are possible and rare. Hepatitis B can have a similar acute presentation but risk of progression to chronic disease and subsequent sequelae being dependent on age at time of infection. The highest risk for of perinatal acquisition. Hepatitis C can have a similar acute presentation and there is a very high rate of progression to chronic disease and subsequent sequelae. There are many host as well as viral factors that impact progression of disease.

Diagnosis

Diagnosis is either based on a consistent clinical presentation or laboratory testing done diagnostically or through screening programs.

Treatment

While treatment of hepatitis A is largely supportive the most effective intervention is pre-exposure vaccination. In addition to supportive care there is the availability of specific antiviral therapy for hepatitis B which is recommended in certain contexts. Hepatitis C therapy has progressed to the stage where various regimens are able to achieve cure of this infection. This is an active area and specific therapies are recommended based on the genotype of the virus. These therapies are currently very expensive and access is often not available in many settings.

38. Cholera

Introduction

Cholera is an acute secretory diarrhea that generally occurs in epidemics or in endemic areas. Appropriate therapy can reduce the mortality from over 50% to less than 1%. It is due to infection with the bacteria *Vibrio cholerae*. Infection is due to oral ingestion of contaminated food or water and usually requires a large inoculum.

Clinical Disease

After an incubation of 1-2 days, but as soon as several hours or as long as 5 days after exposure, an individual will develop watery diarrhea. The characteristic diarrhea of severe cholera is described as "rice-water" stool and has a fishy odor. Severe cases may have as much as 1L of diarrhea per hour. Vomiting can be seen in severe cases. Abdominal pain is typically absent. Diarrhea is often severe enough to produce frank volume-depletion.

Diagnosis

Diagnosis is usually based on clinical suspicion during an outbreak or in an endemic setting but rapid stool dipsticks are available in certain settings. As the mainstay of therapy is rehydration therapy it is not always essential to confirm the specific etiology of acute watery diarrhea.

Treatment

Aggressive rehydration is the foundation of therapy for cholera and can often be given orally. The initial fluid loss should be replaced in the first 3-4 hours and then fluid losses should be matched with fluid intake either orally or intravenously. Oral rehydration solution is often more practical and more available than intravenous fluids.

- **Antibiotics (serve as an adjunctive therapy and can shorten duration, reduce diarrhea and shorten shedding of infectious organisms-recommended only in severe cases with growing antibiotic resistance)**
  - **Azithromycin 1gram PO x1**
  - **Doxycycline 300mg PO x 1**
- **Nutrition/Vitamins**
  - **Child (2-6 months of age)-Zinc supplements 10mg 1x/day for 10 days**
  - **Child/Adult (≥6 months)-Zinc supplements 20mg 1x/day for 10 days**

Example Formulary A
(for a Mobile Clinic in Central America)

Medication	Formulation	ANTIPYRETICS/ANALGESICs
PARACETAMOL (acetaminophen) tablets.	500mg and 80mg	Antipyretic/Analgesic
PARACETAMOL (acetaminophen) 118ml Syrup Bottle	160 mg/5 ml.	Antipyretic/Analgesic
PARACETAMOL Pediatric Suppository	120mg	Antipyretic/Analgesic
IBUPROFEN (syrup, 150ml bottle)	100 mg/5 ml	NSAID
IBUPROFEN tablets	200mg.	NSAID
ACETYLSALICYLIC Acid (aspirin)	81mg and 325mg	NSAID/Antiplatelet

Medication	Formulation	GASTROINTESTINAL/HYDRATION
CALCIUM CARBONATE, chew. tablets.	500mg.	Antacid
OMEPRAZOLE capsules	20mg.	PPI-anti-acid
ORAL REHYDRATION SALTS	1 sachet for 1-liter solution.	Rehydration
ZINC SULPHATE disp tablets	20mg.	Antidiarrheal
DOCUSATE SODIUM capsules	100mg.	Stool softener
DICYCLOMINE tablets	10mg	Antispasmodic
HEMORRHOIDAL SUPPOSITORY	-	Antihemorroidal
SODIUM chloride IV solution 1l, plastic pouch	0.90%	Hydration
DEXTROSE 10% and 20% 250ml, IV solution plastic pouch	10%, 20%	Hydration

Medication	Formulation	ANTIEMETIC
METOCLOPRAMIDE HCL Tablets	5mg.	Antiemetic
ONDANSETRON HCL tablets	4mg.	Antiemetic
PROMETHAZINE HCL tablets	25mg.	Antiemetic
PROMETHAZINE HCL 2 ml, amp. 50mg/ml	50mg/ml.	Antiemetic

Medication	Formulation	ANTIMICROBIALS
AMOXICILLIN (100ml For Oral Sus. Bottle)	250mg/5ml.	Antibacterial
AMOXICILLIN chew tablets	250mg.	Antibacterial
AMOXICILLIN capsules	500mg.	Antibacterial
AZITHROMYCIN tablets	250mg.	Antibacterial
AZITHROMYCIN, 100ml oral sus., bottles.	200mg/5ml.	Antibacterial
CEPHALEXIN capsules	500mg.	Antibacterial
CIPROFLOXACIN tablets	500mg.	Antibacterial
CLINDAMYCIN tablets	150mg.	Antibacterial
CLOXACILLIN capsules	500mg.	Antibacterial
COTRIMOXAZOLE (trimethoprim and sulfamethoxazole) (100ml for Oral Sus. Bottle)	200mg /40mg/5ml.	Antibacterial
COTRIMOXAZOLE (trimethoprim and sulfamethoxazole) tablets	800mg/160mg.	Antibacterial
DOXYCYCLINE tablets	100mg.	Antibacterial
METRONIDAZOLE, dry powd.fr 100ml oral sus., bottle.	125mg/5ml.	Antibiotic/Antiprotozoal
METRONIDAZOLE tablets	250mg.	Antibiotic/Antiprotozoal
CEFTRIAXONE power in vial	1g/vial (3.5ml) and 250mg/vial (1ml)	Antibacterial
ACYCLOVIR tablets	200mg.	Antiviral
FLUCONAZOLE tablets	150mg.	Antifungal
GRISEOFULVIN tablets	125mg, 500mg	Antifungal
NYSTATIN oral suspension	100,000 IU/ml.	Antifungal
ALBENDAZOLE chew./disp. tablets	400mg.	Ant-helminthic
IVERMECTIN tablets	6mg.	Antihelminthic/anti-ectoparasitic

Medication	Formulation	ANTIMICROBIALS(TOPICAL)
CLOTRIMAZOLE 1% cream 20g tube	1%.	Topical Antifungal
CLOTRIMAZOLE vaginal tablet	500mg.	Topical Antifungal
BACITRACIN ZINC, NEOMYCIN SULFATE, BACITRACIN ZINC, NEOMYCIN SULFATE, POLYMYXIN B SULFATE OINTMENT 0.9g Foil packets	-	Topical Antibacterial
BACITRACIN ZINC, NEOMYCIN SULFATE, POLYMYXIN B SULFATE OINTMENT 14.17g Ointment tube	-	Topical Antibacterial
PERMETHRIN 1% lotion, 100ml bottle	1%.	Topical anti-ectoparasitic
PERMETHRIN Cream 5% 60 g Tube	5%.	Topical anti-ectoparasitic
SULFADIAZINE SILVER cream, 50g, tube	1%.	Topical antibacterial
OFLOXACIN Ophthalmic drops	0.3%.	Topical Antibacterial

Medication	Formulation	ANTIHISTAMINES
DIPHENHYDRAMINE HCL tablets	25mg.	Antihistamine
DIPHENHYDRAMINE HCL liquid	12.5/5ml	Antihistamine
LORATIDINE tablets	10mg.	Antihistamine
DIPHENHYDRAMINE HCL 1 ml vial 50mg/ml	50mg/ml.	Antihistamine
LORATIDINE tablets	10mg	Antihistamine

Medication	Formulation	STEROIDS
PREDNISOLONE tablets	5mg.	Steroid
DEXAMETHASONE 1ml vial 5mg/ml	5mg/ml.	Steroid
HYDROCORTISONE ACETATE ointment, 0.9 g, sachet	1%.	Topical steroid
HYDROCORTISONE ACETATE 1% ointment, 15 g, tube	1%.	Topical steroid

Medication	Formulation	RESPIRATORY
SALBUTAMOL (albuterol) 200 doses, Oral Inhaler	100mcg/dose.	Respiratory Beta-agonist
SALBUTAMOL (albuterol) 200 doses, Oral Inhaler 3ml Nebulizer solution	0.083% (2.5mg/3ml)	Respiratory Beta-agonist
BECLOMETASONE (200 puffs, inhaler.)	0.05 mg/puff.	Respiratory steroid

Medication	Formulation	NEUROLOGICAL
AMITRIPTYLINE tablets	25mg	Migraines and neuropathic pain
CARBAMAZEPINE tablets	200mg.	Seizure

Medication	Formulation	ANTIHYPERTENSIVE
ENALAPRIL tablets	10mg.	Antihypertensive-ACE-I
ATENOLOL tablets	50mg.	Antihypertensive-betablocker
LABETALOL tablets	100mg	Antihypertensive-betablocker
METOPROLOL	50mg.	Antihypertensive-betablocker
AMLODIPINE tablets	5mg.	Antihypertensive-calcium channel blocker
NIFEDIPINE tablets	10mg Modified Release	Antihypertensive-calcium channel blocker
FUROSEMIDE tablets	40mg.	Diuretic-loop
FUROSEMIDE 3ml ampule 20mg/ml	20mg/ml.	Diuretic-loop
HYDROCHLOROTHIAZIDE tablets	25mg.	Diuretic-thiazide

Medication	Formulation	DIABETES
METFORMIN HCL tablets	1000mg	Antidiabetic-biguanide
GLIBENCLAMIDE tablets	5mg.	Antidiabetic-sulfonylurea
FAST ACTING GLUCOSE tablets.	4mg.	Anti-hypoglycemic

Medication	Formulation	MISCELLANEOUS
ADRENALINE (epinephrine) 1ml Vial	1mg/ml.	Adrenaline
LIDOCAINE 2% 20mg/ml vial	2% (20mg/ml).	Anesthetic
LIDOCAINE/EPINEPHRINE 2%/10mg/ml vial	2%/10mg/ml.	Anesthetic
NITROGLYCERIN sub lingual tablets	0.4mg.	Antianginal
TRANEXAMIC ACID tablets	500mg	Antifibrinolytic
OXYBUTYNIN tablets	5mg	Antimuscarinic
TOLTERODINE tablets	2mg	Antimuscarinic
MEDROXYPROGESTERONE acetate 1 ml, depo, vial	150mg/ml.	Contraceptive
ZINC OXIDE 28.4 g Ointment tube	10%.	Emollient
FERROUS SULPHATE tablets	200 mg (= 65 mg iron).	Iron replacement
SODIUM CARBOXY-METHYLCELLULOSE eye drops	0.35%	Lubricating eye drops
CYCLOBENZAPRINE HCL tablets	10mg.	Muscle Relaxant

Example Formulary B
(for a Fixed Location Clinic in Sub-Saharan Africa)

Medication	Formulation	ANTIPYRETICS/ANALGESICs
Paracetamol, Susp	bot	Antipyretic/Analgesic
Paracetamol, tab	tin	Antipyretic/Analgesic
Ibuprofen, susp	bot	NSAID
Ibuprofen, tab	pkt	NSAID
Diclofenac, gel	tube	NSAID
Diclofenac, IM	amp	NSAID

Medication	Formulation	GASTROINTESTINAL/HYDRATION
Cimetidine, tab	pkt	Anti-acid
Ranitidine Injection	ampoule	anti-acid
Omeprazole	pkt	PPI-anti-acid
Loperamide, tab	pkt	Antidiarrheal
Zinc	pkt	Antidiarrheal
Bisacodyl, tab	pkt	Laxative
Oral Rehydration (ORS)	pouch	Rehydration
Dextrose 5% IV Liquid	bottle	Hydration

Medication	Formulation	ANTIEMETIC
Promethazine, tab	tin	Antiemetic

Medication	Formulation	ANTIMICROBIALS
Amoxicillin Tablets 125MG	packet	Antibacterial
Amoxicillin, cap	pkt	Antibacterial
Amoxicillin, susp	bot	Antibacterial
Ampicillin, IV	amp	Antibacterial
Ampicillin/Cloxacillin, cap	pkt	Antibacterial
Ampicillin/Cloxacillin, susp	bot	Antibacterial
Ceftriaxone, amp	pkt	Antibacterial
Cephalexin, susp	bot	Antibacterial
Cephalexin, tab	pkt	Antibacterial
Chloramphenicol, amp	amp	Antibacterial
Chloramphenicol, cap	pkt	Antibacterial
Chloramphenicol, susp	bot	Antibacterial
Ciprofloxacin, tab	pkt	Antibacterial
Cloxacillin, cap	pkt	Antibacterial
Cloxacillin, susp	bot	Antibacterial
Co-trimoxazole tab	tin	Antibacterial
Co-trimoxazole, susp	bot	Antibacterial
Doxycyline, cap (pkt)	pkt	Antibacterial
Erythromycin, susp	bot	Antibacterial
Erythromycin, tab	pkt	Antibacterial
Gentamicin, IV	amp	Antibacterial
Nitrofurantoin, tab	pkt	Antibacterial
Penicillin G Aqueous (Benzyl-pcn), IV	amp	Antibacterial
Penicillin G Benzathine, IM	amp	Antibacterial
Penicillin G Procaine, IM	amp	Antibacterial
Penicillin V, tab	tin	Antibacterial
Sulfadoxine/Pyrimethamine, tab	pkt	Antibacterial

Medication	Formulation	ANTIMICROBIALS
Metronidazole, susp	bot	Antibiotic/Antiprotozoal
Metronidazole, tab	pkt	Antibiotic/Antiprotozoal
Artemether+Lumefantrine, 4-pk, >35 kg	pkt	Antimalarial
Artensuate, inj 30mg	bottle	Antimalarial
Quinine, syrup	bot	Antimalarial
Quinine, tablet (pkt)	pkt	Antimalarial
Artensuate, inj 60 mg	amp	Antimalarial
Acyclovir, tab 200 mg 1x10	packet 100	Antiviral
Fluconazole, cap	pkt	Antifungal
Griseofulvin, tab	pkt	Antifungal
Ketoconazole, tab	pkt	Antifungal
Albendazole	packet	Antihelminthic
Mebendazole	pkt	Antihelminthic

Medication	Formulation	ANTIMICROBIALS(TOPICAL)
Antibiotic Ointment	tube	Topical-antibacterial
Gentamicin, eye/ear drops	bot	Topical-antibacterial
Silver Sulfadiazine 1%, cream	tube	Topical-antibacterial
Tetracycline 1%, eye ointment	boxes	Topical-antibacterial
Chloramphenicol, eye drops	bot	Topical-antibacterial
Clotrimazole 1%, cream	tube	Topical-antifungal
Clotrimazole, pessaries	pkt	Topical-antifungal
Compound Podophylin Paint	pkt	Topical-anti-wart

Medication	Formulation	ANTIHISTAMINES
Cetirizine, tab	pkt	Antihistamine
Chlorpheniramine, tab	tin	Antihistamine
Cyproheptadine, tab	bot	Antihistamine

Medication	Formulation	STEROIDS
Dexamethasone, IV	amp	Steroid
Dexamethasone, tablet	pck	Steroid
Hydrocortisone, IV	amp	Steroid
Prednisolone, tab	pkt	Steroid
Triamcinolone Acetonide	amp	Steroid
Betamethasone drops	bot	Topical-steroid
Dexamethasone Eye/Ear Drops	bot	Topical-steroid
Hydrocortisone 1%, cream	tube	Topical-steroid
Calamine Lotion	bottle	Topical-anti-inflammatory

Medication	Formulation	RESPIRATORY
Aminophylline, IV	amp	Respiratory Beta-agonist
Salbutamol Inhaler	piece	Respiratory Beta-agonist
Salbutamol, tab	pkt	Respiratory Beta-agonist
Cough Linctus, 1L jug	bot	Antitussive

Medication	Formulation	NEUROLOGICAL
Amitriptyline, tab	pkt	Migraines and neuropathic pain
Carbamazepine, tab	pkt	Antiepileptic
Diazepam, IV	amp	Seizures/Anxiolytic
Diazepam, tab	pkt	Anxiolytic

Medication	Formulation	ANTIHYPERTENSIVE
Propranolol, tab	pkt	Antihypertensive-betablocker
Nifedipine, tab	pkt	Antihypertensive-calcium channel blocker
Furosemide, tab	tin	Diuretic-loop
Bendroflumethiazide, tab	pkt	Diuretic-thiazide

Medication	Formulation	DIABETES
Dextrose 50% IV Liquid	bottle	Anti-hypoglycemic

Medication	Formulation	MISCELLANEOUS
Misoprostol	pkt	GI-protectant and other uses
Pitocin	pkt	Uterine contractant
Magnesium Sulphate inj	amp	Uterine relaxant
Adrenaline	ampule	Adrenaline
Lidocaine, inj	vial	Anesthetic
Activated charcoal, tab	tin	Anti-toxin
Vitamin A	bottle	Vitamin/Mineral
Calcium, tab	pkt	Vitamin/Mineral
Ferrous Sulfate, tab	pkt	Vitamin/Mineral
Folic Acid, tab	pkt	Vitamin/Mineral
Magnesium Trisilicate, tab	pkt	Vitamin/Mineral
Multivitamin, tab	tin	Vitamin/Mineral
Vitamin B Complex, tab	pkt	Vitamin/Mineral
Vitamin C, tab	pkt	Vitamin/Mineral
Calcium Gluconate inj	amp	Vitamin/Mineral
Ferrous-Folic (Fefon) Tabs	packet	Vitamin/Mineral
vitamin K	packet	Vitamin/Mineral

Medical Equipment

Medical Equipment

When practicing in our home countries some basic equipment and supplies may be so taken for granted we forget to ensure we have them when we prepare to work in a different practice setting. While at home might have several sinks with loaded soap dispensers when practicing in a different setting we may need to set up our own handwashing station and bring the water and soap with us. Hand sanitizer and gloves will usually not be in the remote setting awaiting our arrival and there will almost certainly not be a wall mounted otoscope placed conveniently within reach!

We may arrive with our medications but they will most likely not be perfectly packed with instructions intelligible for our patients and not packaged in the right quantities for each patient ahead of time.

The following list is a suggestion only as the actual equipment will vary based on the different provider's needs and the different practice settings. They are not necessarily listed in order of importance.

Basic Equipment

1. Stethoscope for adults and children
2. Blood pressure cuff (likely will need different sizes)
3. Scale (many medicines are weight based)
4. Equipment for measuring height (many modify dosing to base on height)
5. Penlight (can use a headlamp or cell phone)
6. Otoscope
7. Ophthalmoscope
8. Hand sanitizer
9. Gloves
10. Pulse oximeter
11. Urine dipsticks
12. Glucometer and matching test strips (will need lancets and alcohol pads)
13. Pregnancy tests (important to know including for medicine selection)
14. Nasal aspirator
15. Containers, envelopes or bags for medicines
16. Instructions for medications and pens (may need pictorial instructions)
17. Pregnancy wheel
18. Wound care supplies
19. Malaria Testing (RDT/Microscopy)

Personal Equipment

Personal Equipment

An important rule for remote care is that you cannot take care of others if you do not first take care of yourself. There won't usually be a water fountain, a nearby coffee shot or even reliable electricity in many settings where one travels to provide care. Basic personal equipment like a container to carry enough water for one to drink during the day or a small daypack to carry one's belongings can be essential.

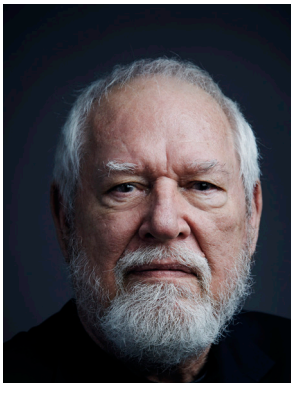
Basic Equipment

1. Refillable water bottle
2. Appropriate clothing (These should be culturally sensitive but also allow one to be comfortable and protected from the weather. Certain communities are uncomfortable with bare shoulders or providers wearing casual clothing. Many clinics and hospitals in remote areas will not allow admission to individuals wearing shorts or open shoes. One should also consider that may need to travel to and from the practice setting in the same clothes they will be wearing when seeing patients)
3. Proper shoes for the setting (Many hospitals will not let individuals in without closed toe shoes. If one is traveling to remote locations by boat open sandals may be ideal for getting in and out of boats.)
4. Watch with 'seconds' for counting pulse, respirations, etc.
5. Bug spray (with DEET or Picaridin)
6. Sun screen
7. Hat
8. Sunglasses
9. Head lamp
10. Cell phone
11. Waterproof bags to protect any electronics such as your cell phone and other sensitive items
12. Phone charger and a portable power bank (electricity may be unavailable or unreliable)
13. Umbrella
14. Rain jacket or poncho
15. Mosquito net
16. Ear plugs and eye mask for sleeping
17. Earbuds/headphones
18. Travel towel
19. Personal Medications (keep with you and do not put in carry-on)
20. Toiletries (All needed toiletries for the duration of your stay)

PARASITES WITHOUT BORDERS

Parasites Without Borders was founded as a direct response to the question: "What can I do to help eliminate human suffering due to parasitic infections?" For us the choice was easy; more and better education for all those in a position to apply medical knowledge directly to populations in need of relief from the burden of parasitic diseases. The three founders have a lifetime of experience in teaching parasitic diseases to students of medicine, both within the U.S.A. and abroad. Our mission statement is clear; we want to help bring the latest medical and basic biological information pertaining to diseases caused by eukaryotic parasites to every clinician and student throughout the world.

http://www.parasiteswithoutborders.com



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