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

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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 <u>pyelonephritis</u> (more serious)
  origin: ascendent or hematogenous
  urethritis - will be dealt with as STD
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Etiology of non-complicated UTIs – revision

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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)
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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 <u>amount of the microbe</u>

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 µl of urine

In this case

1 colony means 10³ CFU/ml 10 colonies mean 10⁴ CFU/ml 100 colonies mean 10⁵ 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 punction	Any	10 ¹

Primary urine pathogens – revision

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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
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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

- 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
blenorrhoea 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

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Direct detection only:
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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

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Media for gonococci: always combine
a non-selective chocolate agar
with a selective medium with antibiotics
Always fresh (moist) & warm, culture it with added
CO<sub>2</sub> (candle jar), read after 24 and 48 hrs
Identification:
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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

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

Early syphilis: primary (ulcus durum)
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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 – l

Direct detection

From exudative lesions only (mostly from ulcus 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

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Homework 4 – solution

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



Successful homework solvers:

Sorry, no answers have been received

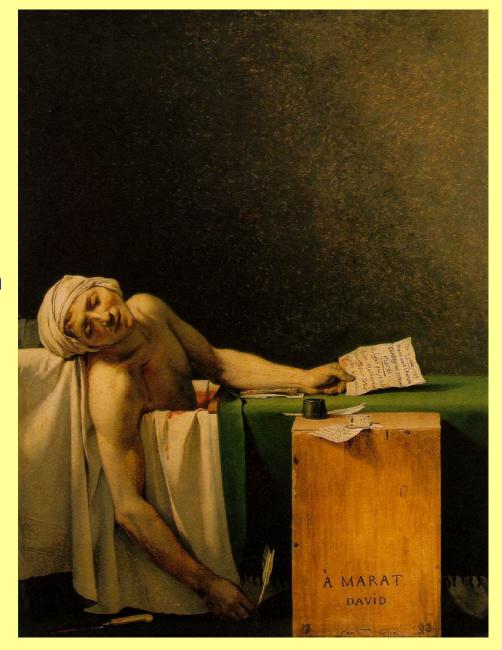
Homework 5 solution

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)

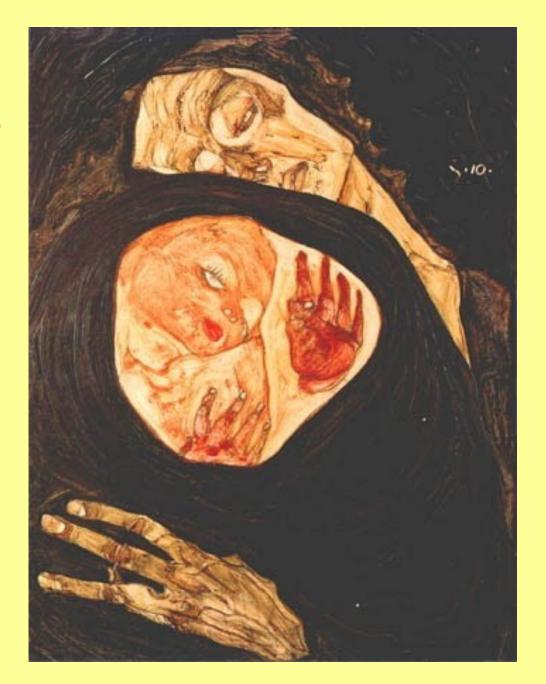


Successful homework solver:

Amy Shah

Congratulations!

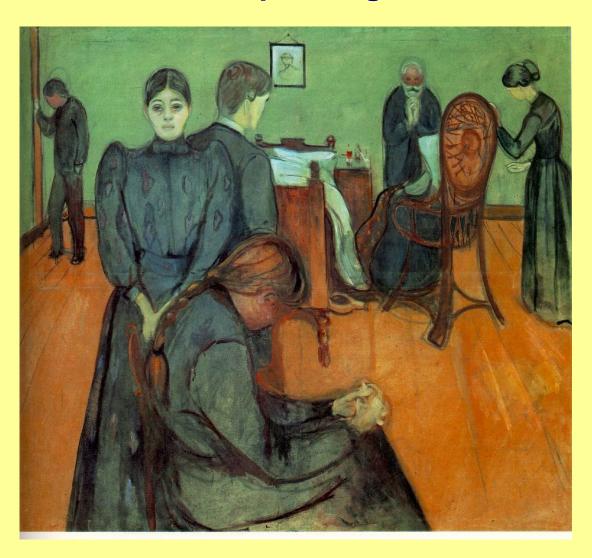
Egon Schiele (1890-1918):
Dead mother (1910)



Successful homework solvers:

Sorry, no answers have been received

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