INFESTATIONS, BITES, AND STINGS

Peggy Vernon, RN, MA, CPNP, DCNP, FAANP

DISCLOSURES

- There are no financial interests or relationships to disclose
- Any unlabeled/unapproved uses of drugs or products referenced will be discussed

RESTRUCTIONS

- Permission granted to the National Nurse Practitioner Symposium 2020 and its attendees
- All rights reserved. No part of this presentation may be reproduced, stored, or transmitted in any form or by any means without written permission of the author
- For permission contact Peggy.Vernon at creeksideskincare@icloud.com

OBJECTIVES

- List diagnosis options for Cutaneous Larva Migrans
- List three immediate treatment choices for brown recluse spider bite
- Identify three signs of Rocky Mountain Spotted fever

CUTANEOUS LARVA MIGRANS

- “Creeping eruption”
- Caused by *Anclostoma braziliensis*, a hookworm of wild and domestic dogs and cats
- Parasitic infestation of the epidermis

CLINICAL PRESENTATION

- Serpiginous distribution, usually around the ankles and feet
- Pruritic, threadlike erythematous tracks
- Present days to weeks after exposure to contaminated soil
- Inflammatory response secondary to release of larval secretions

Photo courtesy Visual Dx
**PATHOPHYSIOLOGY**
- Larva do not penetrate deeper than the basal cell layer of the epidermis.
- Larva migrate 1-2 cm/day.
- Most frequent in warmer climates.
- Adult nematodes live in the intestines of dogs and cats, depositing ova, which are carried to the soil in feces.
- Acquired by walking bare-foot in contaminated sand or soil.
- Penetrate the skin in humans where the skin touches the soil.
- Systemic involvement is rare.

**DIAGNOSIS**
- Clinical presentation.
- Biopsy not recommended, as speriginous tract lags behind the movement of the hookworm, causing negative or nonspecific histology.
- Detailed history:
  - Travel history
  - Skin exposure to the ground or sand in warm climates.

**DIFFERENTIAL**
- Scabies
- Larva currens
- Swimmer's itch
- Portuguese man-of-war and jellyfish stings.
- Erythema annulare centrifugum
- Tinea pedis

**Management**
- Surgical extraction should be avoided secondary to delayed reaction to the parasite by the skin.
- Infection is self-limited, eventually resolved in 4-6 weeks.
  - Due to intense pruritus and risk of secondary infection, treatment is recommended.
  - Oral:
    - Albendazole 400 mg po x 3-7 days; not during pregnancy.
    - Ivermectin 200µg po x 1-2 days; not during pregnancy or breast feeding.
  - May need second course as failure is common.
  - Topical:
    - Mid-to high potency TCI.
    - Treatment of choice: Thiabendazole (Mintezol) 2-3x/day x 5 days.
  - Treat secondary infections with antibiotics.

**PATIENT EDUCATION**
- Wear shoes in areas where parasites are endemic.
- Do not sit, lie, or walk barefoot on wet sand or soil, cover the ground with impenetrable material when sitting or lying on the ground.

**Syphilis**
- Primary syphilis is spirochete *Treponema pallidum* characterized by a cutaneous ulcer (chancre).
- Usually only one lesion.
- Lesions are painless.
Syphilis Sub-types

- **Secondary**
  - 2-6 weeks after chancre presents
  - Lasts 2-10 weeks
  - Flu-like symptoms, generalized adenopathy, mucocutaneous lesions present
  - "Moth-eaten" alopecia present in scalp, beard, and eye area; may progress to total alopecia
  - Symmetric, bilateral macules; may become necrotic
  - Lesions on trunk, proximal extremities, palms, and soles; may appear on mucous membranes
  - All cutaneous lesions are contagious

- **Latent**
  - 1-4 years after resolution of secondary syphilis
  - 90% relapse within first year; no relapses after 4 years
  - Positive serologic test without presence of active disease
  - Patient history important
  - Patient contagious during this phase

- **Tertiary**
  - Untreated or inadequately treated patients
  - Systemic disease
    - Cardiovascular disease
    - CNS lesions
    - Systemic granuloma

- **Congenital Syphilis**
  - Can be transmitted by an infected mother in utero by transplacental transmission of spirochetes
  - Adequate treatment of mother before week 16 usually prevents infection of fetus
  - After 18 weeks gestation treatment may cure disease
  - Risk of irreversible neural deafness, keratitis, and bone changes remain

Syphilis Diagnosis

- ICD 10: A51.39 Other secondary syphilis of skin
- Histology
  - VDRL, RPR (rapid plasma reagin) measure specific antibodies
- Microscopically
  - DFA-TP (direct fluorescence antibody test) reveals fluorescent antibody T. pallidum in 1-2 days
- Chest X-ray
  - Patients with tertiary syphilis to check for aortic dilation
- Lumbar puncture
  - Patients with neurosyphilis or HIV

Syphilis Differential

- Condyloma
- Pityriasis rosea
- Guttate psoriasis
- Lichen planus
- Tinea Vercicolor
- Drug and viral exanthems
- Chancroid
- Herpes
- Bechet's syndrome
**Syphilis Management**

- **Penicillin 2.4 million units IM—adults**
  - Doxycycline 100 mg PO bid x 14 days
  - Tetracycline 500 mg PO bid x 14 days
  - Refer to CDC guidelines
- **Pregnancy**
  - Dictated by penicillin schedule appropriate for given stage of syphilis
  - No recommended alternative to PCN exists. If PCN allergy, desensitize and treat with PCN
- **HIV**
  - Primary or secondary treat as those without HIV infection

**Syphilis Pearls**

- “Great mimicker”
- Involvement of palms and soles (secondary lues) should raise suspicion
- Secondary syphilis almost always associated with lymphadenopathy
- Consider diagnosis in patient is mild constitutional symptoms and widespread eruption without scale
- Secondary syphilis more commonly scaly

**INSECT BITES AND STINGS**

- Dog and cat bites
- Human bites
- Spider bites
- Tick bites

**DOG AND CAT BITES**

- Localized infections and cellulitis may be caused by *S. aureus*, *S. intermedius*, and streptococci.
- 25% of dog bites and 50% of cat bites contain *Pasteurella multocida*
- Systemic infections are rare, and result in brain or lung abscess, endocarditis, and sepsis.
- Symptoms are worse in immunocompromised patients.

**MANAGEMENT**

- Culture infected wounds before irrigation or debridement.
- Irrigate tear wounds with normal saline.
- Debride wound edges to control infection.
- Approximate wound edges with adhesive strips and delayed closure. Topical antibiotics are appropriate for minor wounds.
- Bites affecting the hand, face, joints, or penetrating bone or tendon should be treated orally.
- Update Tetanus vaccine.
- Assess for rabies in offending animal or refer to appropriate health department.

**PHARMACOTHERAPIES**

- Mupirocin ointment applied bid, and covered, until wound heals.
- Amoxicillin/beta-lactamase inhibitor (Augmentin) is first line of treatment.
- Doxycycline Or Minocycline for those allergic to penicillin
- Cefuroxime is active against *P. multocida*
- Ciprofloxacin is active against potential pathogens but has not been studied
Infestations, Bites and Stings
Peggy Vernon, RN, MA, CPNP, DCNP, FAANP

HUMAN BITES

- Aerobic and anaerobic bacteria infect human bite wounds, usually *S. aureus*, and *Haemophilus Eikenella corrodens*
- Human bites have a higher incidence of infections.

MANAGEMENT

- Culture before irrigation and debridement.
- Irrigate tear wounds with normal saline and debride wound edges to prevent infection.
- Monitor for infection or empirically treat with oral antibiotics.
- Patient should be reevaluated every 3-4 days until healed.
- Augmentin is first line of treatment
  - Penicillin
  - Cephalosporin
  - Tetracycline

SPIDER BITES

- Carnivorous arthropods with fangs and venom used to capture and kill prey
- Most fangs are too small to penetrate human skin
- Brown recluse and black widow spiders are the only spiders in the US whose bites produce severe reactions
- Spiders only bite in self-defense
- Most spider bites are felt as soon as they occur, producing itching, swelling, and erythema

MANAGEMENT

- Most spider bites resolve spontaneously.
- Cool compresses will give relief from swelling
- Antihistamines may control itching.

BROWN RECLUSE SPIDER BITE

- The brown recluse spider (fiddle-back spider) is 1.5 cm, yellow-tan to brown with a dark, violin or fiddle-shaped marking on the back.
- Lives in dark areas such as under wood piles and rocks, under porches, and basements.
- Bites only when forced into contact with the skin, such as collecting wood from the wood pile or putting on clothing where the spider resides.
- Usually found in the southern United States but has been found further north.

CLINICAL PRESENTATION

- The bite produces an instantaneous sharp pain resembling a bee sting.
- Most bites are mild, causing minimal swelling and erythema.
- Bites on the fatty areas such as buttocks and proximal thigh show more cutaneous reactions
- Severe bites can cause necrosis within hours.
- A blue-gray macule expands and sinks below the skin surface (sinking infarct), becomes necrotic leaving a deep ulcer that can take weeks to months to heal, resulting in significant scarring.
- Systemic reactions are rare and occur most often in children.
- Characterized by fever, nausea, vomiting, joint and muscle pains, hives or a morbilliform rash, which occurs 12-24 hours after the bite.
- Severe reactions can result in hemolysis, DIC (disseminated intravascular coagulation), renal failure, and rarely death.
**Infestations, Bites and Stings**

Peggy Vernon, RN, MA, CPNP, DCNP, FAANP

**DIAGNOSTICS**
- Clinical diagnosis made by geography, history, skin manifestations, and clinical course
- Most brown recluse spiders found in Midwestern and Southern states

**DIFFERENTIAL**
- Abscess or furunculosis
- Cellulitis
- Caterpillar or centipede envenomation
- Ecthyma
- Factitial ulcer
- Bee or wasp sting
- Lyme disease
- Toxic epidermal necrolysis
- Other spider bites
- Vasculitis
- Syphilitic chancre
- Sweet syndrome
- Necrotizing fascitis
- Pyoderma gangrenosum
- Diabetic ulcer

**MANAGEMENT**
- Wound irrigation
- Immediate ice and elevation of the area.
- Avoid heat.
- Exercise is to be avoided.
- Analgesics
- Oral antibiotics: Erythromycin or Cefalosporins.
- Anti-inflammatories
- Tetanus if necessary.
- Dapsone 50-100 mg/day may prevent extensive necrosis
- If necrosis is greater than 2 cm, oral Prednisone 1mg/kg x 14-21 days
- Monitor for hemolytic anemia
- Surgery is indicated only for debridement of the necrotic lesions
- Antivenom is not available in the United States or Canada at this time

**PATIENT EDUCATION AND MONITORING**
- Teach patients the importance of ice and elevation which will reduce inflammation
- Monitor necrosis size and treat appropriately
- If systemic involvement is suspected, check for evidence of hemolysis
  - Serial hemoglobin
  - Plasma-free haptoglobin levels
  - Monitor for rhabdomyolysis, renal failure, and DIC

**BLACK WIDOW SPIDER BITE**
- The black widow spider is named because the female consumes her mate after copulation.
- Found in every state except Alaska, and is especially prominent in the southern states.
- The female is black, smooth with an abdomen that resembles a shoe button. A red hourglass marking is present on the underside of the abdomen.
- Adult females are 4 cm, and are the only spiders capable of envenomation.
- The venom contains a neurotoxin which releases acetylcholine from the neuromuscular junction of nerves.
- Black widows are found in webs close to the ground, in dark sheltered areas, woodpiles, and privies.
- They are clumsy and need their web for support, and usually do not bite when away from the web.

**CLINICAL PRESENTATION**
- The bite may be painless, or may produce an immediate sharp pain.
- Slight swelling and the appearance of small red fang marks are present.
- Vascular dissemination of the neurotoxin is known as latrodectism.
- Severe abdominal pain and spasm are the prominent features of latrodectism.
- The abdomen becomes board-like and rigid without distension.
- Generalized abdominal pain, back and leg pain are the most common complaints.
- Within 15 minutes to 2 hours, a dull muscle ache or severe pain with numbness spreads from the bite to involve the torso and legs.
- There is an increase in deep tendon reflexes.
- Symptoms increase for 24 hours and gradually decrease in 2-3 days.
- Weakness and transient muscle spasm may persist for weeks to months.
- Recovery from one serious attack affords systemic immunity to subsequent bites.
- Convulsions, shock, paralysis, and death are rare, and usually occur in young children or elderly.
Infestations, Bites and Stings
Peggy Vernon, RN, MA, CPNP, DCNP, FAANP

DIAGNOSTICS
• Look for tiny fang marks and diaphoresis at the bite site
• There may be a halo lesion consisting of a pale circular area surrounded by a ring of redness

DIFFERENTIAL
• See Brown Recluse Spider Bite
• Abdominal aneurysm
• Acute appendicitis
• Mesenteric ischemia
• Ectopic pregnancy
• Pancreatitis
• Anxiety
• Hypertension
• Hypocalcemia
• Muscle spasms
• Priapism

MANAGEMENT
• ABCs (Airway, Breathing, Circulation)
• Collect spider if possible
• Routine cleansing of bite site
• Apply ice to restrict the spread of venom and provide analgesia
• Spider-specific antivenom (Merk & Co. Inc.) IM or IV if patient is <12 years or in shock. Antivenin may be given IM for 1-2 days. Symptoms subside in 30 minutes to 3 hours
• Hospitalization for patients under 16 years or older than 65, pregnant, have hypertensive heart disease, respiratory distress, or symptoms of severe latrodeism.
• Muscle relaxants: Calcium gluconate (10%, 10 ml IV) acts as a muscle relaxant. IV or oral Valium, IV or oral methocarbamol.
• IV Morphine if pain is severe, however should be used with caution as venom may cause respiratory paralysis.
• Tetanus prophylaxis

EDUCATION AND MONITORING
• Application of ice is important to restrict spread of venom
• Closely monitor for convulsions and respiratory failure

Tick Bites
• Arachnids; live in wooded, grassy areas
• Attach to human host when person brushes past, move to warm moist location, burrow and feed off host blood
• Do not jump or fall on people

Tick Bite
• Clinical Presentation
• Small red area, may or may not be raised
• Similar to mosquito bite
• May develop larger red ring (bull’s-eye) within days, weeks, or months
Infestations, Bites and Stings
Peggy Vernon, RN, MA, CPNP, DCNP, FAANP

**Tick Bite**

- **Differential Diagnosis**
  - Spider bite
  - Mosquito bite
  - Flea bite
  - Foreign body
  - Fixed drug eruption

**Diagnosis**
- Based on presence of tick or history
- ICD10: W57.XXXA: bitten or stung by nonvenomous insect, other arthropod, initial encounter

**Pearls**
- Inspect all skin areas, including scalp and groin
- Evaluate all black or brown spots on the skin

**Management**
- Completely remove tick
  - Remove promptly with fine-tipped forceps
- Prevention
  - Protective clothing
  - Repellants (DEET)
  - Inspection following outdoor activities

**Lyme Disease Prophylaxis**
- ALL of criteria must be met:
  - Attached tick identified as *Ixodes scapularis*
  - Attached 36 hours
  - Postexposure prophylaxis started within 72 hours of tick removal
  - Local rate of infection with *Borrelia burgdorferi* is 20%
  - Doxycycline not contraindicated
  - Observation recommended in criteria not met

**Lyme Disease**
- Disseminated disease begins within weeks as spirochete circulates to nervous system, heart, joints
- Patient may develop multiple skin lesions, neurologic abnormalities, AV block, or myocarditis
- Untreated patients may progress to late stage disease:
  - Arthritis
  - Mild encephalopathy
  - Neuropathies

**Lyme Disease**
- Immune-mediated inflammatory disease
- Infection with bacterial spirochete *Borrelia burgdorferi*
- Begins with slowly expanding skin lesion at site of tick bite
  - Erythema migrans (EM)

**3 Clinical Phases**:
- Early localized disease
- Early disseminated disease
- Late disease
Lyme Disease

- **Epidemiology**
  - New England, Midwest states, and west coast
  - Blacklegged tick or deer tick
  - Mice and deer major animal reservoirs
  - Mainly spring and summer months
  - Increases risk of infection linked to amount of time spent in wooded areas

Lyme Disease

- **Systemic Symptoms:**
  - Flu like symptoms
  - Fatigue
  - Headache
  - Neck stiffness
  - Myalgias/Arthralgias
  - Lymphadenopathy
  - Fever

- **Early Localized** (days to weeks)
  - EM at site of tick bite (60-90% of patients)
  - May/may not be systemic symptoms
  - False negative serologic testing common

Lyme Disease

- **Early disseminated** (weeks to months)
  - Multiple widespread skin lesions
  - Up to 15% of pts develop neurologic symptoms: meningitis, cranial/peripheral neuropathy, Bell palsy
  - 5% may experience cardiac sx: AV block or myocarditis
  - Serologic testing usually positive

Lyme Disease

- **Late** (months-years)
  - Chronic arthritis
  - Mild encephalopathy, subtle cognitive deficits
  - Axonal polyneuropathies
  - Serologic testing positive

Lyme Disease

- **Chronic Lyme Disease/Post-Lyme Disease Syndrome**
  - Small percentage of treated patients report ongoing nonspecific symptoms
  - Persistent infection not demonstrated

Lyme Disease

- **Diagnosis:**
  - Transmission takes 24-48 hours; brief tick exposure not sufficient
  - Clinical suspicion in endemic areas
  - Trunk, axillae, groin, popliteal fossa
  - Target lesions
  - ICD 10:A69.2: Lyme disease unspecified
Lyme Disease

- Consider diagnosis for patients presenting with flu-like symptoms and no cough in summer
- Diagnostics:
  - Serologic testing 4-6 weeks after tick bite to avoid false negative/positive results
  - Do not delay treatment for lab results

Lyme Disease

- In the U.S. Lyme disease is reportable except in HI and PR

Lyme Disease Treatment

- Early Localized:
  - Doxycycline 100 mg q 12 h x 14-21 days
  - Amoxicillin 500 mg q 8 h x 14-21 days if pregnant
  - Alternative
    - Cefuroxime axetil 500 mg q 12 h/14-21 days
    - Azithromycin 500 mg q 24 h/7-10 days
    - Clarithromycin 500 mg q 12 h/14-21 days
    - Erythromycin 500 mg q 6 h/14-21 days

Lyme Disease Referral

- If early disease and effective treatment, no referral
- Persistent symptoms:
  - Rheumatology, neurology, cardiology
  - Advanced disease/ treatment failure
    - Infectious disease

Lyme Disease Treatment

- Mild Early Disseminated
  - Doxycycline 100 mg q 12 h x 14-21 days
  - Amoxicillin 500 mg q 8 h/ 14-21 days
  - Alternative
    - Cefuroxime axetil 500 mg q 12 h/14-28 days

Lyme Disease Treatment

- Severe Early Disseminated
  - Ceftriaxone 2 g IV q 24/14-28 days
  - Alternative
    - Cefotaxime 2 g IV q 8 /14-28 days
    - Penicillin G 18-24 million units IV daily, divided q 4 h/14-28 days
Rocky Mountain Spotted Fever

- RMSF caused by gram-negative bacterium *Rickettsia rickettsia*
- Most severe rickettsial illness in humans
- 20-30% fatality without treatment
- Most common from Arkansas, Missouri, North Carolina, Oklahoma and Tennessee.
- More frequent in males and children.
- April through September

RMSF Clinical Presentation

- Late:
  - Rash (children, young adults)
  - Photophobia
  - Confusion
  - Ataxia
  - Seizures
  - Cough
  - Dyspnea
  - Jaundice
  - Severe abdominal pain

- Early:
  - High fever
  - Severe headache
  - Myalgias
  - Nausea, Vomiting

RMSF Diagnosis

- ICD10: A77.0 Spotted fever due to *Rickettsia rickettsii*
- S&S 3-12 days after infection
  - Fever, headache, myalgias almost always present
  - Nausea, vomiting, abdominal pain variably present
  - Rash (pruritic) 3-5 days after onset of fever
  - Macules: ankles, wrists, forearms, spread centripetally to trunk. Face spared. Palms and soles most common.
  - Lesions progress to papules and petechiae

RMSF Differential

- Meningococcemia
- Measles
- Enteroviral infections
- Dengue fever
- Vasculitis
- Drug Eruptions
- Secondary Syphilis

RMSF Treatment

- Doxycycline
- Chloramphenicol (caution in 3rd trimester)
- Treat 3 days after fever subsides, usually 7-14 days
**Jellyfish**

- Free-swimming non-aggressive gelatinous marine animals surrounded by tentacles
- Tentacles covered with nematocysts filled with venom
- Found near the water surface at dusk

**Jellyfish Symptoms**

- Intense stinging, pain, rash
- Progressive symptoms: nausea, vomiting, diarrhea, adenopathy, muscle spasms
- Severe reactions cause difficulty breathing, coma, death

**Jellyfish Sting Treatment**

- Benadryl and acetaminophen or ibuprofen
- Soak area in acetic acid (vinegar), sea water, or 70% isopropyl alcohol 15-30 minutes (fresh water will cause nematocysts to continue to release toxins)
- Remove tentacles with tweezers
- Apply shaving cream or paste of baking powder, shave area with razor or credit card

**Initial Reaction**

10 Days Post-Injury

2 Weeks Post-Injury
Infestations, Bites and Stings
Peggy Vernon, RN, MA, CPNP, DCNP, FAANP

Seabather’s Eruption

- Pruritic dermatitis
- Hypersensitivity reaction to nematocysts of larval-stage thimble jellyfish
- Sometimes called “sea lice”

Treatment

- Scratching causes intense itching and swelling
- Prompt removal of swim clothing while wet
- Warm sea-water shower
- Diphenhydramine, topical corticosteroids

References

- Internet Resources
  - American Academy of Dermatology, www.aad.org
  - American Lyme Disease Foundation, www.aldf.com
  - Centers for Disease Control and Prevention, www.cdc.gov
  - CurrentHarbor, www.currentharbor.com
  - Mayo Clinic: diseases and conditions, www.mayoclinic.com/health/DiseasesIndex
  - UpToDate
- VisualDx