

LABORATORY DIAGNOSIS SEXUALLY TRANSMITTED DISEASES

LABORATORY
MEDICINE COURSE
2004



CLINICAL MICROBIOLOGY SERVICE

Dr. Phyllis Della-Latta 52929

STD EPIDEMIC- USA TIP OF THE ICEBERG

INCIDENCE DISCHARGE

- *Chlamydia* - 4 million
- Gonorrhea - 650,000
- Trichomoniasis - 180 million
- BV - Not reportable
- HPV - 5.5 million
- *Herpes* - 1 million
- Syphilis - 60,000

CLINICAL IMPACT

- ✓ INFERTILITY
- ✓ ECTOPIC PREGNANCY
- ✓ HIV TRANSMISSION
- ✓ PID
- ✓ CERVICAL CA
- ✓ ~\$10 BILLION ANNUAL COST

STDs CLINICAL SYNDROME THE HIDDEN EPIDEMIC

AT RISK

- ✓ ADOLESCENTS & MINORITIES
- ✓ MULTIPLE SEX PARTNERS
- ✓ PAST STDs

DISCHARGE DISEASES

- ✓ HIV ACQUISITION ↑ 5- FOLD

ULCERATIVE LESIONS/ GROWTHS

- ✓ HIV ACQUISITION ↑ 10- FOLD

WOMEN AT RISK THE X FACTOR

- STDs OFTEN ASYMPTOMATIC
 - ✓ 75-90% WOMEN WITH *CHLAMYDIA*
 - ✓ 50-70% MEN WITH *CHLAMYDIA*
- PID
 - ✓ ≤ 40% UNTREATED CASES *GC/CHLAMYDIA*
 - ✓ INFERTILITY
 - 1 IN 5 UNTREATED CASES
- CERVICAL CANCER
- AT- RISK PREGNANCIES
 - PREMATURE LABOR & DELIVERY
 - ✓ LARGEST RATE OF INFANT MORTALITY
 - PREMATURE RUPTURE OF MEMBRANES
 - ECTOPIC PREGNANCIES
 - NEONATES
 - ✓ CONJUNCTIVITIS
 - ✓ PNEUMONIA

TEENS & SEX STD TESTS IN ADOLESCENT CLINICS

- AT-RISK GROUP
 - ✓ MULTIPLE SEX PARTNERS
 - ✓ UNPROTECTED SEX
 - ✓ CONTRACEPTIVE USE INCONSISTENT
- THE X FACTOR: FEMALES
 - ✓ GC HIGHEST IN 15-19 YRS
 - ✓ 5-10% TEENS – *CHLAMYDIA*
 - ✓ 28-46% <25 YRS – HPV
 - ✓ SEX PARTNERS WITH OLDER MEN

DISCHARGE DISEASES

- MOST COMMON DISCHARGE DISEASE IN U.S.
 - ✓ *CHLAMYDIA TRACHOMATIS*
 - ✓ *NEISSERIA GONORRHAEEAE*
 - ✓ *TRICHOMONAS VAGINALIS*
- RISK FACTORS
 - ✓ YOUNG AGE
 - ✓ MULTIPLE SEX PARTNERS
 - ✓ PAST STDs

GONORRHEA & CHLAMYDIA

- CLINICAL SYNDROME
 - ✓ SYMPTOMATIC OR ASYMPTOMATIC
 - ✓ DYSURIA & FREQUENCY
 - ✓ PURULENT DISCHARGE INDISTINGUISHABLE
- GONORRHEA
 - ✓ OTHER SITES (PHARYNX, RECTUM, EYE)
 - ✓ NEWBORNS (PURULENT CONJUNCTIVITIS)
 - ✓ BACTEREMIA, ARTHRITIS

WHEN TO COLLECT..... ENDOCERVIX OR VAGINAL SPECIMENS

	ENDOCERVIX	VAGINA
Normal pH	7.0	<4.5
Cell Type	COLUMNAR EPITHELIAL	SQUAMOUS EPITHELIAL
Pathogens	<i>Chlamydia trachomatis</i> <i>Neisseria gonorrhoeae</i>	Bacterial Vaginosis (BV) <i>Trichomonas</i> <i>Candida</i> sp

LAB DIAGNOSIS C. TRACHOMATIS

- NA AMPLIFICATION
 - ✓ URINE SCREEN
- DIRECT FLUORESCENT AB
- DNA PROBES
 - ✓ URETHRAL SPECIMEN
- TISSUE CULTURE
 - ✓ MCCOY CELLS
 - INTRACYTOPLASMIC INCLUSIONS WITH IODINE
 - IMMUNOFLUORESCENCE

CT/GC LABORATORY DX

	GRAM STAIN	CULTURE	URINE NAA
GC	GRAM – DIPLOCOCCI (bean-shaped) SENSITIVITY - MALES ✓ 95-99% Symptomatic ✓ 69% Asymptomatic SENSITIVITY - FEMALES ✓ 45-65%	CALCIUM ALGINATE Swab (Cotton-toxic) CHOCOLATE AGAR CO ₂ TAT- 2 Days	SENSITIVITY 85-98% SPECIFICITY >98% TAT- 4 hrs
CT	N/A	McCoy Cells TAT- 2-3 Days	

CHLAMYDIA/GC URINE NAAT SCREEN

- NON-INVASIVE, PAINLESS!!!
- AUTOMATION
- TURNAROUND TIME
 - ✓ 4 hrs
- SCREENING IS RECOMMENDED
 - ✓ CDC, AMA, DOH
 - ✓ MALES & TEENS
 - ✓ PREGNANCY

NAAT = NUCLEIC ACID AMPLIFICATION TEST

STD GUIDELINES - GC TESTING CHILD ASSAULT CASES

- CULTURE - THE GOLD STANDARD
 - ✓ PHARYNX & ANUS IN MALES & FEMALES
 - ✓ VAGINA FEMALES
 - ✓ URETHRA MALES
- NOT RECOMMENDED
 - ✓ GRAM STAINS FOR DX
 - ✓ NON-CULTURE TESTS
 - ✓ NAAT – DATA WON'T HOLD UP IN COURT
 - ✓ CERVICAL SPECIMENS FOR PRE-PUBERTAL GIRLS
 - ✓ PHARYNGEAL SPECIMENS
 - LACKS SENSITIVITY

CDC GUIDELINES ADULTS – CT & GC TESTING

- CULTURES FROM ALL SITES OF PENETRATION
- OR
- FDA APPROVED NAAT
 - ✓ 2 NAATs (different targets)
 - ✓ both must be positive
- ASSAYS NOT APPROVED
 - ✓ EIA, non-amplified probes, DFA
 - ✓ Insensitive - False negatives

CLINICAL SYNDROME COMPARISON

SYNDROME	DISCHARGE	ODOR	PRESENTATION
Trichomoniasis	Watery, thin, gray, alkaline homogeneous	FISHY	Itching, vaginal erythema, dysuria, vaginal erosions, & petechiae (strawberry cervix)
BACTERIAL VAGINOSIS	Watery, gray, homogeneous alkaline	FISHY	Cervix normal, Often asymptomatic
CANDIDIASIS	Thick, white, non-homogeneous	SOUR	Itching, vaginal erythema, dysuria, labial & vulval swelling

BRIEF CASES

THE FISHY ODOR IN VIVO

- NORMAL VAGINAL FLORA
 - ✓ H₂O₂ Producing Lactobacilli ⇒ lactic acid
 - ✓ ↓ pH (<4.5)
- BACTERIAL VAGINOSIS
 - ✓ Anaerobes Increase ⇒ Proteolytic enzymes act on vaginal peptides
 - ✓ Release of polyamines and trimethylamine
 - ✓ Trimethylamine in alkaline pH ⇒ fishy odor
 - ✓ Polyamines ⇒ Exfoliation of epithelial cells (clue cell)
 - ✓ Polyamines ⇒ Fishy discharge

BV DIAGNOSED

FACTS TO CONSIDER

- PREGNANT WOMEN
 - ✓ AFFECT 15-20% PREGNANT WOMEN
 - ✓ AMNIOTIC FLUID INFECTION
 - ✓ POSTPARTUM ENDOMETRITIS
 - ✓ PREMATURE RUPTURE OF MEMBRANES
 - ✓ PRETERM DELIVERY
 - ✓ LOW BIRTH WEIGHT
- TREAT PREGNANT WOMEN
 - ✓ METRONIDAZOLE
 - ✓ CLINDAMYCIN

BV ASSOCIATED WITH
RECURRENT UTI
PID
POST-OP GYN
INFECTIONS

TRICHOMONAS VAGINITIS LAB TESTS

- WET MOUNT
 - ✓ URINE OR VAGINAL SECRETION MUST BE VIEWED IMMEDIATELY
 - ✓ TRANSPORT INSTABILITY
 - ✓ <50% SENSITIVITY/SPECIFICITY
 - ✓ TIME TO RESULTS: 5-10 MINUTES
- IN-POUCH CULTURE
 - ✓ NO SPECIMEN TRANSPORT PROBLEM
 - ✓ DIRECT INOCULATION INTO POUCH & PARASITE GROWS IN MEDIA
 - ✓ >95% SENSITIVITY/SPECIFICITY
 - ✓ TIME TO RESULTS: 18-48 HRS

TRICHOMONAS DX

FACTS TO CONSIDER

- THIRD MOST COMMON OF THE VAGINITIDES
- THOUGHT TO FACILITATE HIV TRANSMISSION
- PREVALENCE
 - ✓ COMMERCIAL SEX WORKERS, 50-75%
 - (TRICKY BUSINESS)
 - ✓ STD CLINICS, 32-54%
 - ✓ OB CLINICS, 10-26%
- TREATMENT
 - ✓ METRONIDAZOLE

VULVOVAGINAL CANDIDIASIS

- ETIOLOGIC AGENT
 - ✓ 85-95% *CANDIDA ALBICANS*
 - ✓ *CANDIDA GLABRATA*
 - LESS SUSCEPTIBLE TO AZOLES
 - HIV INFECTED
- FREQUENCY
 - ✓ 70-75% AT LEAST ONCE
 - ✓ 40-50% RECURRENCE
- PREDISPOSING FACTORS
 - ✓ ANTIBIOTICS, DIABETES
 - ✓ ORAL CONTRACEPTIVES
- WHAT TESTS SHOULD BE ORDERED?
 - ✓ GRAM STAIN
 - ✓ CULTURE ONLY WHEN RECURRENT INFECTIONS
 - YEAST IS NORMAL FLORA
 - ✓ DNA PROBE TEST

ULCERATIVE DISEASES

- INCIDENCE
 - ✓ >20 MILLION CASES
- ETIOLOGIC AGENTS
 - ✓ *HERPES SIMPLEX VIRUS*
 - ✓ *TREPONEMA PALLIDUM*
 - ✓ HUMAN PAPILLOMA VIRUS
 - ✓ CHANCROID
- CONTRIBUTE TO HIV TRANSMISSION
 - ✓ ULCER IS PORTAL OF ENTRY

SYPHILIS

- Incidence
 - ✓ Increase in NYC among men who have sex with men (MSM)
 - WHITE MEN & THOSE IN MANHATTAN
 - LARGELY HIV + INDICATING EROSION OF SAFE SEX
 - ✓ Higher in the south
 - HETEROSEXUAL BLACK MEN
- Primary Syphilis – CHANCRE
 - ✓ Single, Painless, Smooth edges, Indurated, LA
- Secondary Syphilis
 - ✓ Palmar rash
 - ✓ 6 wk-6 mth after infection

LAB DX - SYPHILIS

- MICROSCOPIC (primary)
 - ✓ DARK FIELD
 - ✓ *TREPONEMA PALLIDUM*
 - ✓ MOTILE SPIROCHETE (6-14 SPIRALS)
- SEROLOGY (secondary)
 - ✓ RPR (rapid plasma reagin)
 - ✓ FTA (fluorescent treponemal Ab)
 - Confirmatory test
 - ✓ VDRL - CSF
- UNCULTURABLE

LAB DX - SYPHILIS

TEST	ANTIGEN	INTERPRETATION
VDRL (CSF) Screen	CARDIOLIPIN CHOLESTEROL	TRUE POSITIVE ✓ RPR TITER >1:2 ✓ VDRL TITER >1:2
RPR Screen		FALSE POSITIVE ✓ Autoimmune diseases ✓ Infectious mono ✓ Pregnancy, Old age
FTA-AB confirmatory	<i>T. pallidum</i>	+ FLUORESCENCE

SEROLOGIC TESTS FOR SYPHILIS

TEST	SENSITIVITY BY STAGE OF SYPHILIS (%)				SPECIFICITY (%)
	1 ^o	2 ^o	LATENT	LATE	
VDRL	78 (74-87)	100	95 (88-100)	71 (37-94)	98 (96-99)
RPR	86 (77-100)	100	98 (95-100)	73	98 (93-99)
FTA-ABS	84 (70-100)	100	100	96	97 (94-100)

HERPES SIMPLEX LAB DX

- **DIRECT IMMUNOFLUORESCENCE**
 - ✓ SCRAPE CELLS OFF BASE OF ULCER & STAIN
 - ✓ DIFFERENTIATES TYPES 1 & 2
- **CULTURE**
 - ✓ SHELL VIAL
 - ✓ CYTOPATHOGENIC EFFECT
 - ✓ SENSITIVITY 70-99%, SPECIFICITY 99%
- **CYTOLOGY & H & E STAIN**
 - ✓ MULTI-NUCLEATED GIANT CELLS
 - ✓ SENSITIVITY & SPECIFICITY <60%
- **PCR**
 - ✓ INVESTIGATIONAL
 - ✓ DIFFERENTIATES TYPES 1 & 2

LAB DX - HPV

- **HYBRID CAPTURE PROBE**
 - ✓ Sensitivity: 84-100%
 - ✓ Specificity: 74-95%
- **PCR FROM CERVICAL SPECIMENS**
- **DX IS OFTEN CLINICAL**



HUMAN PAPILOMA VIRUS

- **INCIDENCE**
 - ✓ MOST PREVALENT STD IN COLLEGE WOMEN
- **CLINICAL IMPRESSION**
 - ✓ VISIBLE GENITAL WARTS CALLED CONDYLOMA ACUMINATA
 - CONDYLOMA = "KNUCKLES", ACUMINATA = "POINTED"
 - ✓ SMOOTH OR FINGERLIKE FLESH-COLORED PROJECTIONS → ROUGH
 - ✓ MULTIPLE PAPULES MAY BECOME CONFLUENT, OR MULTILOBED MASSES
 - ✓ CAN BE PAINFUL, FRIABLE &/OR PRURITIC
- **INVASIVE CANCER**
 - ✓ 16,18, 31, 33 & 35 TYPES CARRY HIGH TO MODERATE RISK