COMMON INFECTIONS

GAIL REID, MD, MS-CTS

OBJECTIVES

- ID characteristics on ROS and PE that define SSSIs and severity of disease
- ID risk factors predisposing for various SSSIs & organisms causing SSSIs
- Develop a differential diagnosis for SSSI
- Develop a treatment plan – empiric antibiotic therapy, decide on outpatient vs inpatient, oral vs intravenous
- ID the types of urinary tract infections and symptoms & PE findings associated with them
- Assess risk factors for types of UTI
- Develop a treatment plan for UTI and identify possible complications of the infection

WHAT ARE SOME TYPES OF SKIN & SKIN STRUCTURE/SOFT TISSUE INFECTIONS?

- Superficial infection
  - Impetigo
  - Erysipelas
  - Folliculitis
  - Farunculosis
  - Hidradenitis
- Deep
  - Cellulitis
  - Fasciitis
  - Absess (superficial or deep)
  - Myositis

A 42 year old male with poorly controlled diabetes presents to the ED with 5 days of right lower leg pain and swelling with erythema that started on his toes and has progressed to just above his ankles. He has noted development of low grade fever over the past few days as well and has more pain with walking.

On PE
Tm 100.1 bp 143/79 HR 82 RR 14
Wn/WD, NAD,
Lungs clear b/l
No murmurs,
Right lower extremity with erythema above ankle, warm, tender, edema c/w left, no ulcers
Neuro no focal deficits

- What is the likely diagnosis?

A. Diabetic foot ulcer

B. Necrotizing fasciitis

C. Hidradenitis

D. Cellulitis

E. Lymphangitis

F. Farunculosis

- What is the likely diagnosis?

A. Diabetic foot ulcer

B. Necrotizing fasciitis

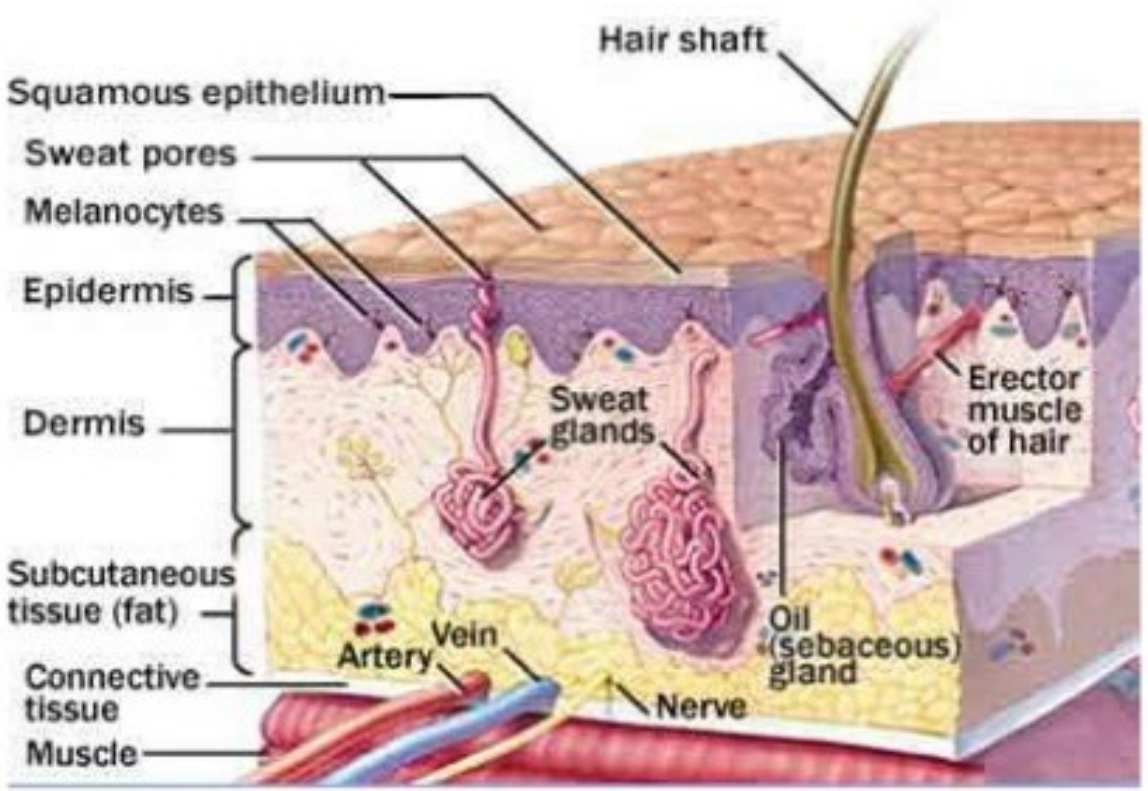
C. Hidradenitis

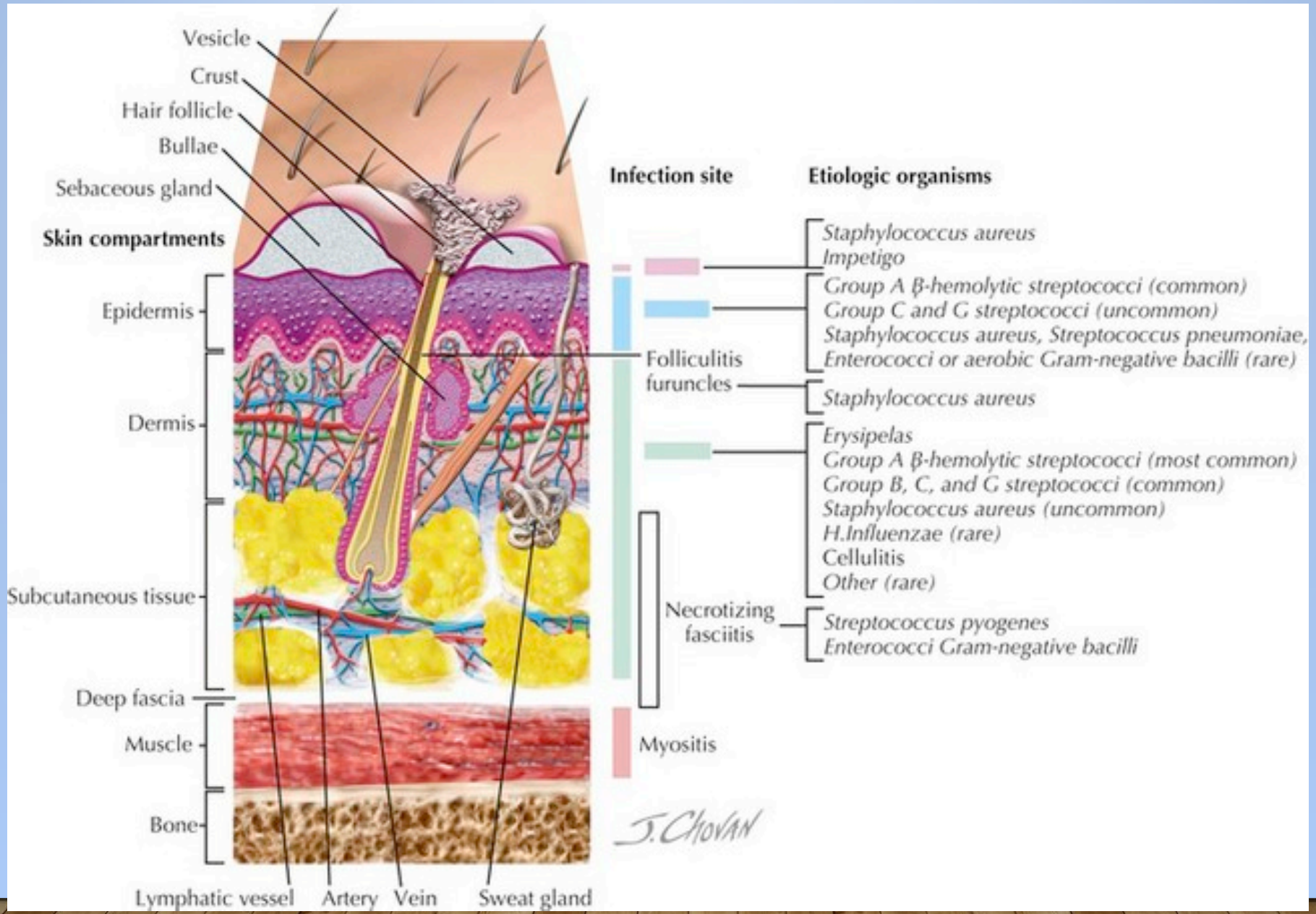
D. Cellulitis

E. Lymphangitis

F. Farunculosis

- Infections in,
  - Skin
  - Subcutaneous tissue
  - Fasciae
  - Muscles





Skin and Soft Tissue Infections | Obgyn Key

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https://emuaid.com/cellulitis

WHAT ARE SOME LABORATORY TESTS YOU WOULD ORDER FOR THIS PATIENT?

- Cbc w/ differential – left shift with leukocytosis
- Blood cx
- Cmp
- Imaging?

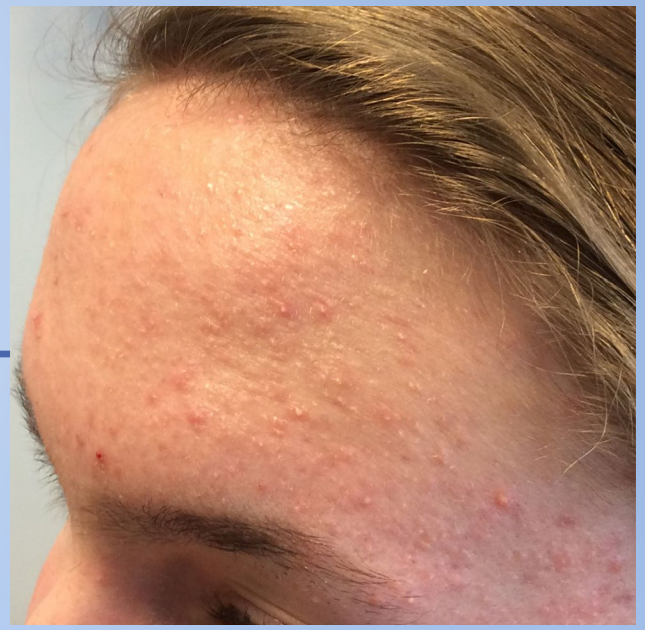
IMPETIGO

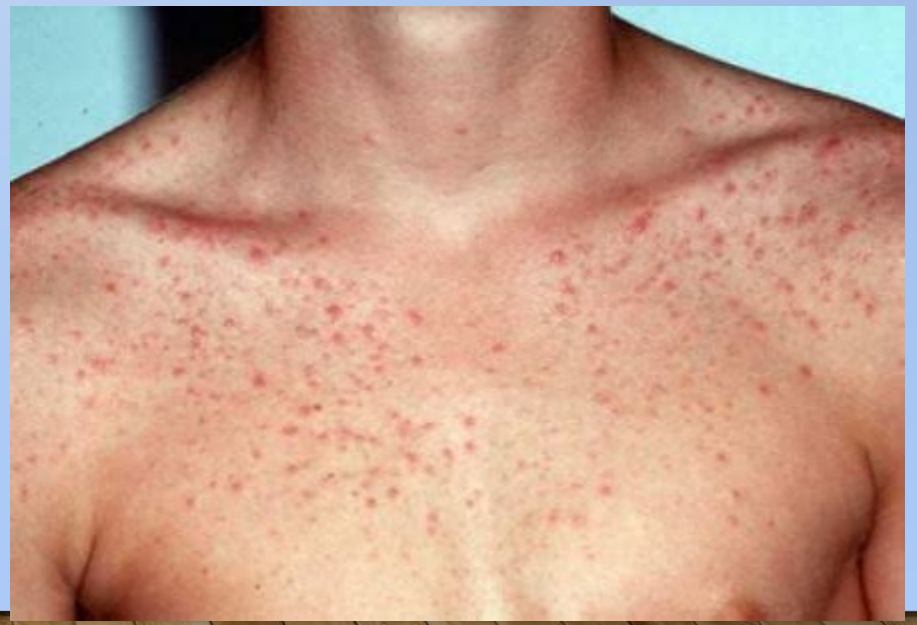
- Superficial vesicular/pustular infection,
- Exposed areas of face and extremities
- a/w poverty, poor hygiene, crowding, warm humid, children
- Group A Strep and Staphylococcus
- Red and tender pustules→ rupture → crust →May lead to LAD
- Early treatment can prevent post-strep GN
- Tx: topical mupirocin or a few; po with many (amox-clav, erythromycin, cephalexin, dicloxacillin)

Healthjade.net

FOLLICULITIS

- Hair follicles pyoderma (painful sores)
- Small, multiple erythematous with central pustule
- RF: nasal carriage with Staph aureus,
  - pools/hot tubs w/ inadequate chlorination – Pseudomonas
  - Antibiotics or steroids – Candida
- Tx: topical

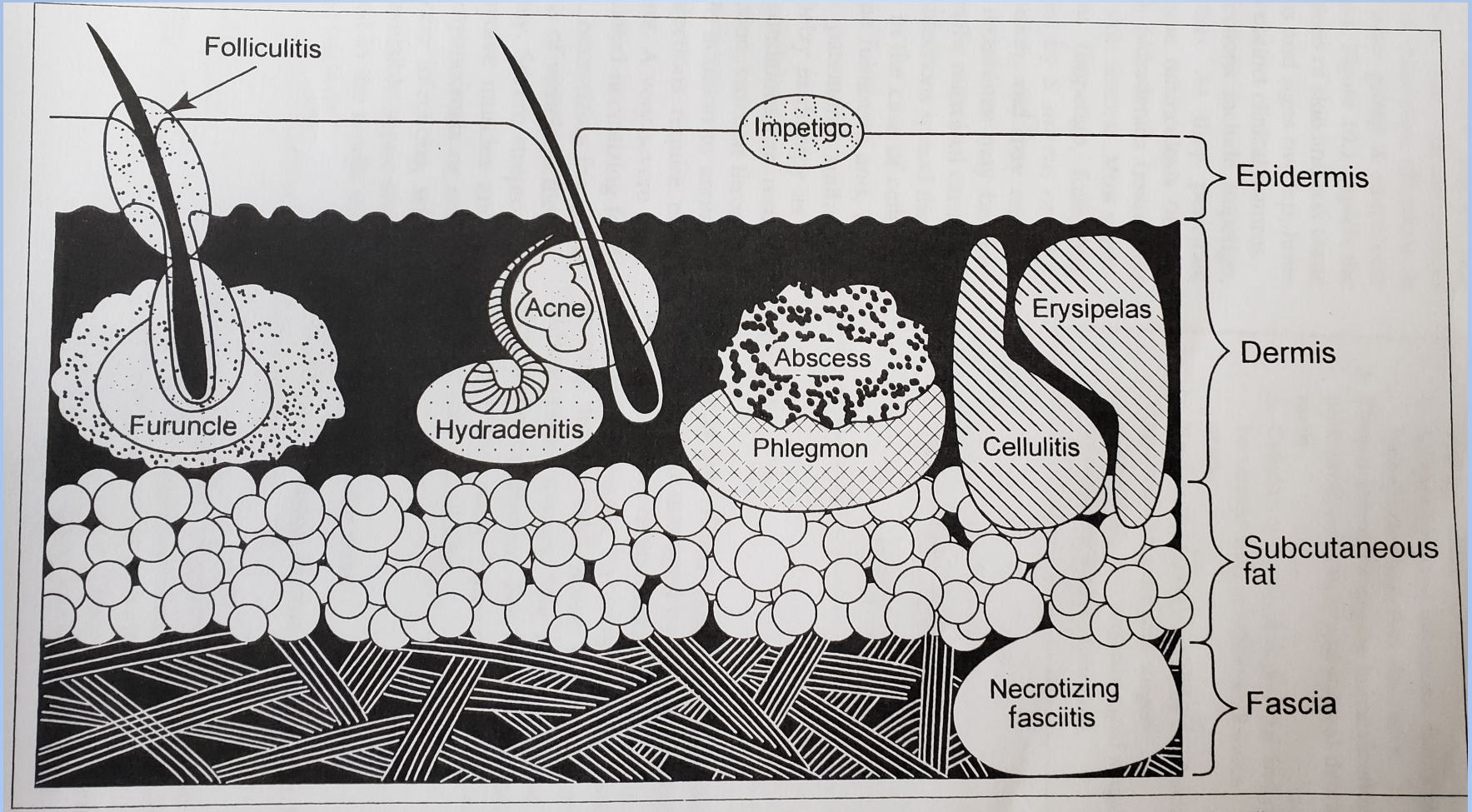




Emuaid.com/folliculitis; healthsurgical.com

FURUNCULOSIS & CARBUNCLES

- Furunculosis – inflammatory nodule of hair follicle, often after folliculitis episode
- Carbuncle – abscesses in SubQ that drain through hair follicles
- Mostly Staph aureus
- Mostly areas with perspiration and/or friction
  - Back of neck, face, axillae, buttocks
- RF: steroid tx, obesity,
- Tx: warm compresses for furuncles
- If fever – systemic Abx – dicloxacillin, cephalexin, clindamycin

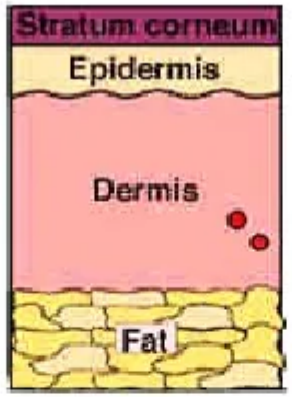


Schematic drawing of the anatomic sites of soft tissue infections. (Adapted from Saurat, J.-H., Grosshans, E., Laugier, P., and Lachapelle, J.-M.: *Dermatologic et Vénéréologic,* 2nd edition. Editions Masson, 1990, p. 109.)

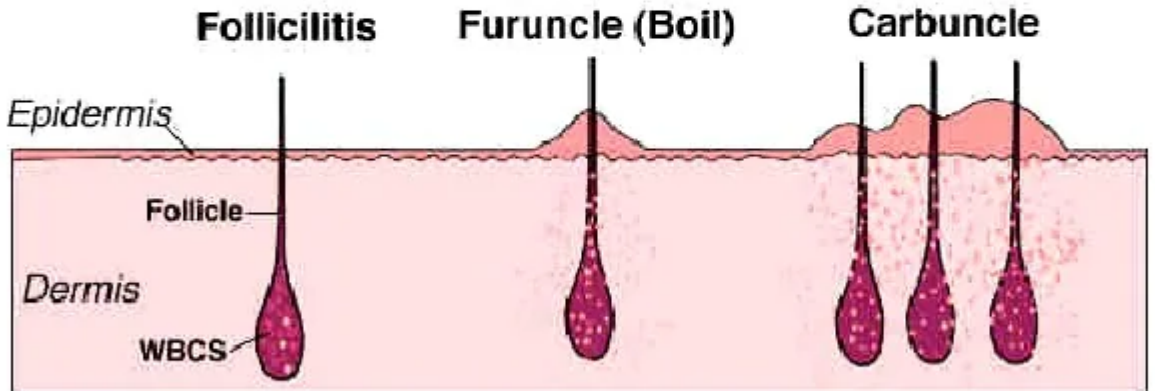
FURUNCULOSIS & CARBUNCLES

- Surgical drainage if no improvement
- For recurrence: chlorhexidine baths
  - Mupirocin intranasal
- Complications: furuncles in nose and perioral can → cavernous sinus infection

Bacterial Skin Infections: Types



Impetigo	Vesicles/honey colored erosions
Ecthyma	Crusts/erosions
Erysipelas	Tender, red plaque with sharp borders
Lymphangitis	Red streaks (usually on an extremity)
Cellulitis	Tender, red plaque



Folliculitis	Furuncle (Boil)	Carbuncle
1mm perifollicular red papule or pustule	About 1cm tender red papule or fluctuant nodule	Several cm diam red plaque
Areas of sweat & abrasion	Areas of sweat & abrasion	Nape of neck

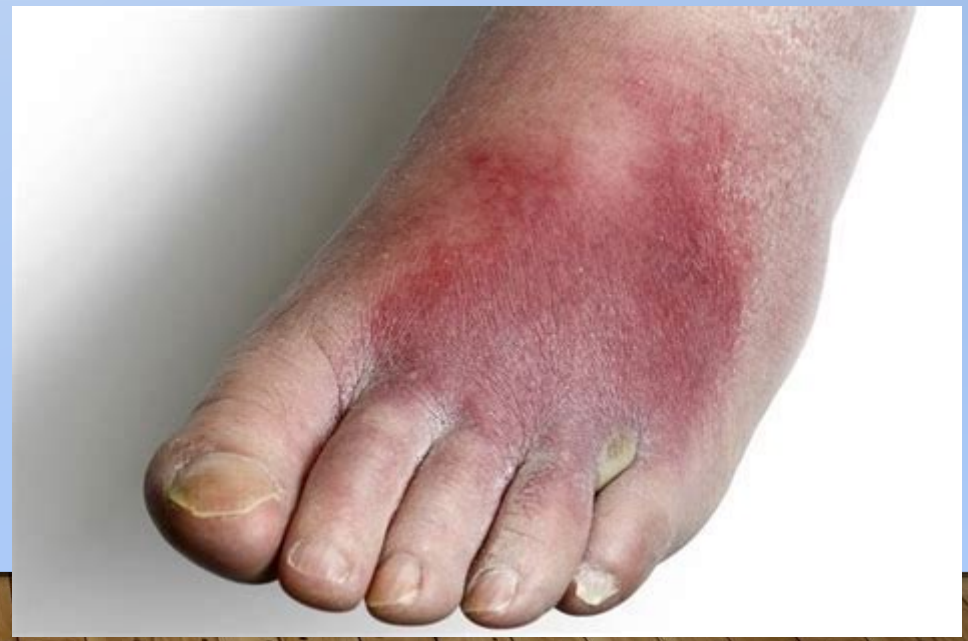
[Pathology of Skin - Common Disorders (slideshare.net)]

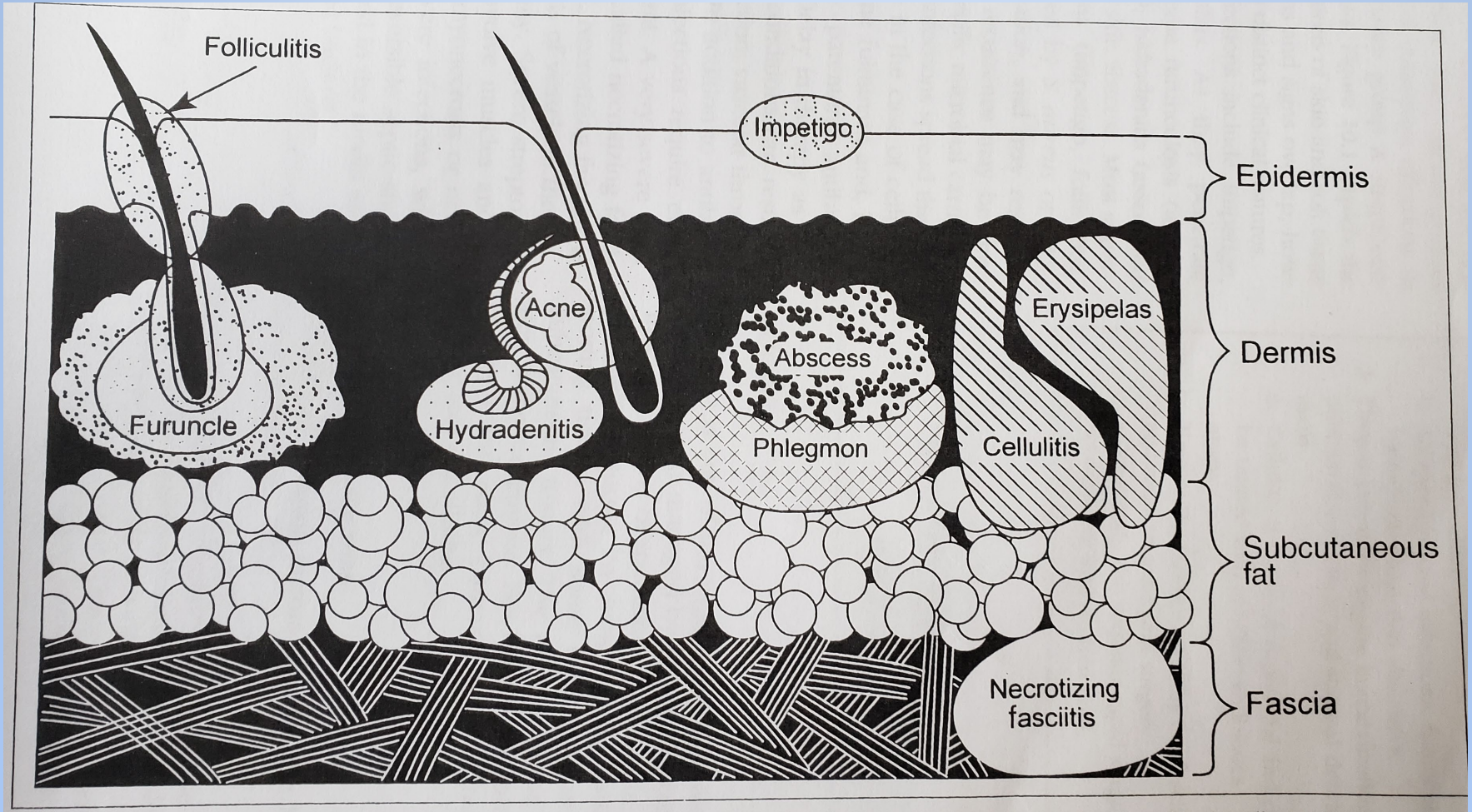
ABSCESS

- Collection of pmns, necrosed tissue and microbes
- Often deeper than carbuncles and not necessarily from hair follicle
- Pain, swelling, erythema, warmth, regional LAD, +/- drainage
  - Systemic sometimes
- Treatment: drainage and Abx

CELLULITIS

- infection of the skin mostly by bacteria
  - Dermis, epidermis, supporting tissue → subcutaneous tissues
- s/s: warm, red, tender, swollen also fever, blister
  - → systemic s/s fever, hypotension, AMS
- Types:
  - Hand, leg, facial
  - Periorbital, orbital





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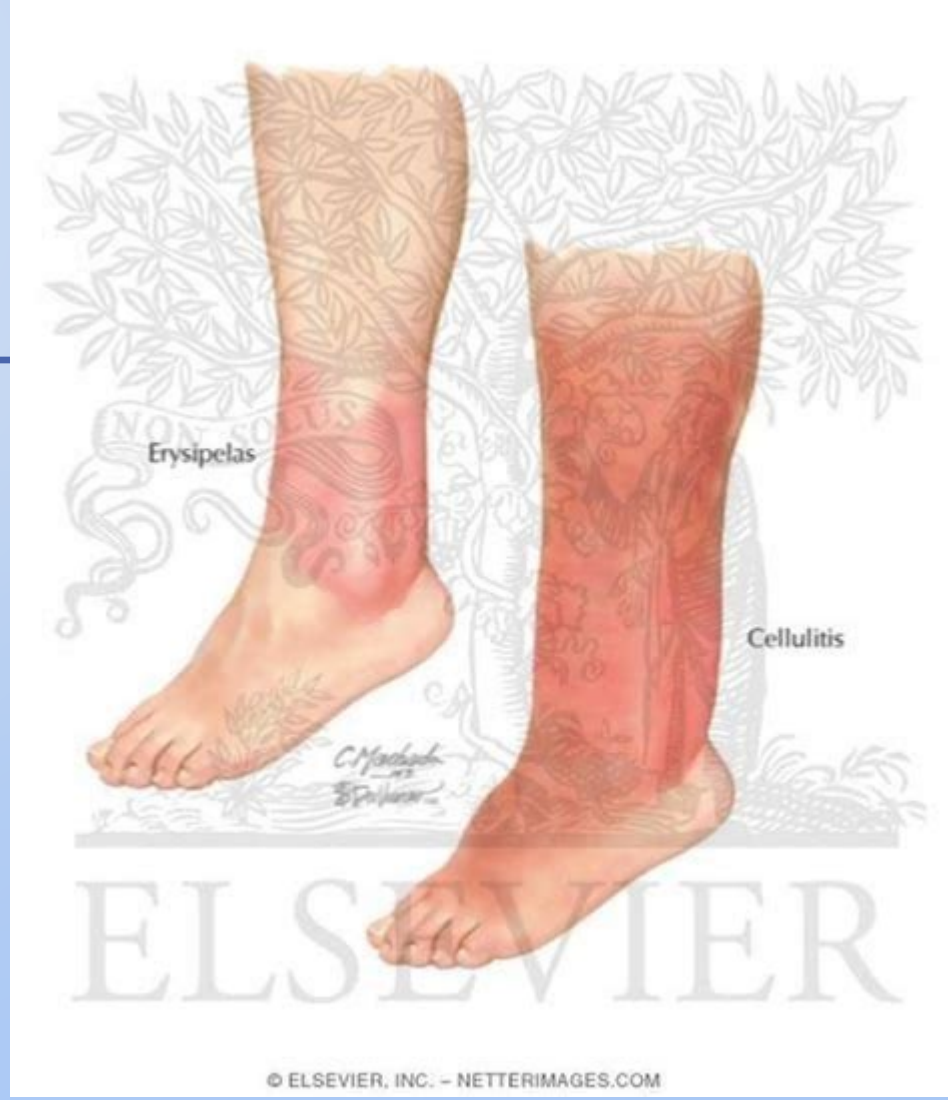
CELLULITIS RISK FACTORS – IN ONLY ABOUT 50%

- Vascular insufficiency – venous/lymphatic compromise
  - From surgery, thrombophlebitis, trauma, CHF
  - DM leading to peripheral neuropathy and small vessel disease
  - Chronic EtOH

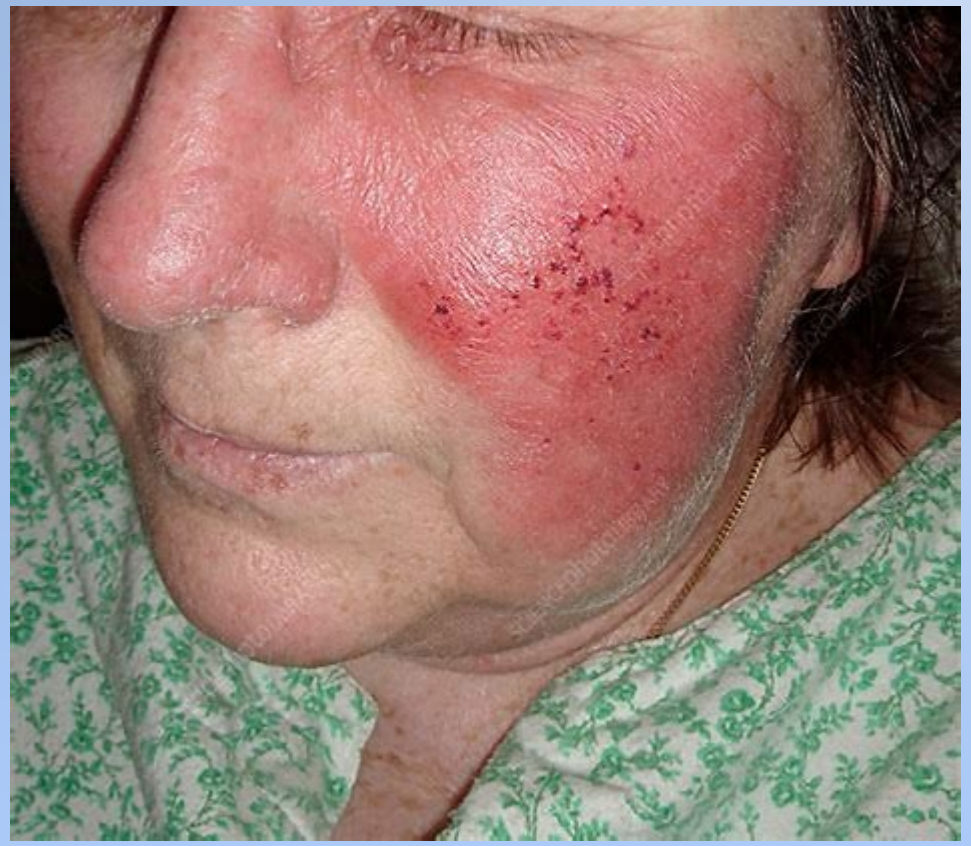
- Mostly Streptococcus and Staph aureus
  - In children with facial cellulitis/erysipelas H influenzae

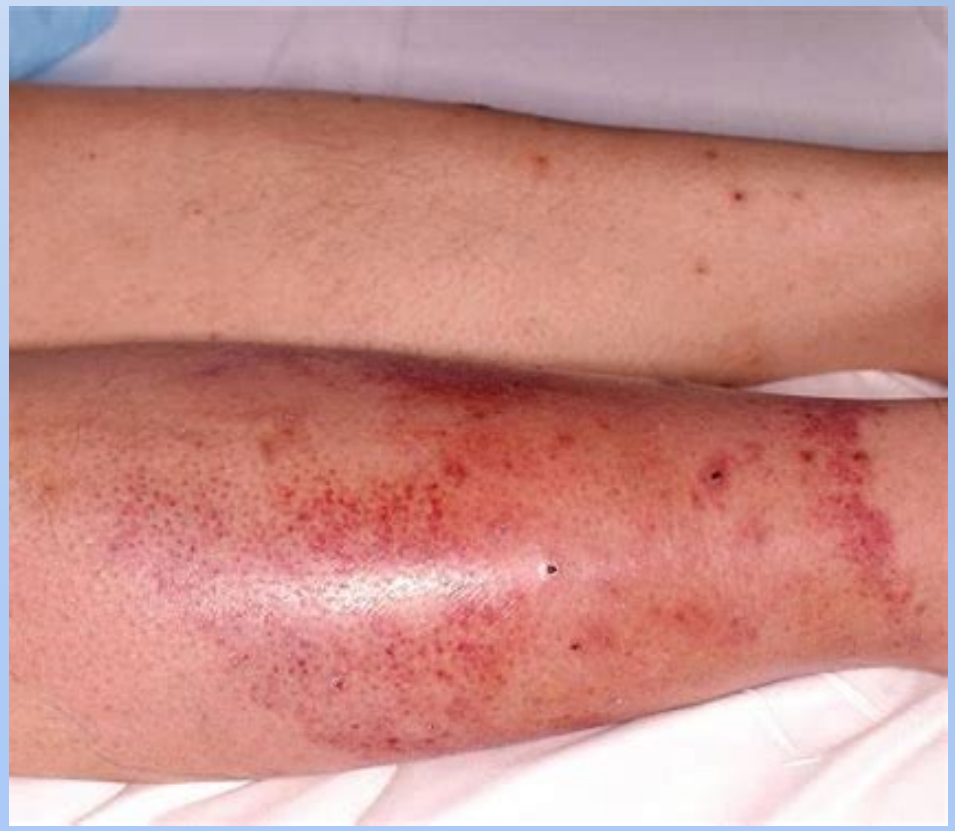
TYPES OF CELLULITIS

- Erysipelas – superficial cellulitis
  - Pain, indurated, bright red, edematous
  - sharp demarcation
  - prominent lymphatic involvement
  - Group A Strep
  - Lower extremities >>> face
- Clostridial cellulitis – superficial from local trauma,
  - Gas in the skin
  - Need MRI
  - Surgical exploration and check CK to rule out myonecrosis



ERYSIPELAS AND CELLULITIS





Drsundardas.com; science photo library

TYPES OF CELLULITIS

- Nonclostridial anaerobic cellulitis – mixed organisms
  - Produce gas in tissue
  - Usually a/w DM
  - Malodorous
  - Rule out myonecrosis and nec fasc

CELLULITIS - DIFFERENTIAL DIAGNOSIS

- Arterial insufficiency
- Venous stasis/vascular insufficiency
- Dvt
- Hyperkeratosis/hyperpigmentation from DM/skin disorders
- Radiation therapy effect

CELLULITIS – TREATMENT

- Basic Streptococcus (not GAS) - Penicillin
  - 1st generation cephalosporin
- MSSA -Nafcillin or dicloxacillin (for mild)
  - 1st generation cephalosporin
- MRSA or pcn allergic – vancomycin

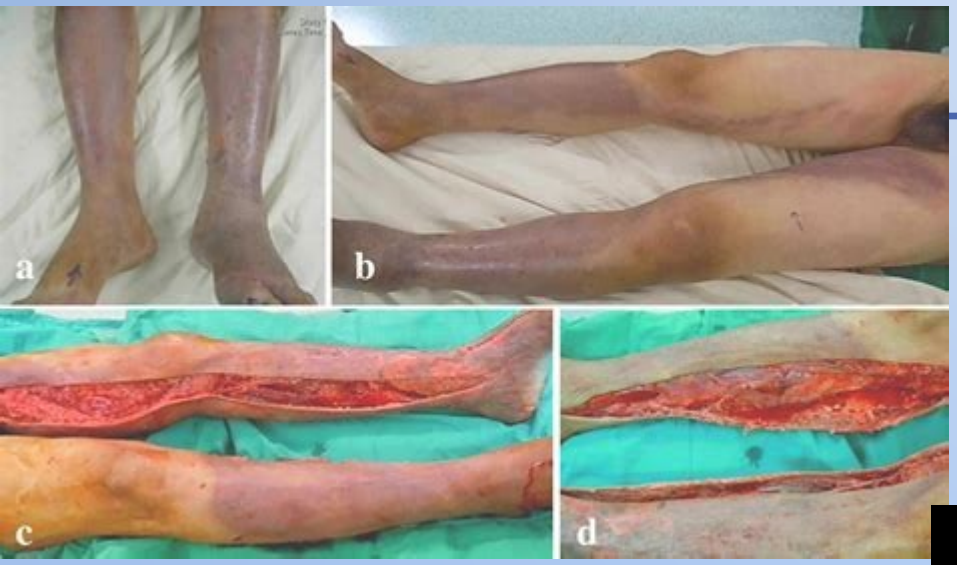
NECROTIZING FASCIITIS

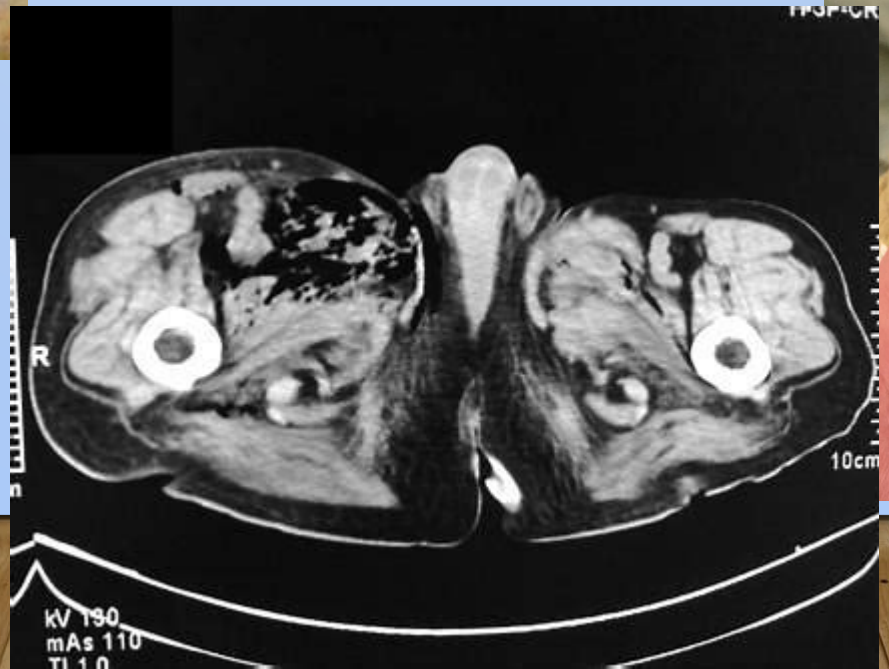
- Infection of fascia and fat extremities> abdomen> perineum
- Usually after trauma – bug bit, contusion, minor burn or vzv superinfection
- Cause: #1 Group A Strep (*Streptococcus pyogenes*)
  - polymicrobial – 4 or 5 aerobic/anaerobic pathogents
    - *Staph aureus*, GAS, *E coli*, *Peptostreptococcus, Clostridum, Prevotella, Bacteroides*
    - Associated with Fournier's gangrene – perineum (GIT and urethral mucosa compromised)
    - DM – acidosis, leukocytosis, tachycardia, hyperglycemia
    - Cervical – odontogenic infection or instrumentation

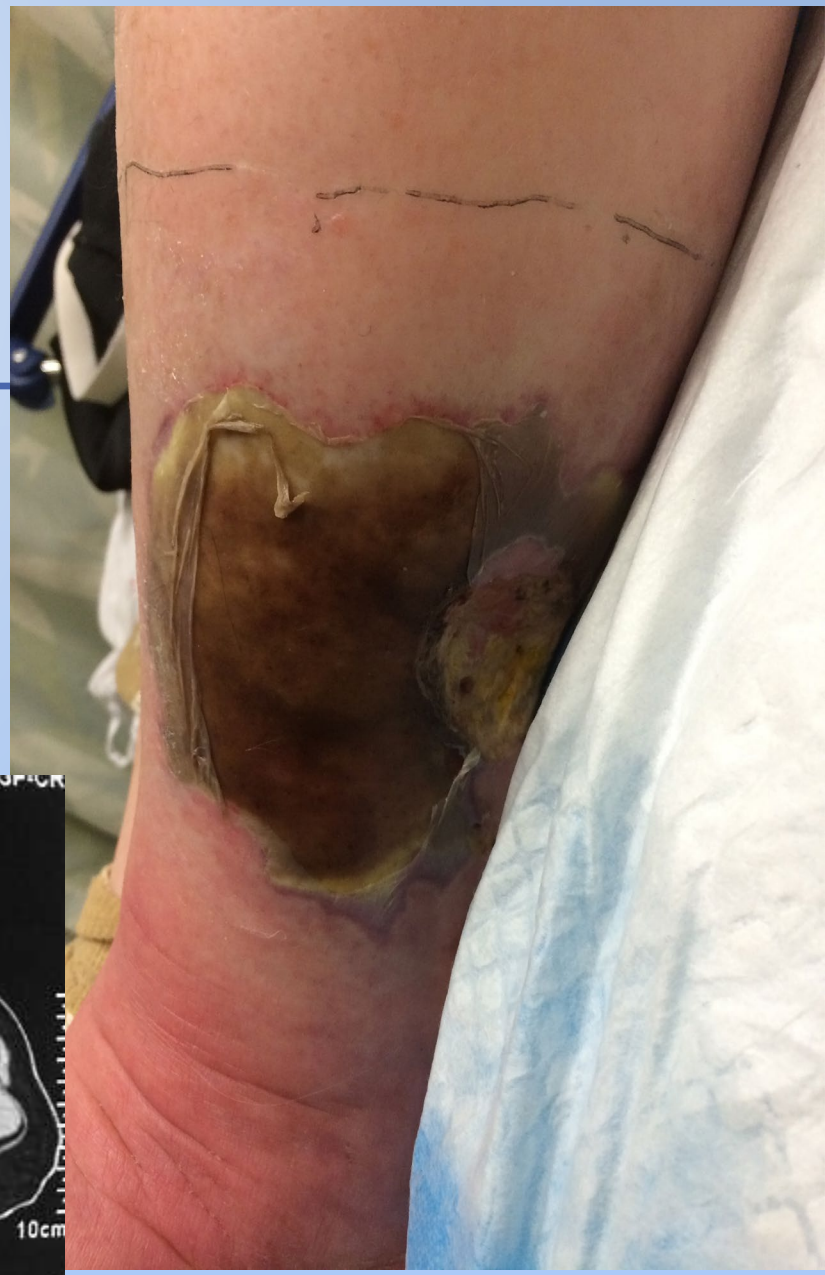
NECROTIZING FASCIITIS

- Pain out of proportion, especially early on.
- Rapid development of erythema or → red/purple
- +/- blisters → fever, AMS, hypotension, myalgia, diarrhea, anorexia, malaise,
- DDX: gas gangrene, pyomyositis, myositis
- DX: MRI
- Tx: surgical debridement/exploration
  - Beta lactam (a penicillin or cephalosporin) + clindamycin
  - If polymicrobial or anaerobic – amp-sulbactam (anaerobes)
  - Treatment of septic shock

NECROTIZING FASCIITIS



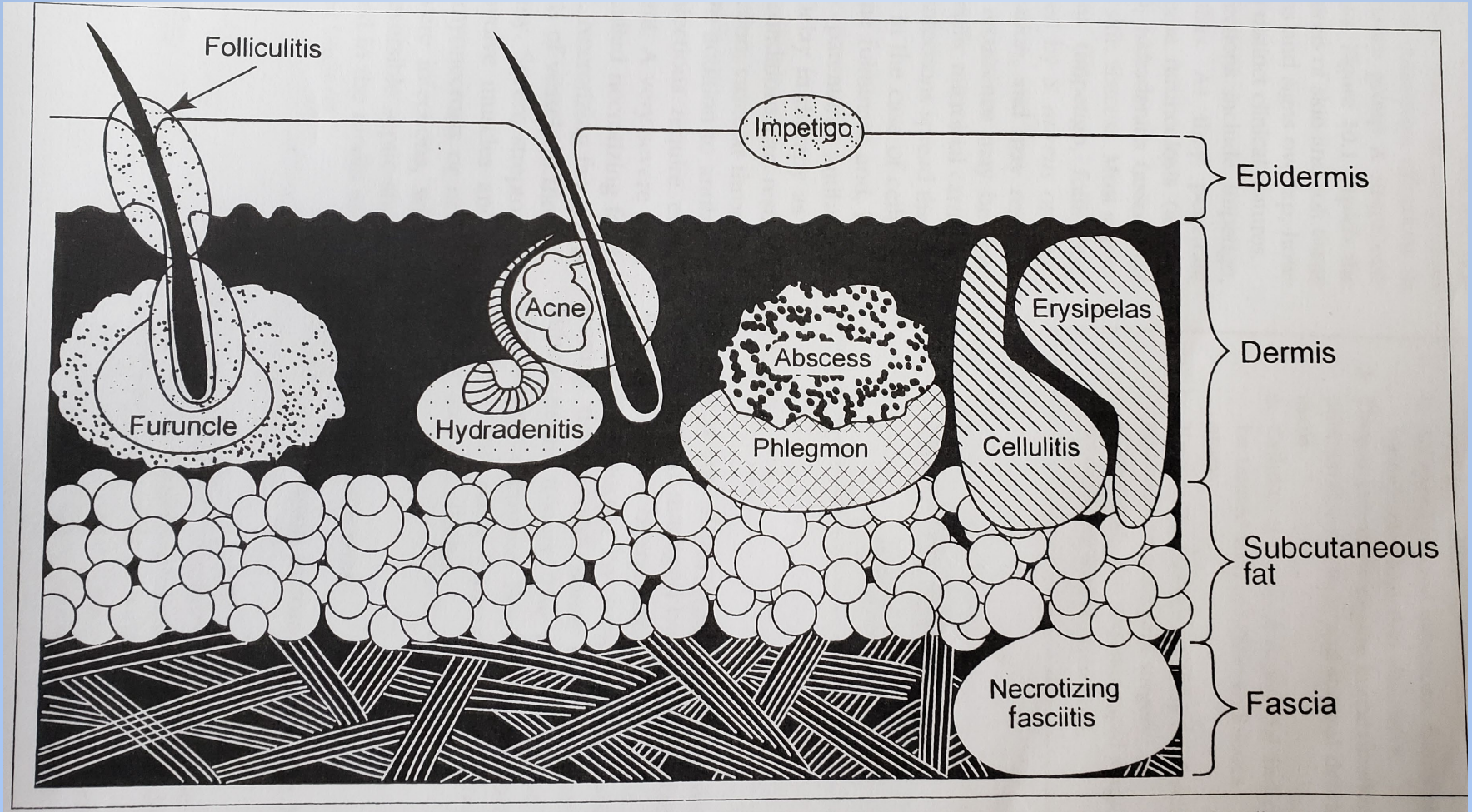




Lacerationrepair.com; radiopaedia

MYONECROSIS

- Necrotizing myositis – rapidly progressive
- Mostly Clostridium (gas gangrene) perfringens or septicum
- Group A Strep,
- Pyomyositis – more in tropical countries and due to Staph aureus
- Vibrio vulnificus – cirrhosis, raw seafood, cut in salt water



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ORGANISMS CAUSING SKIN INFECTION

- MSSA/MRSA
- Streptococcus (GAS)
- Pseudomonas
- Clostridia
- Anaerobes
- Aeromonas
- Vibrio vulnificus

CONSIDERATIONS FOR TREATMENT

- Type of infection/diagnosis
  - Likely organisms
- Location
- Extent of infection
- Comorbid conditions
- Renal function

BITES

ANIMAL

- *Pasteurella*
  - 50% of dog & 70% of cat bites
- *Capnocytophaga*
- *Staph aureus*
- Anaerobes
- *Streptococcus*
- Tx: amp-sulbactam or amox-clav or
  - Clinda + cipro

HUMAN

- Closed fist injuries- polymicrobial
- *Streptococcus viridans*
- *Staph aureus*
- *Fusobacterium*
- *Eikenella*
- *Bacteroides*
- peptostreptococci

URINARY TRACT INFECTIONS

A 25 year old female presents with 3 days of worsening dysuria and now fever to 101.8F and nausea. On PE she appears tired and is temp to 102F. Lungs are clear and HR is 98bpm, abd soft, with suprapubic tenderness and + CVA tenderness on the right. As you are examining her, she starts to rigor as well. What are you concerned about in this patient?

A. Bacteremia
B. Pyelonephritis
C. Cystitis
D. Pelvic inflammatory disease (PID)

URINARY TRACT INFECTIONS

What are you concerned about in this patient?

A. Bacteremia
B. Pyelonephritis
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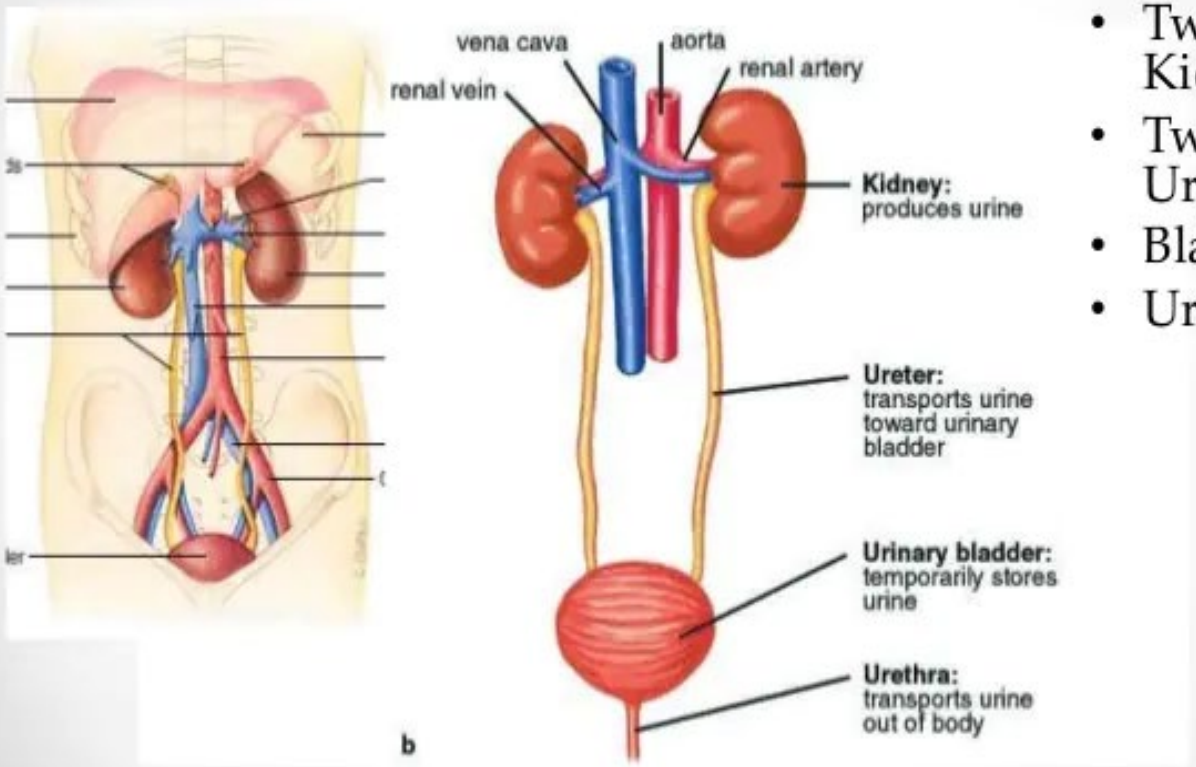
UTIS

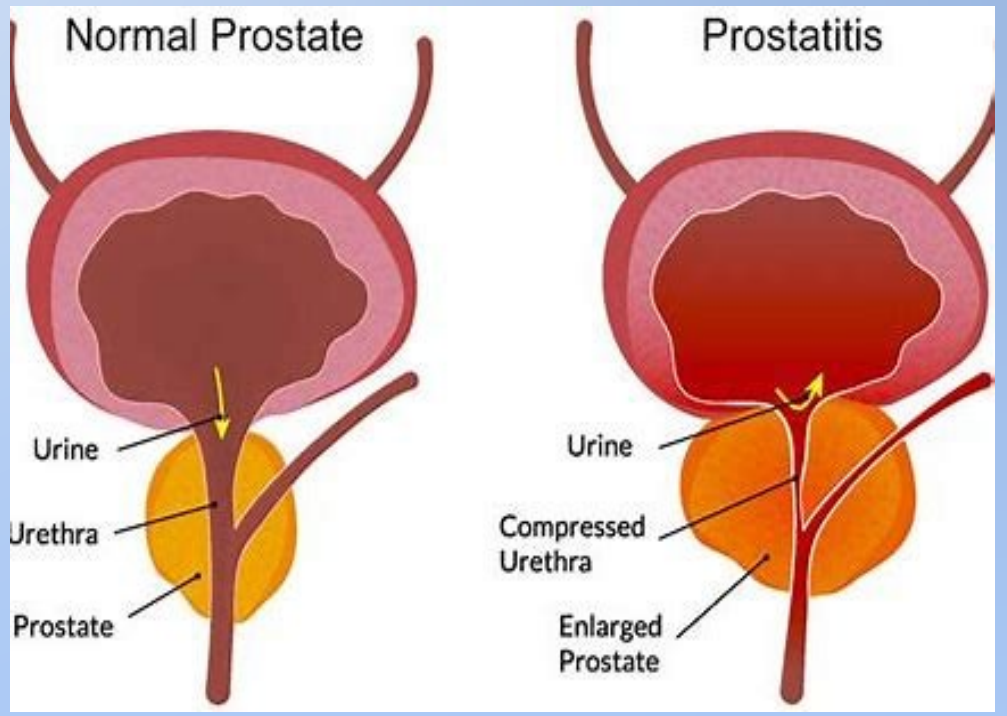
- RF:
  - Female: sexual activity, spermicidal compounds including on condoms, DM, incontinence, pregnancy
  - Male :urethral obstruction from enlarged prostate, insertive rectal intercourse, uncircumcised
  - Stricture/obstruction, neurogenic bladder (MS, spinal cord, DM, tabes dorsalis), catheterization, stones, vesicoureteral reflux, surgical revisions (neobladder, kidney transplant)
- Wbc in urine, +/- protein, blood, leukocyte esterase
- Leukocytosis, (?increased creatinine)
- + urine cultures
  - MTB if negative?

URINARY TRACT

Structure of the Urinary System



- Two Kidneys
- Two Ureters
- Bladder
- Urethra

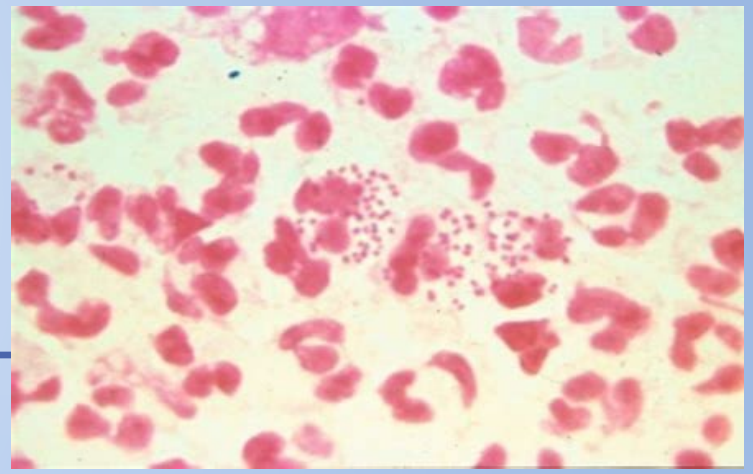


Form 3 PMR Science Chapter 3 Excretory System (slideshare.net)

CYSTITIS

- Inflammation of the bladder
- S/S: urgency, dysuria, frequency, hematuria, suprapubic pressure, cloudy malodorous urine
  - Rarely n/v/abd pain/fever
- Pathogens: GI flora (*E coli, Enterococcus, Klebsiella*)

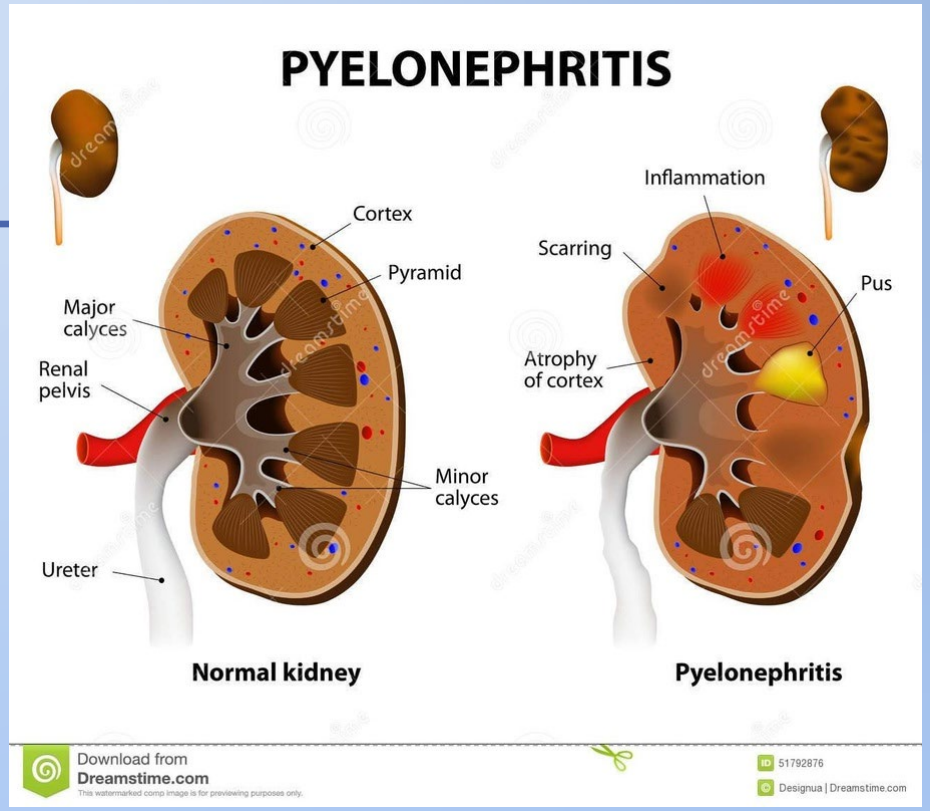
URETHRITIS



- Inflammation of the urethra
- S/S: burning with urination, blood in urine, frequency, abnormal discharge, dyspareunia
- Pathogens: *E coli*, gonococcus, *Chlamydia*, trichomonas, *Staph saprophyticus,* HSV
- RF: unprotected sex, multiple partners, unhygienic environment
- Often culture negative uti or not responding appropriately to treatment
- STD: gradual onset > 7 d, no hematuria, no suprapubic pain, new sex partner or partner with gc/chlamydia

PYELONEPHRITIS

- Inflammation of the kidneys
- Often progression of cystitis
- S/S: fever, back pain, dysuria, fever
  - AMS, hypotension
- Often concurrent bacteremia



CATHETER ASSOCIATED UTI

- Risk 3-5%/day of catheterization
- E coli, Proteus, Pseudomonas Klebsiella, Serratia, staphylococci, enterococci, Candida
- RF: female, prolonged catheterization, severe underlying disease,
- Tx: withdrawal of catheter, if symptomatic treat with withdrawal

PROSTATITIS

- Acute bacterial - Fever, chills, dysuria, tense or boggy tender prostate, possible tenesmus
  - Uropathogens (*E coli*). Tx: FQ
- Chronic bacterial –recurrent UTIs, obstructive s/s, perineal pain, normal prostate
  - Uropathogens *(E coli*). Tx: FQ
- Chronic inflammatory pelvic pain syndrome- perineal & low back pain, obstructive s/s, recent NGU.
  - *Ureaplasma, Mycoplasma, Chlamydia*. Tx: macrolide, tet, etc x 4-6 weeks
- Massage → purulent secretions, may lead to bacteremia
- RF: indewelling foley in older men

TREATMENT

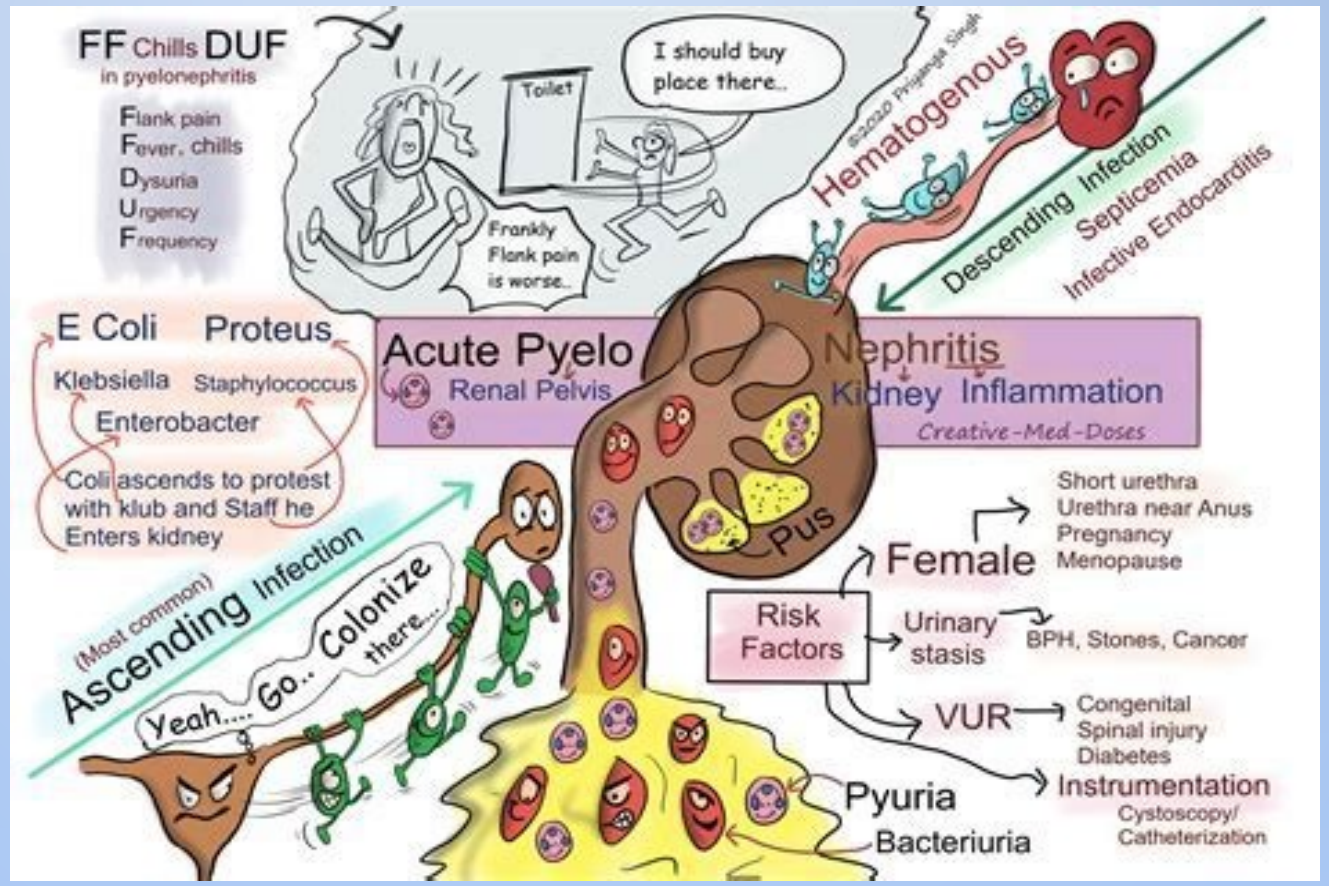
- Pathogen directed
  - GNRs – tmp-smx, FQ, cephalosporin,
  - Enterococcus – ampicillin
  - Gonococcus/chlamydia ceftriaxone + azithro/doxycycline
  - Staphylococcus -

- Cystitis PO if possible based on pathogen
- Urethritis – based on pathogen
- Pyelonephritis – IV (except FQ)

TREATMENT

- What must you take into consideration when treating a urinary tract infection?
  - Location
    - Cystitis vs pyelonephritis
  - Extent of infection
    - Bacteremia
    - Prostatitis
  - Organisms
  - Patient symptoms
    - Nausea/vomiting/abdominal cramping
    - Mental status changes
    - Hypotension

QUESTIONS?


FF Chills DUF
in pyelonephritis
Flank pain
Fever, chills
Dysuria
Urgency
Frequency
Toilet
I should buy place there..
Frankly Flank pain is worse..
Hematogenous
Descending Infection
Septicemia
Infective Endocarditis
E Coli
Proteus
Klebsiella
Staphylococcus
Enterobacter
Coli ascends to protest with klub and Staff he Enters kidney
Acute Pyelo
Renal Pelvis
Nephritis
Kidney Inflammation
Creative-Med-Doses
Pus
(Most common)
Ascending Infection
Yeah.... Go.. Colonize there...
Female
Short urethra
Urethra near Anus
Pregnancy
Menopause
Risk Factors
Urinary stasis
BPH, Stones, Cancer
VUR
Congenital
Spinal injury
Diabetes
Instrumentation
Cystoscopy/ Catheterization
Pyuria
Bacteriuria