UWTASP tele-antimicrobial stewardship program | echo

August 15, 2017

Chloe Bryson-Cahn, MD
Robert Cybulski, PhD
Marisa D'Angeli, MD
Rupali Jain, PharmD
John Lynch, MD, MPH
Natalia Martinez-Paz
Paul Pottinger, MD
Erica Stohs, MD, MPH
Ted Wright, MD

Agenda

- Didactic: John Lynch, *NSTI*
- Case Discussion
- Open Discussion

URL: http://rwpoll.com
Code: uwecho

UW TASP tele-antimicrobial stewardship program | echo

Necrotizing Skin and Soft Tissue Infections

John Lynch, MD, MPH
Harborview Medical Center &
The University of Washington School of Medicine

August 14, 2017

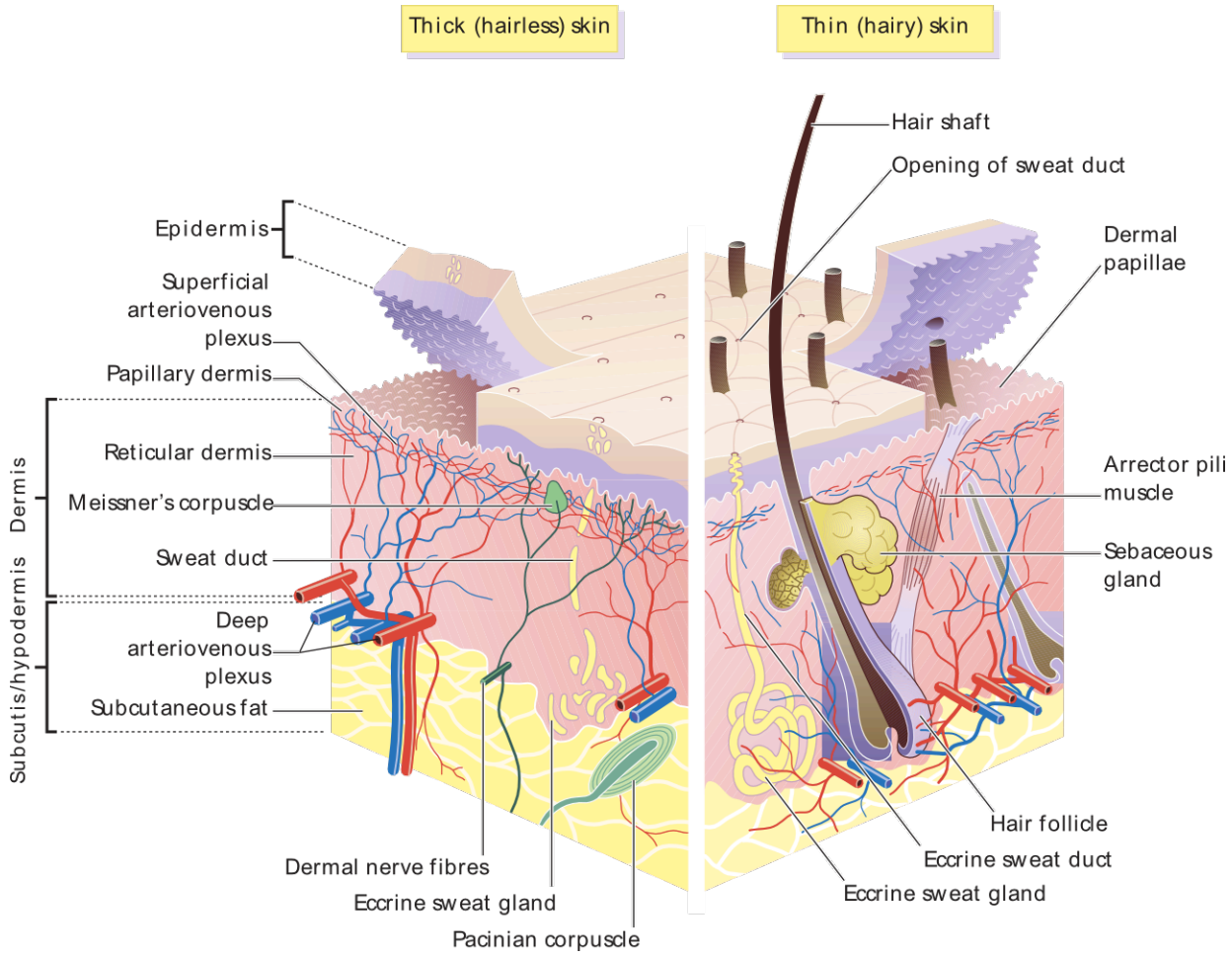
URL: http://rwpoll.com
Code: uwecho

This presentation is intended for educational use only, and does not in any way constitute medical consultation or advice related to any specific patient.

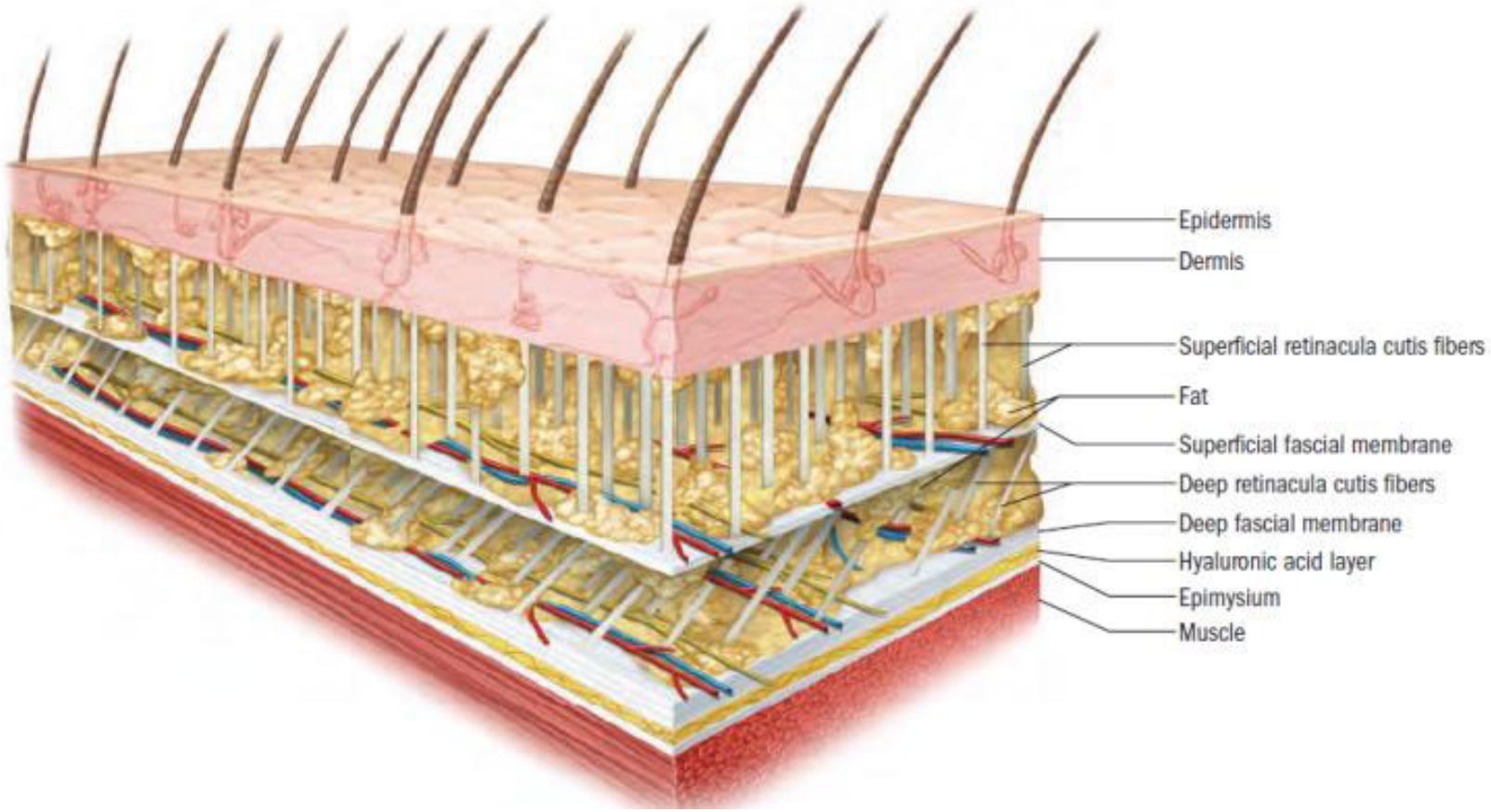
Necrotizing Skin and Soft Tissue Infections

- Group of necrotizing infections with systemic signs/sxs of sepsis, tissue destruction and high mortality
  - Necrotizing fasciitis
  - Necrotizing cellulitis
  - Necrotizing myositis
- Necrotizing fasciitis:
  - Life-threatening infection of the subcutaneous tissue and muscle fascia
  - Travels deep to the visible skin, so dx can be delayed
  - 0.4-1 per 100,000 people, mortality 13-31%
  - DM, IV drug use, recent surgery, traumatic wounds

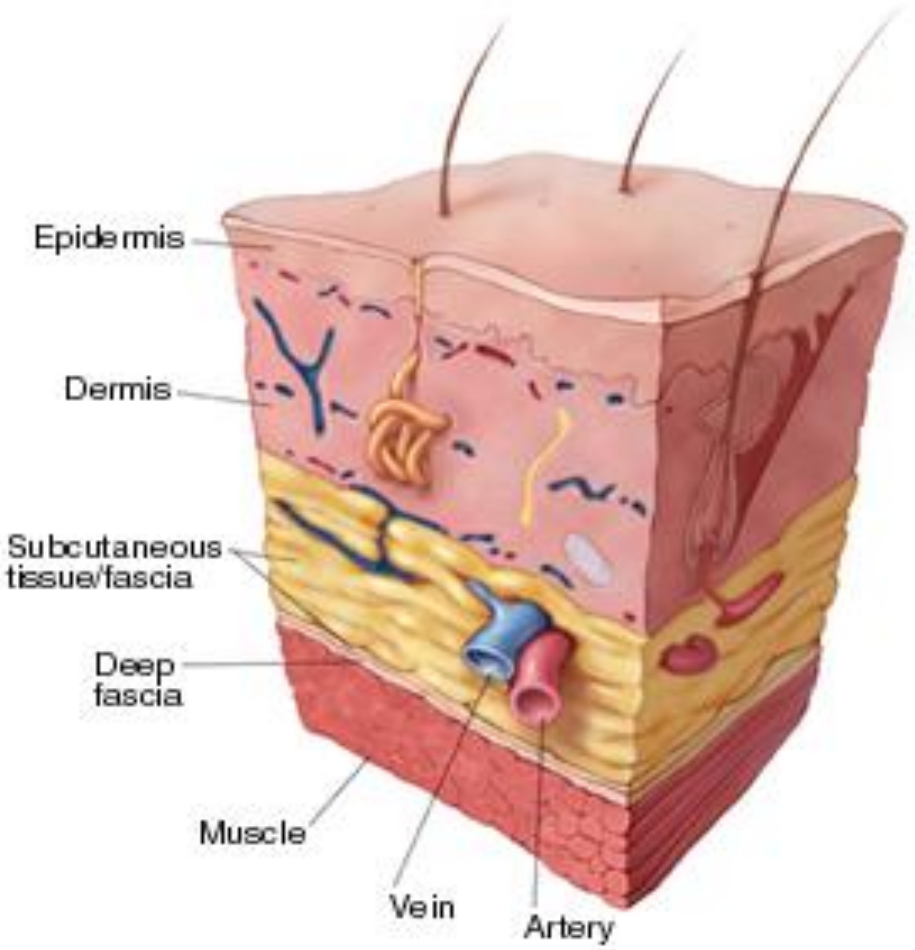
Necrotizing Skin and Soft Tissue Infections



Necrotizing Skin and Soft Tissue Infections



Necrotizing Skin and Soft Tissue Infections



Necrotizing Skin and Soft Tissue Infections

- AKA necrotizing fasciitis

Types of NSTI

- Type I: polymicrobial anaerobes and aerobes, most commonly Fournier's gangrene (perineal necrotizing fasciitis) and head/neck infections
- Type II: Group A streptococus (S. pyogenes), sometimes *S. aureus*, usually extremities and/or trunk.
- Type III: GNRs such as *Vibrio vulnificus* and *Aeromonas hydrophila*
- Type IV: fungal

Types of NSTI

- Group A strep and NSTI:
  - GAS M proteins are antiphagocytic and associated with NSTI
  - GAS can produce pyrogenic exotoxins A,B, or C (can act as superantigens)
  - May be associated with toxic shock syndrome
  - May localize to site of trauma

ARS:What is the “gold standard” for initial NSTI dx?

1. Blood cultures
2. MRI
3. Surgical exploration
4. Septic shock
5. Tissue cultures

Diagnosis of NSTI

- Primarily clinical
  - Classically presents with pain out of proportion
  - Tenderness to palpation beyond area of erythema
  - Skin bullae, ecchymotic changes, **paresthesias**
  - Crepitus
  - Systemic signs of sepsis/shock
- Imaging can be helpful, but cannot r/o NSTI
- Laboratory Risk Indicator for Necrotizing Infection (LRINEC)

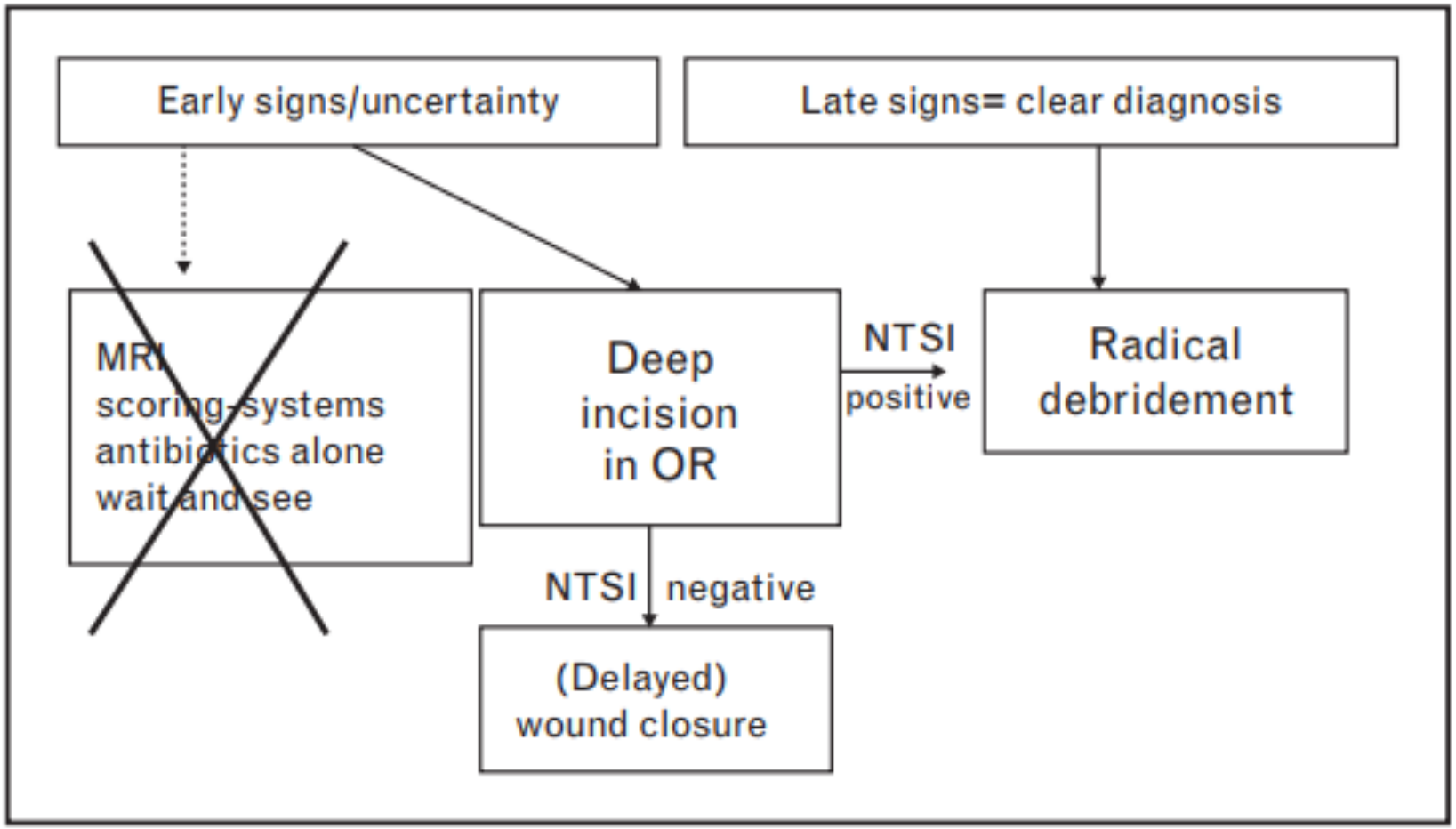
Wikimedia Commons

Wikimedia Commons

Laboratory Risk Indicator for Necrotizing Infections

- LRINEC
  - CRP above 150 (4 points)
  - Total WBC above 25 (2 points)
  - Hemoglobin less than 11 (2 points)
  - Sodium less than 135 (2 points)
  - Creatinine greater than 1.6 (2 points)
  - Glucose greater than 180 (1 point)
- Score of 6 = PPV 92%
- Score of 8 = 75% risk of necrotizing infection

Diagnosis of NSTI



Eckman, Current Opinion in ID, 2016

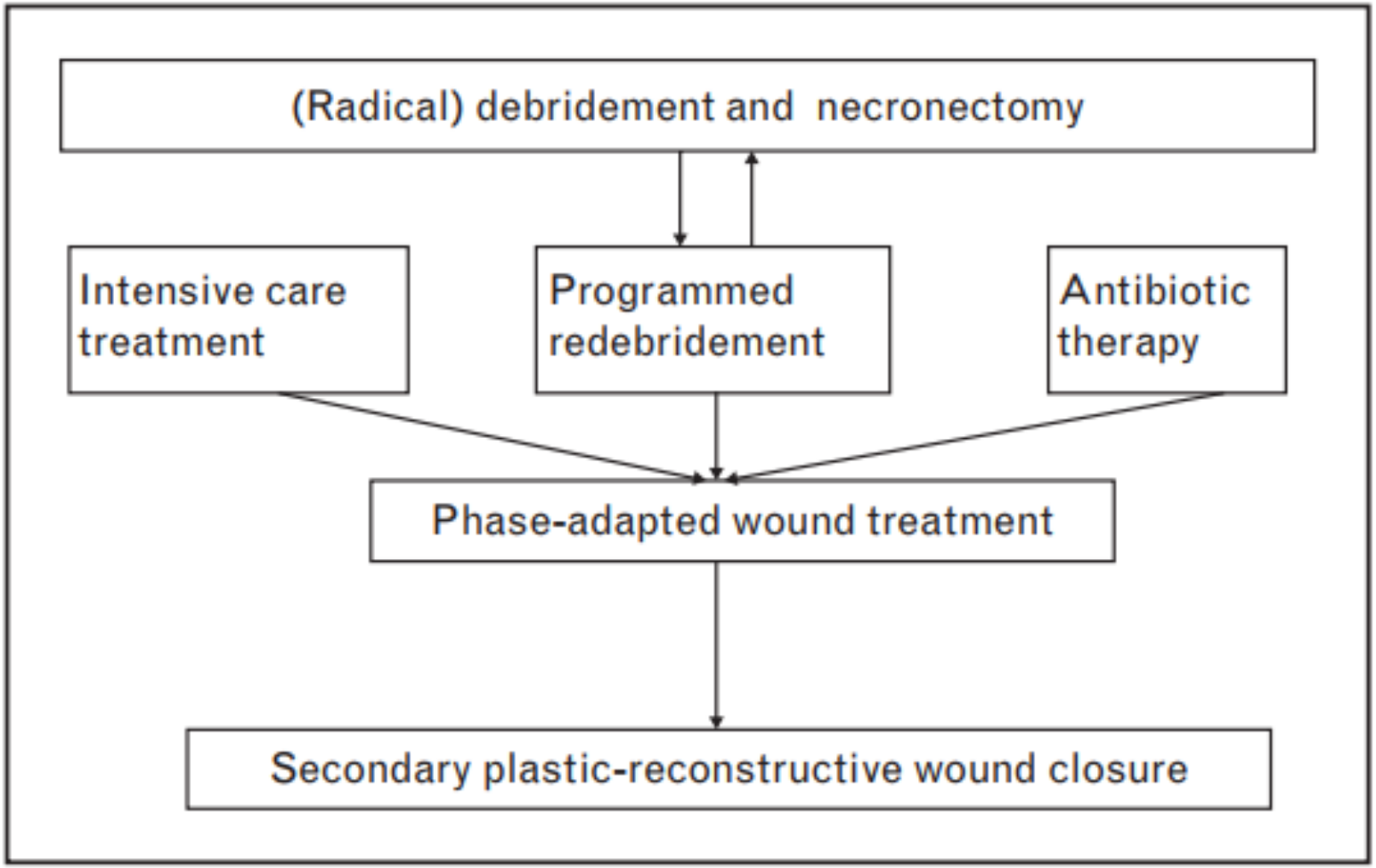
Treatment of NSTI

Table 1. Aspects of source control in severe soft tissue infections

(Surgical) measure	Description	Clinical setting	Example(s)
Device removal	Removal of infected/colonized device	Superficial or deep-seated infected device	Infected central venous catheter-infected vascular graft
Incision and drainage	Evacuation of infected fluid by incision and/or insertion of drain(s)	Abscess formation	Perineal abscess deep surgical-site infection
Limited debridement	Maximum preservation of vital tissue	Limited local extent of infection	Diabetic foot infection
Radical debridement	Extensive removal of all infected and necrotic soft tissue	Necrotizing soft tissue infections with severe sepsis	Necrotizing fasciitis Fournier's gangrene
Amputation	Minor or major (above ankle) amputation of extremities	Infected necrosis of the extremities	Gas gangrene

Eckman, Current Opinion in ID, 2016

Treatment of NSTI



Eckman, Current Opinion in ID, 2016

Treatment of NSTI

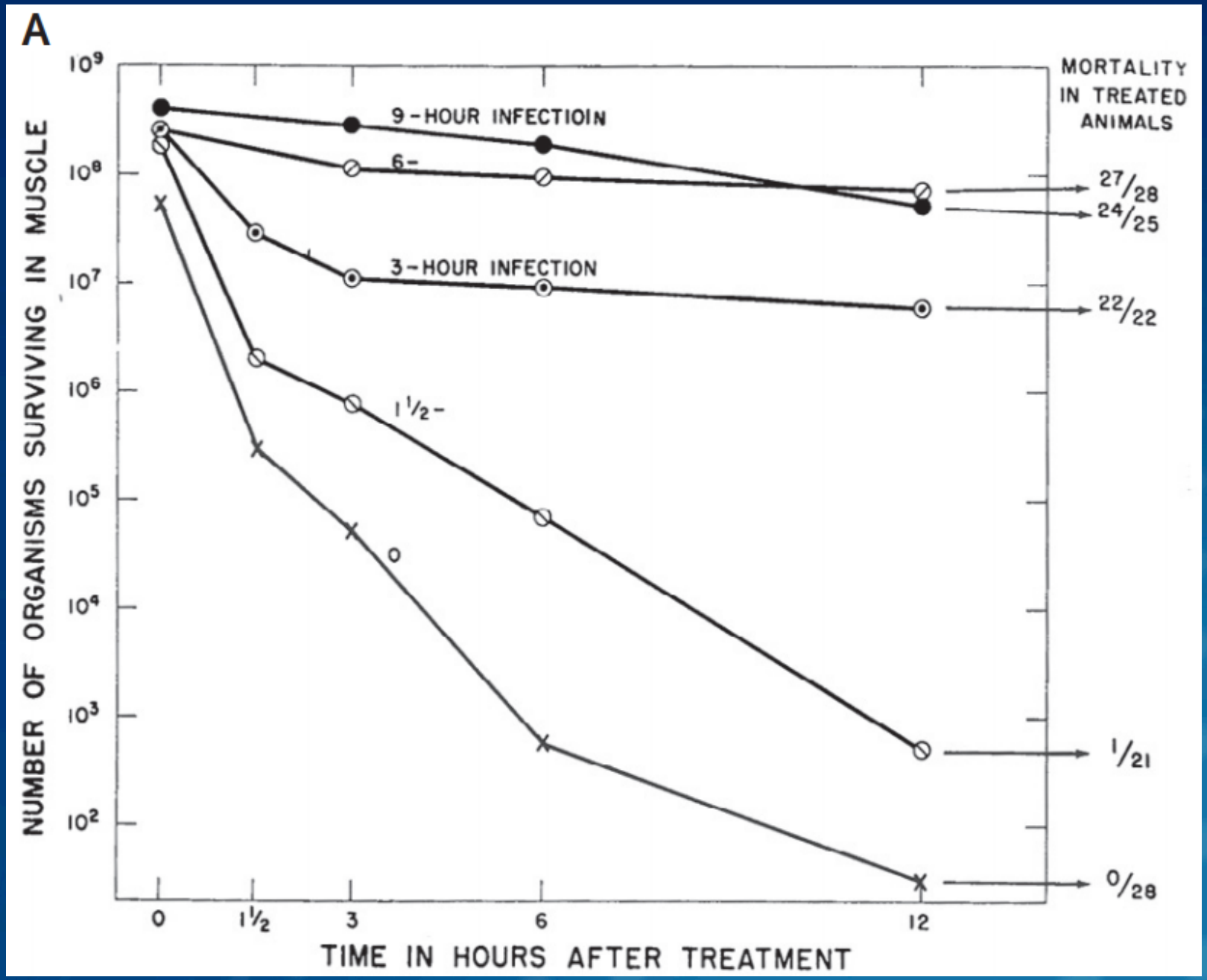
Wikimedia Commons

ARS: What antimicrobials?

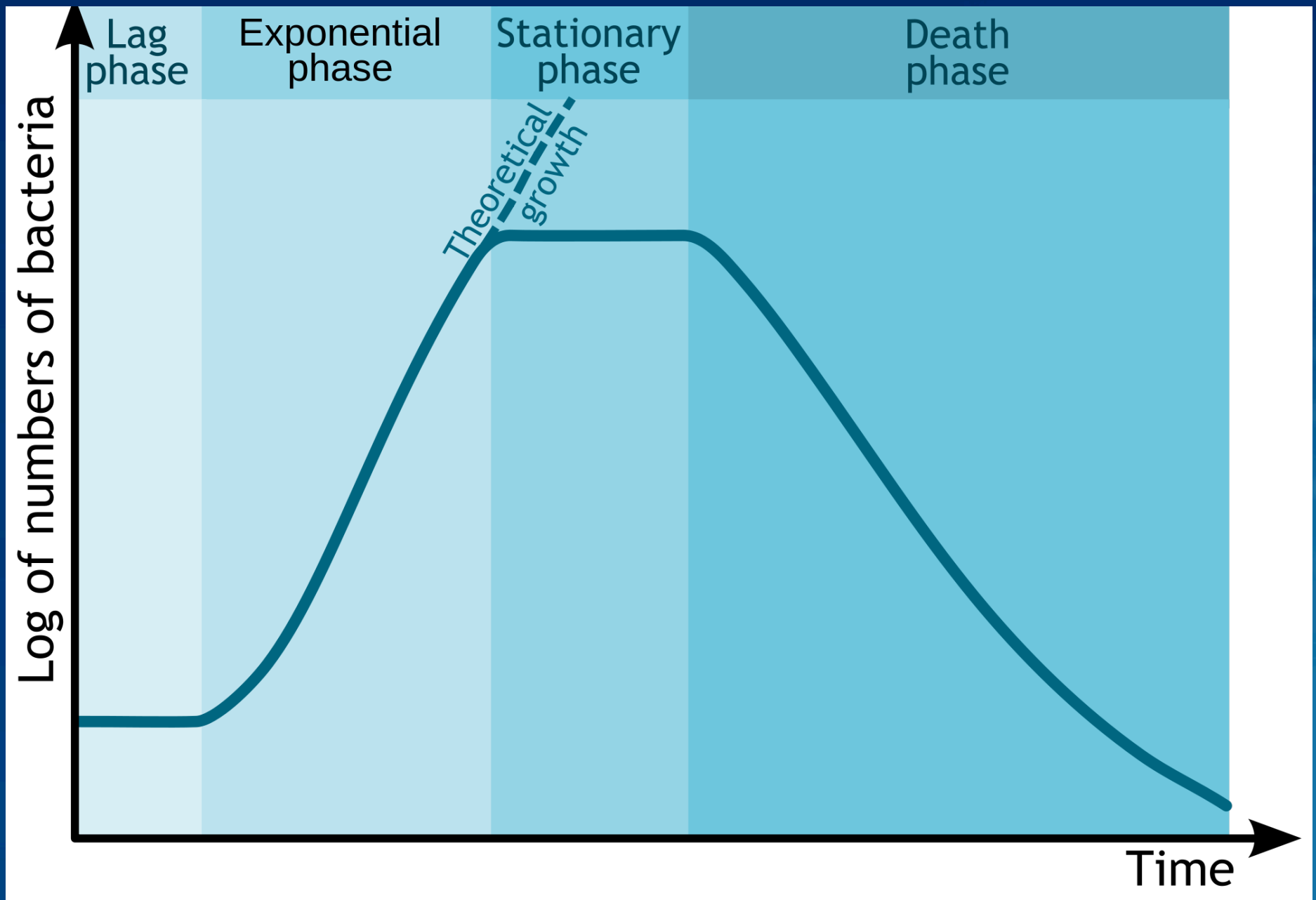
1. Vancomycin
2. Vancomycin+pipericillin/tazo (Zosyn)
3. Vancomycin+meropenem
4. Meropenem+clindamycin
5. Clindamycin+vancomycin+pipericillin/tazo+penicillin
6. Clindamycin+vancomycin+pipericillin/tazo+penicillin

Antimicrobials for NSTI

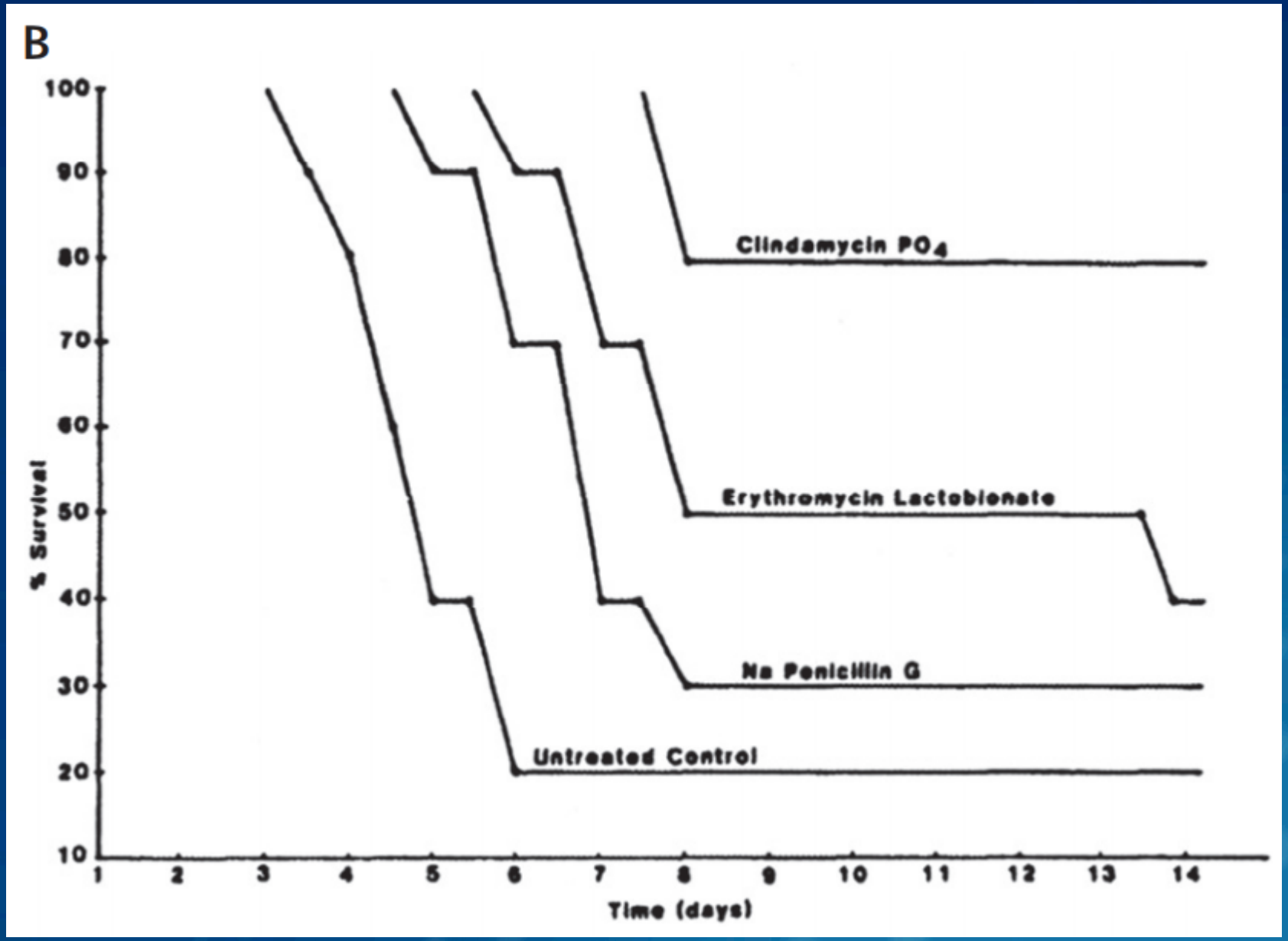
- Penicillin IV (targets group A strep)
- Vancomycin IV (targets MRSA)
- Pipericillin/tazobactam or carbapenem IV (targets Gram negative organism and anaerobes)
- Clindamycin IV (targets toxin production)
- De-escalate based on cultures
- If GAS, keep clindamycin on till debridements complete



Eagle, I. Group A streptococcal infection in mice, Am J Med, 1952



Wikimedia Commons



Stevens, JID, 1988

Other Treatments for NSTI

- Intravenous immune globulin
  - Very limited data
  - No clear support for benefit
- Hyperbaric oxygen may be of benefit if used early (some human and dog data supportive), but access is very limited

Key Points

- NSTI can be subtle in early phase
- Diagnosis depends on clinical evaluation
- Other labs not specific
- Early surgical debridement and antimicrobials are critical
- Start very broad + toxin inhibitor and de-escalate first with culture results then with completion of debridement
- Mortality remains high despite early and aggressive therapy

ARS: Didactics?

Topics? Can chose >1:

1. Genetic assays in the micro lab
2. IV to PO conversion, safety data/ operationalizing
3. Antibiotic time-outs, supporting data?
4. The diabetic foot
5. Abx dosing in the high BMI patient
6. Other ideas