DERMATOLOGY

Andrea M. Kline-Tilford PhD, CPNP-AC/PC, FCCM
C.S. Mott Children's Hospital
Ann Arbor, MI

Objectives

- Discuss common pediatric dermatologic disorders in acute care
- Review the diagnostic evaluation of pediatric dermatologic disorders in acute care
- Identify appropriate management strategies for common pediatric dermatologic disorders in acute care

Bites - Mammalian

Background

- Dog bites responsible for > 3 million Emergency Department visits per year
- 1/3 or more occur in children
- Male predominance
- Children more likely to suffer facial bites

Etiology

- Dog and human bites are most common

Bites - Mammalian

Presentation

- Bleeding
- Pain
- Disfigurement
- Erythema
- Edema
- Exposed subcutaneous tissue

Diagnostic Evaluation

- Radiographic evaluation; suspected fracture or penetrating wound over joint to evaluate for foreign body inoculation
- Wound culture; if infected appearance

Bites - Mammalian

Management

- Thorough debridement and irrigation; copious amount with [illegible] syringe irrigation
- No consensus on primary wound closure
- Antimicrobial therapy indicated for
  - Moderate or severe bite wounds; signs of infection
  - Puncture wounds
  - Facial bite wounds
  - Hand/foot wounds
  - Genital area wounds
  - Immunocompromised host; asplenia

Infective pathogens primarily come from mouth of 'biter.' Less commonly from skin

Bites - Mammalian

Management – Cont'd

- Evaluate for rabies risk (animal bites)
- Evaluate for HIV risk (human bites)
- Evaluate for tetanus status; may require booster
- No antibiotic prophylaxis required for new wounds with simple epidermal injury (e.g. scratches and abrasions)

Bites - Mammalian

Source	Common Organisms	Enteral	Intravenous
Dog, Cat	Pasteurella species, Staphylococcus aureus, streptococci, Neisseria, Moraxella anaerobes	Amoxicillin-clavulanate If Penicillin (PCN)-Allergic: Extended-spectrum cephalosporin or trimethoprim-sulfamethoxazole; plus clindamyin. Doxycycline for children > 8 years of age combined with clindamycin *Consider coverage for Methicillin-resistance	Ampicillin-sulbactam. Alternatives include pipercillin-tazobactam or ticarcillin-clavulanate IF PCN-Allergic: Extended-spectrum cephalosporin or trimethoprim-sulfamethoxazole; plus clindamyin OR carbapenum

Be sure to provide MRSA coverage In SEVERE bite wounds

Bites - Human

Source	Common Organisms	Enteral	Intravenous
Human	Streptococci, *Staphylococcus aureus,* *Eikenella corrodens,* *Haemophilus* species, anaerobes	Amoxicillin-clavulanate **If PCN-Allergic:** Extended-spectrum cephalosporin or trimethoprim-sulfamethoxazole; plus clinadamyin. Doxycycline can be considered for children > 8 years of age combined with clindamycin *Consider coverage for Methicillin-resistant *staphylococcus aureus* for severe bites	Ampicillin-sulbactam. Alternatives include pipercillin-tazobactam or ticarcillin-clavulanate **IF PCN Allergic:** Extended-spectrum cephalosporin or trimethoprim-sulfamethoxazole; plus clinadamyin OR carbapenum *Consider coverage for Methicillin-resistance

Dermatology-Severe Immune Response

Continuum of Severity-Minor to Severe

Erythema Multiforme (EM)-low mortality, target lesions on extremities, face, trunk and legs spared, little mucosal involvement. Lesions are symmetrical, fixed, round and macular.

Stevens Johnson Syndrome (SJS)-Mortality linked to infections or organ failure. BSA 10-30% involved. Often preceded by flu like symptoms. Target lesions appear on face & trunk, become bullae. Ulcer/mucus membrane involved. Can lead to blindness.

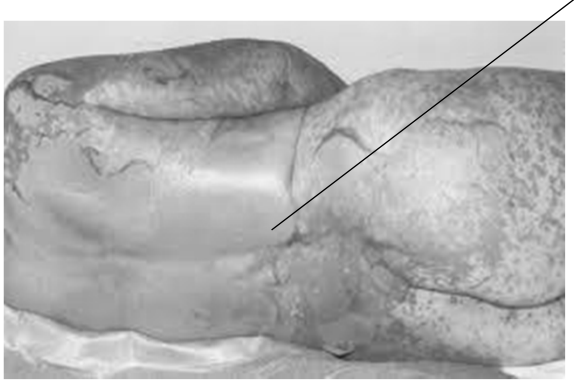
Toxic Epidermal Necrolysis (TEN)-More severe form, mortality 25-75%. Epidermal detachment of >30% BSA. No target lesions, burning skin with flu like symptom with rapid widespread macules that turn into bullae and full thickness epidermal necrosis.

Erythema Multiforme

Stevens Johnson Syndrome

TEN

Sloughing of dermis



www.studyblue.com

Erythema Multiforme/SJS/TEN

- Etiology
  - Many; bacterial, viral, pharmacologic, sunlight
  - In children- Herpes Simplex Virus (HSV) is most common trigger in Erythema Multiforme (EM)
  - Medications; Sulfa drugs, anticonvulsants, NSAIDS
    - Repeat medications cause reaction to occur more rapidly. Stop MEDS!!
  - *M. Pneumoniae* noted in EM and SJS

Erythema Multiforme/SJS/TENS

- Diagnostic Evaluation
  - Skin culture (bacterial and viral) with biopsy
- Management
  - Intensive care unit for SJS and TEN
  - Electrolyte monitoring; replacement
  - Evaluation of kidneys; problems common
  - Meticulous skin care with dermatology consult
  - Intubate for airway sloughing
  - Treat hypovolemic shock
  - Intravenous immunoglobulin (IVIG) gaining popularity

SJS and TEN

Staph Scalded Skin Syndrome

Background

- Most common in Infants 1-3 month of age

Pathophysiology

- Epidermal erythema and superficial necrosis
- Consistent pattern of progression with prodrome of URI and purulent conjunctivitis

Presentation

1. Erythema-Red around mouth and other orifices, spreads with +Nikolsky's sign (slight rubbing results in skin exfoliation)
2. Exfoliation-24-48 hrs, Superficial erosions to large bullae
3. Desquamation-Affected areas dry up and form powdery scales. New skin 5-7 days

Staph Scalded Skin Syndrome

-Diagnostic Evaluation

- Exfoliative cytology & biopsy
- Exclude diagnosis of TENS

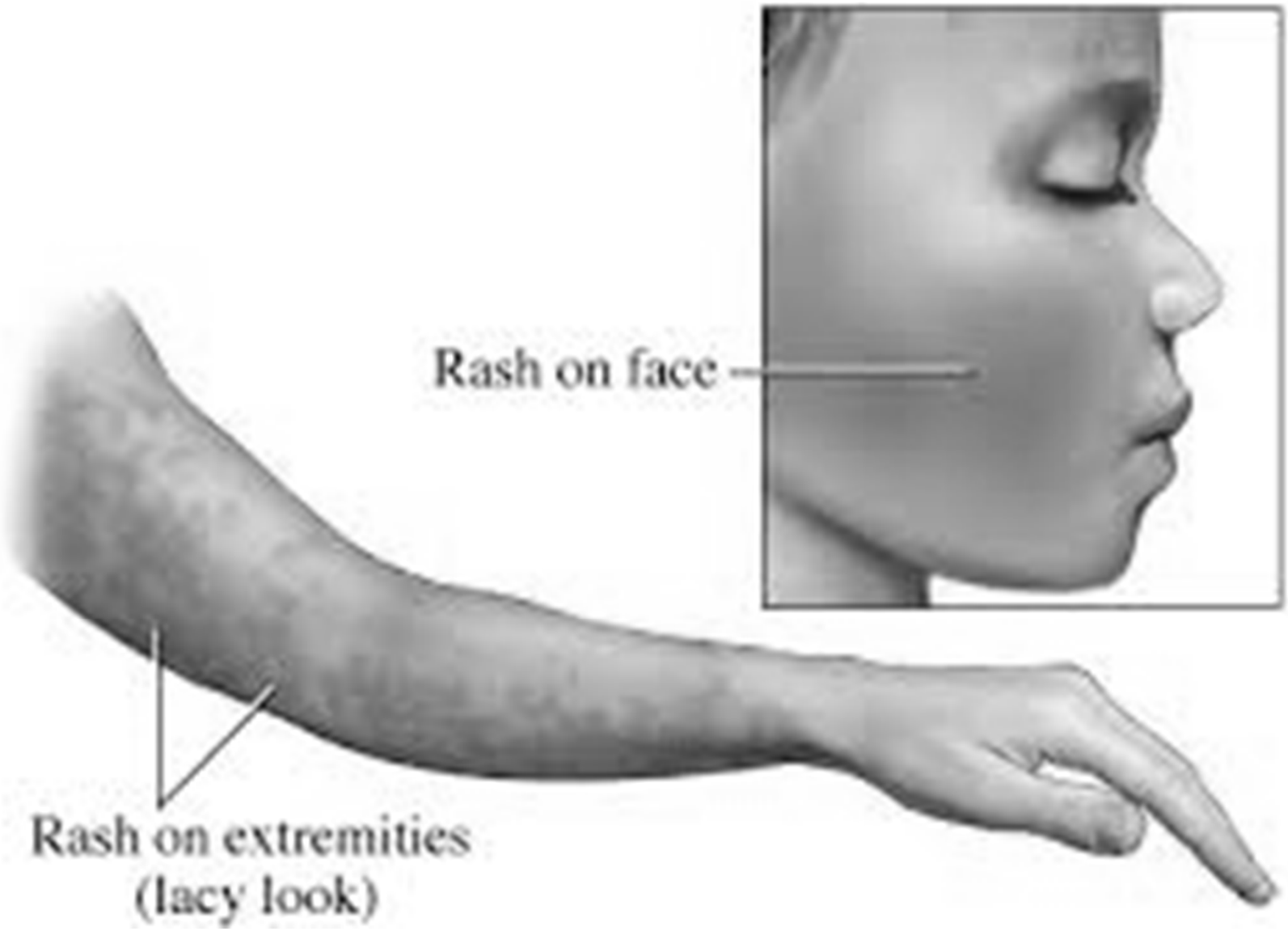
-Management

- Antibiotics; targeted at *Staphylococcus*
- Fluid and electrolyte replacement

Staph Scalded Skin

Parvovirus B19/5th Disease

- Infection caused by parvovirus
- Common in children
- Symptoms: fever, runny nose, headache, rash
  - First rash: Slapped cheek rash
  - Some may get 2nd rash: Chest, back, legs, arms. This rash may be itchy. May begin as a lacey rash in appearance. Can take days to weeks to resolve
  - May also be associated with pain/swelling in joints
- Diagnosis: “Slapped cheek” appearance; testing for parvovirus only in special cases
- Treatment: Supportive care; will go away on own
- Transmission: Respiratory droplet; likely no longer contagious once rash appears



Scarlet Fever

- Symptoms: Sore throat, fever, and rash!
  - Rash caused by strep toxins; usually occurs before illness or up to 7 days later
  - Rash is flat, red blotches that become fine bumps and feel like sandpaper. Underarms, elbow, groin creases often become more red than rest of rash (Pastia's lines).
  - As rash fades, may peel around finger tips, toes, groin area
  - Most common in children 5-15 years of age
- Caused by bacterial infection: Group A Strep
  - Diagnosis: Rapid strep throat test; throat culture
- Complications: Rheumatic fever, post-strep glomeruloenephritis, skin infections, pneumonia
- Treatment: PCN; cephalexin, azithromycin, or clindamycin if PCN allergic

Necrotizing Fasciitis

Background

- Also known as “Flesh eating bacteria”

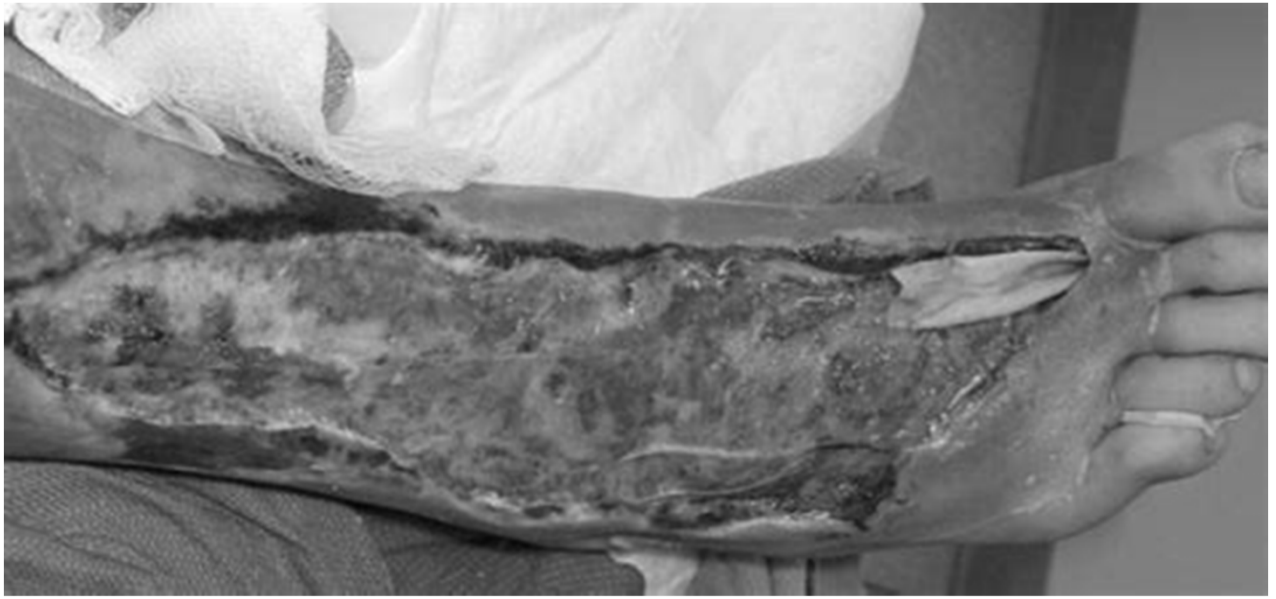
Pathophysiology

- Causes destruction of skin and muscle by releasing pyogenic exotoxins
- Toxin is capable of activating T-cells which causes the overproduction of cytokines and severe systemic illness

Etiology

- Common organisms-, Group A *Streptococcus, Staphylococcus aureus, Clostridium perfringens, Bacteroides fragiles, Aeromonas hydrophila*

More likely to occur in people with compromised immune system



Necrotizing Fasciitis

- ***Mortality up to 70% without appropriate therapy***
- Presentation
  - Erythema, warmth, induration, and edema of skin at local inflammatory site; rapidly progressing
  - Infection progresses along the superficial faschial plane
  - *Epidermis often spared
  - Can occur anywhere on body
  - Fever
  - Tachycardia
  - Crepidance most commonly with *Clostridium species or other gram negative organisms*
  - *May progress to gangrene*
- Diagnostic Evaluation
  - Confirmed by visual examination of the tissues and by tissue samples sent for microscopic evaluation and culture
  - Blood culture; commonly yield an organism
  - CBC; leukocytosis
-

Necrotizing Fasciitis

- Management
  - Aggressive surgical debridement to prevent spread; all devitalized tissue debrided
  - Initial antibiotic treatment is combination of intravenous antibiotics including piperacillin/tazobactam and clindamycin. Consider vancomyin in communities with high rates of methicillin resistance. Alternate: metronidazole and third generation cephalosporin
  - Evaluate for compartment syndrome
  - Taper antibiotics according to cultures

Abscess

Background

- An area of nonfunctioning tissue that is contained, most often resulting from persistent bacterial infection

Diagnostic Evaluation

- Found on all parts of body; more common on buttocks, axilla, and extremities
- Edema, erythema, pain
- Ultrasound may be useful to identify location and extent

Management

- Most important management is incision and drainage and culturing of the wound and or fluid
- Dressing choices depend on age and wound being treated
- If antibiotic therapy is indicated; based on severity of infection and most likely pathogens

Abscess

Incision and Drainage

- Procedure to drain pus from an abscess
- Performed when abscess is large, painful, or not improving on its own
- Abscess can be found on any part of body

- Usually performed as an outpatient
- Incise most fluctuant site of wound with 11 or 15 surgical blade
- Direct incision on plane of skin folds to reduce scarring
- Uncomplicated abscesses of do not require antibiotic therapy

Incision and Drainage

- IV antibiotics indicated if:

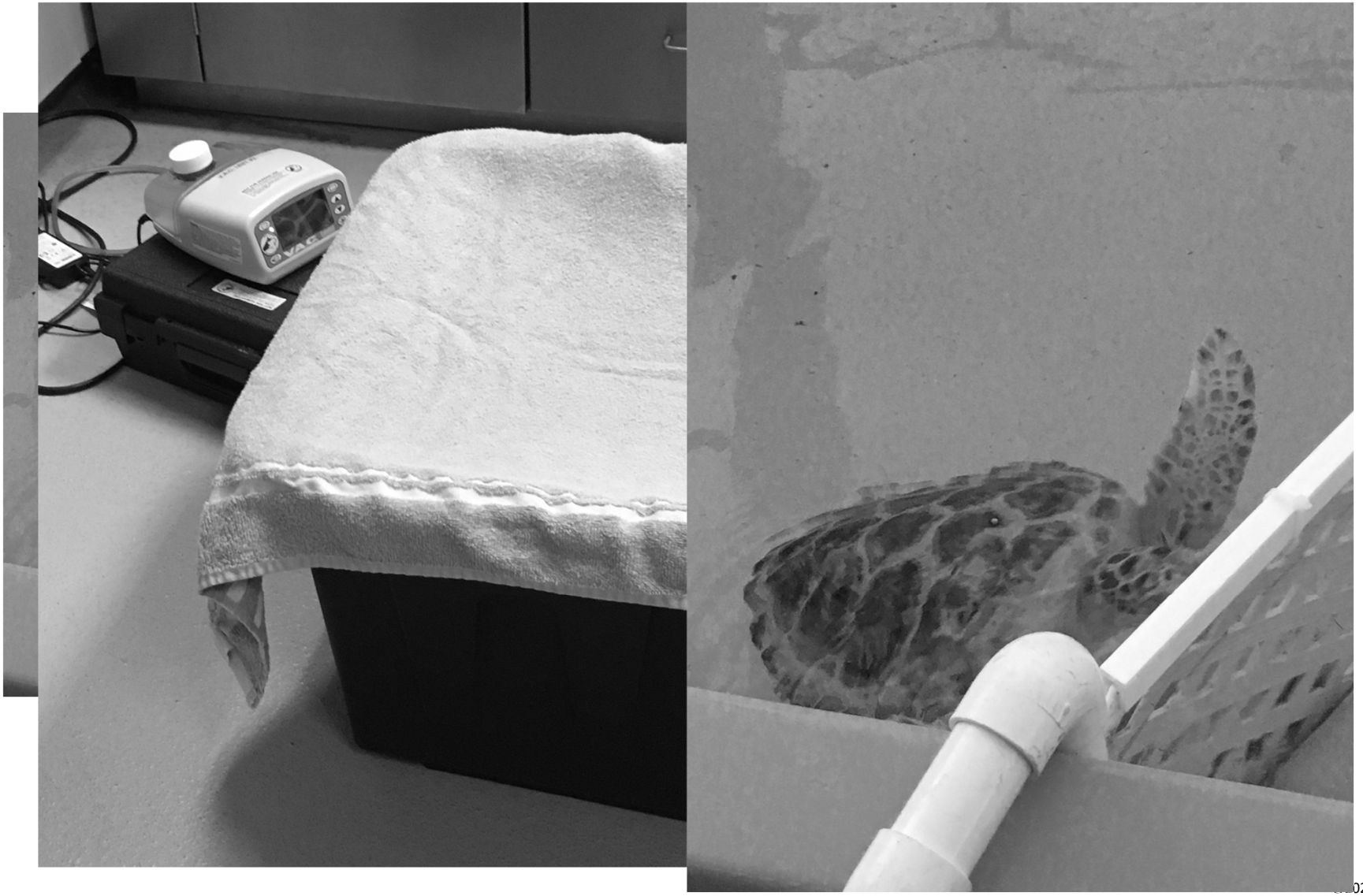
  Life or limb threatening illness, immunocompromised host, infants (some cases)

- Most common pathogens:
  - *Staph aureus (*consider MRSA), *Strep pyogenes*
  - Site specific organisms; e.g. gram negative organisms in perianal absesses

Wound Care

- Consider-negative pressure wound therapy via Wound VAC, hyperbaric treatment.
- Wound care consult as available. ID consult.
- Sedation for dressing changes
- Full dressing guidelines based on stages of injury
- Neonate-use only hydrogels, hydrocolloids and film dressings.

Sea Turtle VAC Therapy



Question 2

After performing initial stabilization and initiating antibiotics, the next treatment priority in necrotizing fasciitis is which of the following

a. CT scan of affected area
b. Ultrasound of affected area
c. Punch biopsy
d. Aggressive surgical debridement

Question 3

Which antimicrobial therapy is a first line therapy indicated in a 6 y/o male presenting with sore throat, sand paper rash, fever?

A. Cefdinir
B. Amoxicillin
C. Levofloxacin
D. Gentimicin

Question 4

Which of the following is an appropriate oral antibiotic choice for a moderate dog bite?

A. Amoxicillin

B. Amoxicillin-clavulanate

C. Azithromycin

D. Cephalexin

References/Additional Reading

- Abelt, R. (2012). Erythema multiforme. In K.R. Rice & B.N. Bolick. (Eds.). *Pediatric acute care: A guide for interprofessional practice*. (pgs 347-351). Burlington, MA: Jones and Bartlett Learning.
- American Academy of Pediatrics. (2012). Bite wounds. Red Book: 2012 Report of the Committee on Infectious Diseases. In L.K. Pickering (29th ed.). Elk Grove Village, IL: Author.
- Baharestani, M (2007). Use of Negative Pressure Wound Therapy in the Treatment of Neonatal and Pediatric Wounds: A Retrospective Examination of Clinical Outcomes. *Ostomy Wound Management,* 53(6).75-85.
- Edwards, J. (2012). Wounds and wound care. In K.R. Rice & B.N. Bolick.(Eds.). *Pediatric acute care: A guide for interprofessional practice*. (pgs 354-361). Burlington, MA: Jones and Bartlett Learning.
- Fitch, M., Manthey, D. Henderson, M., Nicks, B. & Pariyadath, M. (2007). Abscess incision and drainage. *New England Journal of Medicine, 357.* DOI: 10.1056/NEJMvcm071319
- Harper, M.B., & Fleisher, G.R. (2010). Infectious Disease Emergencies. In G.R. Fleisher & S. Ludwig (Eds.). (pg 928). Texbook of Pediatric Emergency Medicine. Philadelphia, PA. Lippincott, Williams,Wilkins.
- Hess, C.T. (2012). *Clinical Guide to Skin and Wound Care*. Springhouse, PA: Springhouse.
- Livingston & Rancillo. (2016). Toxic Epidermal Necrolysis. In A.M. Kline-Tilford & C. Haut (Eds). Lippincott Certificaiton Review: Pediatric Acute Care Nurse Practitioner. (pgs 492). Philadelphia, PA. Wolters-Kluwer.
- Meadows, M. (2012). Stings. In K.R. Rice & B.N. Bolick.(Eds.). *Pediatric acute care: A guide for interprofessional practice*. (pgs 351-354). Burlington, MA: Jones and Bartlett Learning.
- Mohr, L. (2016). Incision and Drainage. In A.M. Kline-Tilford & C. Haut (Eds). Lippincott Certificaiton Review: Pediatric Acute Care Nurse Practitioner. (pgs 494-495). Philadelphia, PA. Wolters-Kluwer.
- Morelli, J. G. (2011). Subcutaneous tissue infections. In R.M.Kliegman, B.F. Stanton, J.W. St. Geme, N.F. Schor, & R.E. Behrman.(Eds.). Kliegman: Nelson Textbook of Pediatrics. (19th ed.). Philadelphia, PA. Elsevier Saunders.
- National Pressure Ulcer Advisory Panel (NPUAP) (2010). Retrieved from https://www.npuap.org
- Thomas Hess, C*. (2012). Clinical Guide to Skin and Wound Care.* Springhouse, PA: Springhouse.