Poisonous Plants: Poison Ivy, Oak, Sumac

- Etiology/pathophysiology
  - Poison Ivy, Oak, and Sumac all produce an oil known as *urushiol* from the *Toxicodendron* genus of the Anacardiaceae plant family.
  - Release of this oil is related to damage to the plant parts that involve the leaves, stems/vines, and roots, meaning all parts of these plants are considered poisonous.
  - When the oil becomes oxidized it turns into a shiny black lacquer leaving the plant to be coated in small black dots of buildup of the urushiol oil.
  - Initial contact causes a T-lymphocyte-mediated delayed allergic reaction leading to a cytotoxic immune response.
  - Direct contact: occurs when contact is made directly between the skin and the damaged plant.
  - Indirect contact: from pets, clothing, tools, or inhaled from smoke of a burning plant.
  - Inhalation: particles, smoke, gas from burning plants (may lead to morbidity and mortality r/t cardiopulmonary arrest and can potentially be fatal)
  - Oils can remain active for ≥ 1 year
  - Identification:
    - Poison ivy/oak are easily identifiable as ground level or climbing vines with leaves grouped in threes, may be accompanied by yellow or green flowers with white, green, yellow, or amber berries.
    - **"Leaves of three, let it be!"**
    - Poison sumac is identified by being a shrub with branches of 7-13 leaves grouped in pairs, the leaves may also appear shiny with small pale-yellow or cream-colored berries.
  - Those at risk:
    - Those who spend lots of time outdoors in the woods/marsh lands.
    - Firefighters', forestry workers, and farmers r/t having a job that predominantly requires working outdoors.
    - If these plants are burned the urushiol is then released into the air via smoke and conversion to gas due to its stability at high temperatures still causing an allergic reaction and puts those exposed at risk for a respiratory injury.
    - Age groups most commonly affected are children ranging from 8-14 years r/t curiosity and wanting to explore.
- Signs and Symptoms
  - May not be aware of plant exposure – contact dermatitis develops 24-72 hours after exposure.
  - Erythema
  - Severe pruritis

- Edema at the site of exposure depending on sensitivity
- Rash, lesions, and blisters that eventually break open, ooze, and then crust over
  - Fluid in blisters does not spread the dermatitis.
- Lesions may appear in linear configuration if direct exposure, atypical appearance if dermatitis contracted indirectly.
- Rash does not spread unless prevention measures fail such as scratching area of dermatitis and then touching a non-contaminated part of your body.
- Exposure to burning plants may cause facial erythema and edema.
- Inhalation exposure can lead to respiratory injury AEB dyspnea, SOB, asthma exacerbation, similar dermatitis rash on the inner lining of the lungs, and increased oxygen demand.
- Symptoms can last between 1-4 weeks.

➢ <u>On-scene treatment</u>

- Once exposure is recognized remove oils from skin as soon as possible
  - Use soap and water and repeat 3 times.
  - May use alcohol-based wipes/gels
- Remove all contaminated clothing and wash immediately, if possible, if washer not accessible place clothes in tied plastic bag.
- Scan the area for safety!
- If pruritis becomes severe may take oatmeal baths to soothe irritated skin.
- May take over-the-counter antihistamines (ex. Benadryl)
- Cool compresses
- Apply topical cortisone or calamine lotions.
- If exposure was indirect be sure to wash pets, tools and other objects that may have been contaminated (handle with gloves, and wear clothing that covers skin to prevent further reactions).
- Keep nails short and clean.
- **Poison Control (800)-222-1222**

➢ <u>ED Treatment</u>

- For any ED admission for ABC assessment and intervention order (especially if inhalation injury suspected and or sever allergic reaction r/t contact).
- If inhalation exposure monitor cardiopulmonary functions
- Thorough skin assessment
- Identify poisonous exposure, if pt unable to recall if there was an exposure to a poison ivy, oak, or sumac have them walkthrough the past week of events with you, ask if there were any witnesses.
- Assess baseline vital signs.
- Obtain baseline labs (CBC, CMP)
- Cultures of blood and skin lesions

- Question if inhalation injury possible
- May do CXR or PFTs if urushiol inhaled causing severe respiratory distress.
- Full workup typically not needed unless extreme reaction is occurring, or inhalation injury caused respiratory depression/injury
- Symptom management and education
- May be prescribed oral prednisone for moderate→severe dermatitis.
  - Dosing: 1mg/kg/day over 7-10 days (max dose 60mg initial dose) taper down over 7-10 days
  - Corticosteroid treatment used with pediatric clients.
- Treatment for pediatric clients typically same as adults

➢ <u>Role of the ED nurse</u>

- Preform focused assessment and have a baseline knowledge of pt condition (recent outdoor activity).
- Maintain ABC's
- Initiate consults PRN: poison control, dermatology, wound care, infectious diseases.
- Initiate any medication orders (corticosteroids, antihistamines, topical creams, IV fluids, analgesics, antibiotics)
- Educate on future prevention.
- Evaluate need for oxygen supplementation and operate on O2 protocol.
- Monitor for adventitious lung sounds.

➢ <u>Discharge/Prevention Instructions</u>

- Follow up with PCP to ensure dermatitis is resolving.
- May use barrier creams before a known possible exposure.
- Use liquid dish soap immediately if ever exposed again.
- Wear disposable gloves.
- If outside in area of poisonous plants, remove clothes and shoes and wash with hot water all by themselves.
- Clean tools with isopropanol alcohol.
- If burning poisonous plant is unavoidable or exposure is known, ensure proper use of respirators at level R-95, P-95, or better (ex. Firefighters).
- Be able to identify poisonous plants and avoid them.
- Where clothing that covers skin when in areas such as the woods or marsh lands.
- If exposure were to happen again, educate ways to treat at home and when seeking medical treatment is necessary.
  - Having symptoms unrelieved by over-the-counter medications.
  - Rash developing on face with edema of eyes.
  - Trouble breathing.
  - Trouble swallowing.

        - Rash that has spread all over body.
    - Supervise children outside and prevent going into unknown areas full of unknown shrub.
    - Teach children how to identify poisonous plants to stay away from and show them pictures.
        - **"Leaves of three, let it be!"**
    - If exposed to ivy, oak, or sumac wash off skin within 30 minutes to prevent dermatitis.
    - Avoid hot baths and showers.
    - Cool baths and showers will aid in itching.
    - DO NOT ITCH
    - WASH YOUR HANDS

Poisonous Plants: Foxglove

- Etiology/Pathophysiology
    - Foxglove is a form of digitalis purpurea L. and a part of the Scrophulariaceae plant family.
    - It has a toxic principal r/t the cardiac glycosides such as digoxin.
    - Digoxin is used to treat Chronic Heart Failure (CHF) and inhibits the sodium-potassium pump which results in an increase in intracellular sodium and decrease in the transmembrane sodium gradient. Ultimately increasing automaticity and decreasing conduction.
    - This component is located throughout the entire plant leaving it to be completely toxic if ingested (leaves, flowers, stems and seeds).
    - Though rare to ingest due to its unfavorable texture, the base leaves are the most toxic, but each component is considered fatal if ingested.
    - The therapeutic blood level of digoxin is considered to be 0.8-2.0 ng/mL.
    - Toxic levels of digoxin are considered to be ≥2.5 ng/mL.
    - Digoxin antidote is: digoxin immune Fab (ovine)
    - Able to touch with bare hands, only toxic when ingested.
    - Those at risk for developing foxglove toxicity are those older than 80 and less than 5 years old.
        - Children 5 years and younger tend to be more exploratory and the foxglove plant is very appealing to the eye and their leaves can easily be mistaken for borage leaves as they resemble each other with their hairy like texture (borage is non-toxic).
        - Small children may see the pretty flower and think it is edible.
        - Also, small children (≤5yo) are also at risk for getting into medicine cabinets that may result in digoxin toxicity r/t unintentional medication overdose.

- Identification:
  - Long, downward, tapered, bell shaped flowers ranging from pink, purple, yellow, and white.
  - Each stalk contains many flower blooms (20-80)
  - Usually have lots of dark purple spots inside each bloom as well as long fiber like hairs and white on "the lower lip" of the flower.
  - Basal clump of leaves remains at bottom of which are textured with grey-white hairs that have a downy texture on the upper part and wooly/hairy below the surface, "velvet-like."
  - Can grow up to 6 feet tall

- Signs and symptoms
  - Intentional overdose (adults), accidental overdose (children), and accidental ingestion of foxglove plant.
  - Rapid onset (minutes to hours).
  - GI: N/V, abdominal pain, diarrhea, **anorexia (first to appear)**
  - Neurologic: mental status changes, delusions/hallucinations, dizziness/ataxia, weakness and headache, seizure activity
  - Cardiac: Palpitations r/t arrythmias (tachycardia, bradycardia, PVCs, 2nd or 3rd degree AV blocks, **atrial tachycardia**), syncope, hypotension, dyspnea, fatigue, and weakness r/t HF
  - Visual changes (chronic)
  - Hyperkalemia: muscle cramps, paresthesias
  - May be asymptomatic for several hours and serum digoxin level will be misleading after six hours.
  - Possible to inhale pollen from flowers of hair fibers that have blown off—cause nasal irritation and possible respiratory irritation depending on sensitivity.
  - Extended poisoning – hallucinations, loss of appetite, vision changes (halos around objects)

- On-scene treatment
  - Assess ABC's and treat to meet needs.
  - Assess type of toxicity (what part of the plant was consumed, how much, was it intention vs. unintentional?)
  - Where was the plant from?
  - Scan the environment for safety
  - Provide supplemental o2
  - If toxicity is suspected have antidote ready for administration
  - Assess LOC
  - Establish and maintain peripheral IV access.
  - Focused cardiopulmonary assessment.
  - **Contact poison control!!! (800)-222-1222**
  - Control dysrhythmias with atropine, diltiazem, or IV fluids.

- ED treatment
  - ABC'S
  - Vital signs
  - Symptomatic treatment
  - O2 supplementation
  - Ventilator if needed
  - CXR
  - 12-lead EKG (determine dysrhythmias and show digitalis effect)
  - May need gastric lavage via NG or OG.
  - CBC and BMP
  - Need serum digoxin levels drawn STAT
  - If antidote not available can give activated charcoal at 1mg/kg
  - **Administer antidote (digoxin immune Fab)** – comes in 40mg vials, amount needed is based on amount of digoxin consumed
    - If digoxin level is unknown start by giving 10 vials of antidote and observe the patients response can give another 10 PRN.
    - Treatment is the same for both adults and children.
    - Always round up to nearest whole number.
  - Should have anaphylactic medications at bedside when giving high doses of digoxin immune fab (ex. Epinephrine)
  - Phenytoin and lidocaine given if digoxin immune fab is unavailable or ineffective.
  - Can give Atropine for bradycardia.
  - Mag sulfate replacement
  - If acidotic: give sodium bicarb, glucose, and insulin to treat hyperkalemia.
- Role of ED nurse
  - Anticipate and have medications ready for administration.
  - Have IV fluids primed and ready to be hung.
  - Ensure pt is hooked up to telemetry
  - Maintain continuous pulse oximetry
  - Provide supplemental O2 PRN
  - Monitor ABC's and act fast if one were to be abnormal
  - Have NG/OG tube placement kits ready at the bedside – if needed
  - Focused assessment → then full head to toe when crisis is resolved
  - Assess suicidal ideations (intentional vs. accidental?)
    - If intentional – consult behavioral health
  - Anticipate a complete response to antidote within 4 hours of administration.
  - Consult poison control PRN
  - Anticipate transcutaneous/transvenous pacing
  - Anticipate need for placement of an A-line

- Provide education and reorientation to pt PRN
- Educate family

- Discharge/Prevention Instructions
  - Depending on severity of toxicity determines pt outcome, symptoms may last a few days post discharge but life-threatening ones resolved.
  - Stress importance of following up with PCP
  - What s/sx should be reported immediately such as cardiovascular or respiratory disturbances (ex. Heart fluttering, palpitation, trouble breathing, loss of appetite)
  - How to identify toxic foxglove plant – downward facing bell shaped flower with clusters of many flowers with a base of leaves that feel velvet-like.
  - Help find resources to a company who could remove foxglove plant if in pts yard or surrounding areas, or find resourceful information on how to safely get rid of it yourself.
  - Don't not ingest any part of foxglove plant (the whole this is toxic)
  - Educate children on no consuming things without asking a responsible adult first, or just not consuming random plants found outside
  - Close monitoring of young children while outside
  - Keep all medications in a safe cabinet

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