

**Institute for Microbiology, Medical Faculty of Masaryk University
and St. Anna Faculty Hospital in Brno**

Miroslav Votava

Agents of classical venereal infections

**The 7th lecture for 3rd-year students of dentistry
8th December, 2010**

Urinary tract infections (UTIs) – revision

Frequency of UTIs:

The 2nd most common infections (after respiratory ones)

In adults: the most common infections in a general practitioner's office

Afflicting mainly females (because of shorter urethra)

Examples of UTIs – revision

The most common UTI: cystitis

develops **ascendently**

caused by **intestinal microflora**

main symptoms: **dysuria** (difficult urination with sharp and burning pain)

pollakisuria (urgent need to urinate accompanied by urination of a small amount of urine only)

Other UTIs: mainly pyelonephritis (more serious)

origin: **ascendent** or **hematogenous**

urethritis – will be dealt with as STD

Etiology of non-complicated UTIs – revision

circa 80 % *Escherichia coli*

circa 10 % enterococci (esp. *Enterococcus faecalis*)

circa 5 % *Proteus mirabilis*

rest: other enterobacteriae (*Klebsiella pneumoniae*,
Klebs. oxytoca, *Enterobacter cloacae*,
Citrobacter freundii etc.)

Streptococcus agalactiae

coagulase neg. staphylococci (*S. epidermidis*,
S. saprophyticus, *S. haemolyticus* etc.)

yeasts (mainly *Candida albicans*)

Etiology of complicated UTIs – revision

circa 80 %:

Escherichia coli

Klebsiella pneumoniae

Proteus mirabilis

Pseudomonas aeruginosa

enterococci

the rest:

other enterobacteriae

acinetobacters

other G-neg. non-fermenting rods

candidae

***Lege artis* taking a urine sample – revision**

- 1. Only after a thorough cleaning of genital incl. external orificium of urethra by means of soap and water**
- 2. Take the middle stream of urine only**
- 3. Use a sterile vessel**
- 4. Pour urine into a sterile tube & stopper it promptly**
- 5. If not possible to process it within 2 hours, place the specimen into 4 °C for 18 hours at most**

Semi-quantitative examination of the urine sample – revision I

We are interested

- not only in the kind of microbe present in the urine sample, but especially
- in the amount of the microbe

Why are we interested in the number of microbes in 1 ml of urine?

Because

- high numbers only stand for the UTI
- low numbers mean usually contamination acquired during urination

Semi-quantitative examination of the urine sample – revision II

Therefore, the **urine is inoculated** on culture media by means of **calibrated loop**, usually taking **1 μ l of urine**

In this case

1 colony means 10^3 CFU/ml

10 colonies mean 10^4 CFU/ml

100 colonies mean **10^5** CFU/ml

(**CFU** = colony-forming unit = 1 bacterial/yeast cell)

Significant concentrations of bacteria in urine – revision

Type of specimen, symptoms	Type of microbe	Significant number (CFU/ml)
Middle stream, symptoms present	Primary urine pathogen	10^3
	Dubious urine pathogen	10^5
Middle stream, no symptoms	Any	10^5
Suprapubic puncture	Any	10^1

Primary urine pathogens – revision

Escherichia coli & most of other enterobacteriae
enterococci (mostly *Enterococcus faecalis*)

Streptococcus agalactiae

staphylococci (not only *S. aureus*, but mostly
coagulase negative: *S. epidermidis*, *S.*
saprophyticus, *S. haemolyticus* etc.)

yeasts (in the main *Candida albicans*)

Pseudomonas aeruginosa & some other Gram-
negative non-fermenting rods

...

Classical venereal infections

- **Gonorrhoea** (rudely: the clap)
Neisseria gonorrhoeae
- **Syphilis** (in Central Europe also: lues)
Treponema pallidum
- **Chancroid** (soft chancre, ulcus molle)
Haemophilus ducreyi
- **Lymphogranuloma venereum**
Chlamydia trachomatis serotypes
L₁, L₂, L_{2a}, L₃

Clinical forms of gonorrhoea

1. Infections of **lower** parts of urogenital tract
2. Infections of **upper** parts of urogenital tract
3. Other **localized** infections
4. Rare gonococcal infections: **disseminated** ones

GO: infections of the lower UGT

urethritis

cervicitis

urethritis

bartholinitis

inflammation of Skene s glands

GO: infections of the upper UGT

epididymitis (mind the orthography:
i-i- y -i-i)

endometritis

from **salpingitis** up to **adnexitis** (PID
= pelvic inflammatory disease) →
sterility!

GO: other localized infections

i

proctitis

pharyngitis

blenorhoea neonatorum

peritonitis (Fitz-Hugh syndrome)

perihepatitis (Curtis syndrome)

GO: disseminated infections

&

- affliction of **skin** (pustulae), **joints** (purulent arthritis of wrist, knee or ankle) and **sinews** (tendosynovitis)
- **monoarticular septic arthritis**
- **endocarditis (rarely)**
- **meningitis (very rarely)**

GO: complications

prostatitis

periurethral abscesses

cervicitis chronica

tuboovarial abscess

adnexitis chronica → sterility

graviditas extrauterina

GO: laboratory diagnostics – I

Direct detection only:

microscopy

culture

molecular biology tests

Sampling places:

urethra

cervix, urethra, rectum, pharynx (if necessary)

GO: laboratory diagnostics – II

Way of sampling: always 2 swabs

the first swab inoculate directly on culture media (warmed, not from the fridge), or put it into a transport medium, transport it at ambient temperature

from the second swab make a film on the slide

Microscopy (Gram): important in acute gonorrhoea in males

symptomatic gonorrhoea in females

GO: laboratory diagnostics – III

Media for gonococci: always combine

a non-selective **chocolate agar**

with a selective **medium with antibiotics**

Always fresh (**moist**) & warm, culture it with added

CO₂ (candle jar), read after 24 and 48 hrs

Identification:

biochemistry (oxidase +, **glucose +**, **maltose –**)

serology (slide agglutination)

molecular biologic confirmation tests

GO: therapy

Nowadays, many strains of *N. gonorrhoeae* are resistant to penicillin & tetracyclines

Therefore: **ceftriaxone** or **ciprofloxacin** usually in a single dose because of potential concurrent *Chlamydia trachomatis* infection: in a combination with doxycycline or azithromycine

Syphilis: history

1493 Columbus seamen from America to Spain?

1494 Italy: infrequent skirmishes between
Frenchmen & Spanish mercenaries → a lot of
time for frequenting brothels

Italians: Spanish disease

Frenchmen: Italian or Neapolitan disease

the English and many others: **French disease**

Russians: Polish disease

1530 Fracastoro: **Syphilis** sive morbus gallicus

1575 Ambroise Paré: **Lues** venerea (lovers pest)

Syphilis: course

From the very beginning: syphilis = **always a systemic disease!**

Early syphilis: **primary** (ulcus durum)
secondary (mostly rash)
early latent

Late syphilis: **latent**
terciary (gummas, aortitis,
paralysis progressiva,
tabes dorsalis)

Congenital syphilis: early and late

Syphilis: therapy

„One night with Venus, the rest of life with Mercury“
Ehrlich and Hata: preparation No 606 – salvarsan (As)
von Jauregg: malaria (because of high fever)

Nowadays, the drug of choice is penicillin

Primary syphilis:

benzathin penicillin (2,4 MIU) 1 dose

Secondary and late syphilis:

benzathin penicillin (2,4 MIU) 3 times after 7 days

Syphilis: laboratory dg – I

Direct detection

From exudative lesions only (mostly from ulcer durum)

darkfield examination

PCR

immunofluorescence

Indirect detection (serology)

= mainstay of laboratory diagnostics of syphilis

Two types of serologic tests:

with nonspecific antigen (cardiolipin)

with specific antigen (*Treponema pallidum*)

Syphilis: laboratory dg – II

Nontreponemal tests (with cardiolipin):

RRR, VDRL, RPR

fast, cheap, positive early, reflecting the activity, but sometimes falsely positive

Treponemal tests:

TPHA, ELISA, WB, FTA-ABS, TPIT

sensitive, more expensive, more specific, but positive later, remaining positive for life

Soft chancre (chancroid)

Agent of *ulcus molle*: *Haemophilus ducreyi*

Occurrence: the tropics

Course: genital **ulcerations** (easier transmission of HIV) & purulent lymphadenitis

Dg: only **culture** on enriched media (chocolate agar with supplements), 3 days at 33 °C in 10% CO₂

Lymphogranuloma venereum

Agent of LGV: *Chlamydia trachomatis*
serotypes L₁, L₂, L_{2a}, L₃

Occurrence: the tropics and subtropics

Course: purulent lymphadenitis (tropical bubo) & lymphangoitis with fistulae & scars devastating the pelvic region in females

Dg: mostly serology – CFT with the common antigen of chlamydiae

...

Homework 4 – solution

Gerrit van Honthorst (1590-1656): Dentist (1622)



Homework 4

Successful homework solvers:

Sorry, no answers have been received

Homework 5

– solution

Jacques-Louis David (1748-1825):

Death of Marat (1783)

What is the connection between this painting and medicine?

- Jacques-Louis David, had a facial tumor
- Jean Paul Marat, murdered by Charlotte Corday in 1793, was initially a physician
- He was run through when taking a bath for treatment his skin disorder (probably dermatitis herpetiformis Dühring)



Homework 5

Successful homework solver:

Amy Shah

Congratulations!

Homework 6

Egon Schiele
(1890-1918):
Dead mother
(1910)



Homework 6

Successful homework solvers:

Sorry, no answers have been received

Homework 7

Who is the author of this painting and what is its name?



Answer and questions

The solution of the homework and possible questions please mail (on 6.30 a.m. at the latest) to the address

mvotava@med.muni.cz

Thank you for your attention