Bacterial infection in pregnancy

Overview

- **UTI during pregnancy**
  - Upper tract infections
  - Lower tract infections

UPPER TRACT INFECTIONS

Acute Pyelonephritis

- Dx: Clinical
- Classic: chills, fever, CVA tenderness
- UA: WBC, WBC casts, RBC
- Serum: Leukocytosis, ESR

- Bacteriology:
  - 80% *E. coli*
  - P pili virulence factor
  - *Klebsiella*
  - *Proteus*
  - *Enterobacter*
  - *Pseudomonas*

Gram Neg

  - *E. faecalis*
  - *S. aureus*
  - *S. epidermidis*

Gram Pos

Uncomplicated Cystitis

- Absence of physiologic or anatomic abnormalities & no recent urologic surgery
- 30% of women between age 20-40 have had a UTI
  - 80% E. coli
  - 15% S. Saprophyticus
- Rarely occurs in men
  - Uncircumcised
  - HIV

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Uncomplicated Cystitis

- Microscopic analysis is more sensitive than dip-stick testing
  - Bacteriuria
  - Pyuria
  - Hematuria

Symptoms:

- Dysuria, frequency, urgency, small urine volumes, suprapubic pain

- Differential Diagnosis:
  - Vaginitis
  - Urethral infection / urethritis
  - STD

Uncomplicated Cystitis

- Pretherapy urine Cx only for the following:
  - Dx in doubt
  - Symptoms longer than 7 days
  - Older than age 65
  - DM
  - Pregnancy
  - All males

- Treatment (3-days):
  - TMP-SMX
  - TMP alone
  - Nitrofurantoin
  - Fluoroquinolones (use for patients with allergy to less costly drugs or with high risk of infection with resistant organism)

  - Amoxicillin-Clavulanate during pregnancy

UTI DURING PREGNANCY

Anatomic & Physiologic Changes

- 1cm increase in renal length
- Smooth muscle atony of collecting system
  - Progesterone & Uterus size
- Bladder displaced superior & anterior
- 30-50% increase in GFR
  - Eval renal Fx if Cr >0.8 or BUN >13
  - Normal to have proteinuria up to 300mg/24 hours

Bacteriuria During Pregnancy

- Increased incidence of pyelonephritis
  - 1-4% of all pregnant women
  - 60-75% occurs during the 3rd trimester
  - Increased prematurity?

➢Treat bacteriuria in the symptomatic or asymptomatic pregnant female

Table 14–21. ORAL ANTIMICROBIAL AGENTS USED IN PREGNANCY

Drug	Dosage	Comments
Agents Considered Safe		
Penicillins		
Ampicillin	500 mg qid	Extensively used
Amoxicillin	250 mg tid	Safe and effective
Penicillin V	500 mg qid	Used less frequently, but achieves excellent urinary levels
Cephalosporins		
Cephalexin	500 mg qid	Extensively used
Cefaclor	500 mg qid	Somewhat more effective against gram-negatives
Nitrofurantoin	100 mg qid	May result in hemolytic anemia in patients with G6PD deficiency
Sulfisoxazole	1 g, followed by 500 mg qid	May cause kernicterus in the newborn; also may cause hemolytic anemia when G6PD deficiency is present; especially avoid in last few weeks of gestation
Agents That Should Be Avoided		
Fluoroquinolones		Possible damage to immature cartilage
Chloramphenicol		Associated with "gray-baby syndrome"
Trimethoprim		May cause megaloblastic anemia because of antifolic action
Erythromycin		Associated with maternal cholestatic jaundice
Tetracyclines		May cause acute liver decompensation in the mother and inhibition of new bone growth in the fetus

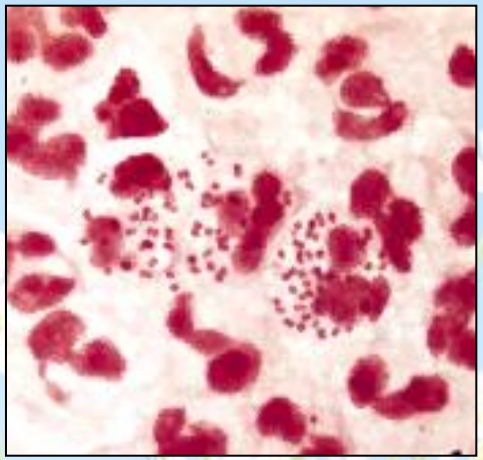
G6PD, glucose-6-phosphate dehydrogenase.

Adapted from Schaeffer AJ: Urinary tract infections. In Gillenwater JY, Grayhack JT, Howards SS, Duckett JW (eds): Adult and Pediatric Urology, 3rd ed. St. Louis, Mosby–Year Book, 1996, p 338.

- 3-day course of therapy
- Reculture urine 1-2 days after treatment
- Use parenteral agents to treat acute pyelonephritis

Gonorrhea

Neisseria gonorrhoeae



- ***Gram-negative diplococcus***
- ***Infects non-cornified epithelium***

- ***Second most common bacterial STD***
- ***Estimated >1 million US cases per year***
- ***Incidence highest among adolescents and young adults***
- ***Causes a range of clinical syndromes***
- ***Many infections are asymptomatic***

Risk Factors for GC Infection

- *Urban and low SES populations*
- *Adolescents > age 20-25 years > older*
- *Multiple sex partners*
- *Inconsistent use of barrier methods*
- *High prevalence in sexual network*

GC Sexual Transmission

- *Efficiently transmitted by sexual contact*
- *Greater efficiency of transmission from male to female*
  - ◆*Male to female: 50 - 90%*
  - ◆*Female to male: 20 - 80%*
- *Vaginal & anal intercourse more efficient than oral*
- *Can be acquired from asymptomatic partner*
- *Increases transmission and susceptibility to HIV 2-5 fold*

GC Microbiology

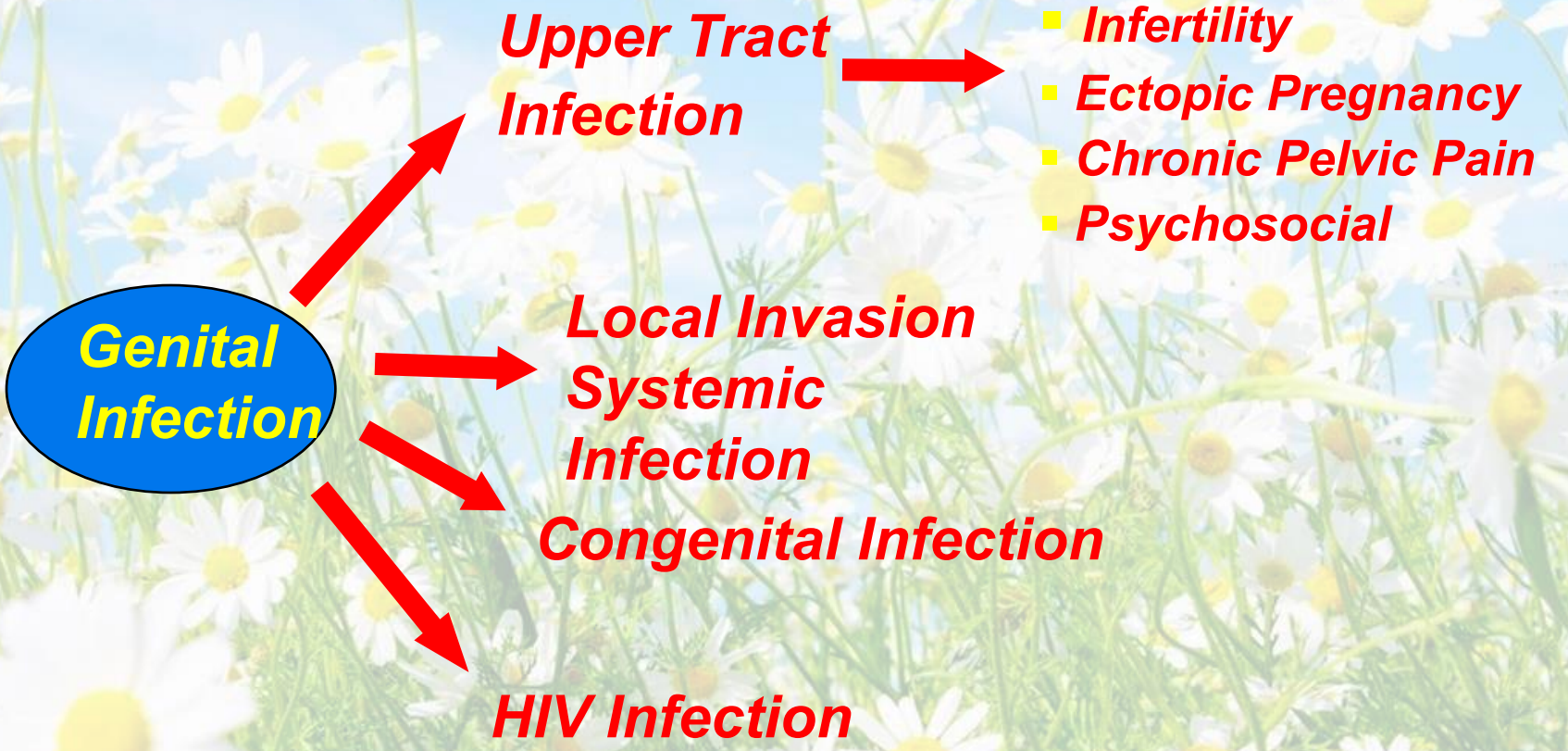
- *Gram-negative diploccocus*
- *Infects non-cornified epithelium*
  - *Cervix*
  - *Urethra*
  - *Rectum*
  - *Pharynx*
  - *Conjunctiva*
- *Observed intracellularly in PMNs on Gram stain*

Gonococcal Infections in Women

- *Cervicitis*
- *Urethritis*
- *Proctitis*
- *Accessory gland infection (Skene, Bartholin)*
- *Pelvic inflammatory disease (PID)*
- *Peri-hepatitis (Fitz-Hugh-Curtis)*
- *Pregnancy morbidity*
- *Conjunctivitis*

Many infections asymptomatic

Complications of GC Infections in Women



Gonococcal Cervicitis

- *Incubation 3-10 days*
- *Symptoms:*
  - *Vaginal discharge*
  - *Dysuria*
  - *Vaginal bleeding*
- *Cervical signs :*
  - *Erythema*
  - *Purulent exudate*

Pelvic Inflammatory Disease

- ***Sx: lower abdominal pain***
- ***Signs: uterine/ adnexal tenderness, +/- fever***
- ***Laparoscopy may show : hydrosalpinx, inflammation, abscess, adhesions***

PID often silent

Disseminated Gonococcal Infection

- *Gonococcal bacteremia*
- *Sources of infection include symptomatic and asymptomatic infections of pharynx, urethra, cervix*
- *Occurs in < 5% of GC-infected patients*
- *More common in females*
- *Patients with congenital deficiency of C7, C8, C9 are at high risk*

DGI Clinical Manifestations

- *"Dermatitis-arthritis syndrome"*
  - *Arthritis: 90%*
  - *Characterized by fever, chills, skin lesions, arthralgias, tenosynovitis*
  - *Less commonly, hepatitis, myocarditis, endocarditis, meningitis*
- *Rash characterized as macular or papular, pustular, hemorrhagic or necrotic, mostly on distal extremities*

DGI Skin Lesion

- *Necrotic, grayish central lesion*
- *erythematous base*

DGI Skin Lesion

Papular and pustular lesions on the foot

DGI Differential Diagnosis

- *Meningococcemia*
- *Staphylococcal sepsis or endocarditis*
- *Other bacterial septicemias*
- *Acute HIV infection*
- *Thrombocytopenia & arthritis*
- *Hepatitis B prodrome*
- *Reiter's Syndrome*
- *Juvenile Rheumatoid Arthritis*
- *Lyme disease*

Gonococcal Complications in Pregnancy

- *Postpartum endometritis*
- *Septic abortions*
- *Post-abortal PID*

Possible role in:

- *Gestational bleeding*
- *Preterm labor and delivery*
- *Premature rupture of membranes*

Gonorrhea Treatment
Pregnancy

Must avoid quinolones & tetracycline

Recommended regimens:

- ***Cefixime 400 mg PO x 1***
- ***Ceftriaxone 125 mg IM x 1***

PLUS if chlamydia is not ruled out:

- ***Azithromycin 1 g PO x 1***
- ***Other appropriate chlamydial regimen***

Test of cure in 3-4 weeks

Syphilis

Bacterial STD

Treponema pallidum

Spiral shaped morphology,motility pattern in darkfield microscopy

T.Pallidum cannot be grown in vitro

Epidemiology

- Man is only known host
- Transmission:Direct contact with infectious lesions,generally through sexual contact.
- Incidence :sexually active people,adolesent & adults
- Higher for men than women(3.5:1)

Clinical manifestation

- ***Incubation period***: 3weeks (10-90 days)
- ***Primary syphilis (hard chancre)***

indurated, painless, highly infectious, single or multiple occur anywhere on the body

- will heal in 3-6 weeks
- Regional lymphadenopathy adjacent to the chancre during primary syphilis
- nodes are firm, nonsuppurative & persisted for months.

continue

- ***Secondary syphilis:***

generally begin 6-8 weeks post chancre

may be overlap with chancre

skin & mucous membrance lesions

vary from macular,papular,pustular&nodular type rashes,

occur on the palms & soles

patchy alopecia

condyloma lata

mucous patches

continue

- ***Latent syphilis:***
- positive serological test in the absence of any clinical disease symptoms
- duration is highly variable
- 25% experience a relapse of secondary syphilis
  only 30% of latent cases progress to tertiar ysyphilis.

continue

- ***Tertiary or late syphilis:***
- noncontagious but highly destructive
- may take many years to develop
- late benign or gummatous syphilis(most common), develops in 15% of untreated cases within 1-10 years after infection

nodular lesions with granolomatous inflamation
may be in any organ

Congenital syphilis

- Maternal syphilis spreads in utero to the fetus after 4th month of gestation.
- ***clinical presentation:***

  early stage(first 2 years of life)

  Rhinitis/skin & mucocutaneous lesions

  Osteochondritis

  Hepatospelenomegaly & lymphadenopathy

  Immune complex G.N

  Death(pul hemorrhage, bacterial infection, hepatitis

Congenital Syphilis

Congenital syphilis continue

Congenital syphilis continue

- ***Late congenital syphilis***
  (after 2 years of ago)
  60% subclinical
- manifestation:
  Clutton joints,
  Deafness,
  Hutchinson teeth,
  Bone abnormalities:
  saddle nose
  saber shins

Diagnosis:

nontreponemal test

VDRL

RPR

ART

treponemal test

FTA-ABS

MHA-TP

TIP

Group B *Streptococcus*

Streptococcus agalactiae

GBS Epidemiology

- Colonizes the genital tract; risk groups include:
  - Infants: Colonization during delivery may results in invasive disease
  - **Pregnant and post-partum women**
  - Non-pregnant adults
    - Elderly
    - Individuals with chronic underlying disease

Risk Factors for Early Onset Group B Streptococcal Disease

BMJ, 2002; 325:308

Risk Factor	Adjusted Odds Ratio (95% CI)
Group B Streptococcus isolated during pregnancy	1.9 (0.03 to 142.7)
Gestation < 37 weeks	12.1 (2.7 to 53.8)
Prolonged rupture of membranes > 18 hours	4.8 (0.98 to 23.1)
Rupture of membranes before onset of labour	3.6 (0.7 to 17.6)
Intrapartum fever	10.0 (1.7 to 60.7)

- Universal screening of all women at 35-37 weeks gestation
- Prophylaxy:
  - Previous infant with IGBS
  - GBS bacteriuria this pregnancy
  - Positive GBS screen this pregnancy unless
    - C-section planned in the absence of labor or rupture of membranes
  - Unknown GBS status AND delivery at < 37 weeks, rupture of membranes ≥ 18 hours, or intrapartum temperature ≥ 100.4 F

GBS Clinical Presentation

- Neonates
  - Sepsis, meningitis, pneumonia, cellulitis, osteomyelitis, septic arthritis
- **Pregnant and post-partum women**
  - Mild UTI, sepsis; less commonly endocarditis, meningitis
- Non-pregnant adults
  - Bacteremia, skin or soft tissue infections > pneumonia > urosepsis > endocarditis > peritonitis > meningitis > empyema

IGBS Case Definition

- **Clinical description**
  - Invasive group B streptococcal infections may manifest as any of several clinical syndromes, including pneumonia, deep soft-tissue infection, meningitis, peritonitis, osteomyelitis, septic arthritis, postpartum sepsis (i.e., puerperal fever), neonatal sepsis, and nonfocal bacteremia.

IGBS Case Definition

- **Laboratory criteria for diagnosis**
  - Isolation of group B *Streptococcus* (*Streptococcus agalactiae*) by culture from a normally sterile site (e.g., blood or cerebrospinal fluid, or, less commonly, joint, pleural, or pericardial fluid)
- **Case classification**
  - *Confirmed*: a case that is laboratory confirmed

GBS - Summary

- Important pathogen of:
  - Newborns
  - Pregnant and post-partum women
  - Non-pregnant adults with underlying disease
- Investigation
  - Demographics, site of infection, source of isolate (establish baseline incidence before vaccine licensure)
  - Follow-up of early-onset disease