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LABORATORY PROTOCOL Nr.5 - CNS Infections

Case report 1

Male 62 yrs. old transported by his family to the emergency department of regional hospital because of rapid increase of temperature, strong headache worsening during last hours. Patient is repeatedly vomiting, the communication with him is bad, patient is daytime somnolent.

Lately he was treated twice with ATB for sinusitis.

Objective at admission:

Fever 39,2 °C, signs of meningeal irritation, strong headache, worsening communication, nausea, CRP 130mg/l.

Lumbar puncture – CSF collection – Gram staining, CSF is turbid, lightly yellowish

Question:

1. Which further microbiological procedures will continue?

Describe microscopic picture:

2. Bacteria – G + or G - ?

3. Formation – is it typical for any bacteria?

4. What is the suspected clinical diagnosis? What can help us to elucidate the etiologic agent?

5. Which microorganisms are the most frequent causative agents of the discussed disease?

6. Which biologic specimens will be obtained for examination and which examinations will be indicated?

7. Which bacteria is suspected according to the result of Gram staining?

8. What are the most important virulence factors of this bacteria?

9. Is there any specific prevention of this infection?

CSF latex agglutination: Using diagnostic kit PASTOREXTM MENINGITIS

10. Therapy

11. Microbiologic examination procedures

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Case report 2

Male 75 yrs., gamekeeper actively looking after the forest animals is sent to the infectious diseases department by his general practitioner because of persistent strong headache and nausea. Few days ago he felt to have a flu – myalgia, arthralgia, higher temperature. These symptoms have gone within 3 days. 3 weeks ago he found a tick attached, as a gamekeeper he time to time finds tick attached to his skin. He didn't notice any skin reaction in the surroundings of the tick bite.

Objective: fever 39,5 °C, tachycardia, light scared, strong headache, nausea, vomiting, neck stiffness.

Laboratory examination:

EEG examination: signs of encephalitis

CRP 20mg/l, sedimentation of erythrocytes 20

Questions:

1. Sampling of which specimen is indicated immediately?
2. Further sampling ??

CSF examination:

Obtained CSF is clear

Cellular elements: Lymphocytes ++

Antibody detection in CSF: Tick borne encephalitis virus IgM ++, IgG borderline

Serologic examination performed:

1) Detected tick borne encephalitis virus IgM ++, IgG borderline in serum sample

2) Antibodies against *Borrelia burgdorferi (garinii)* detected in higher level (positivity index = borderline value = 1,1) – IgG of 3,6 index of positivity and IgM detected below the borderline value - 0,886 index in serum sample

3. What is the causative agent?
4. Is dual infection suspected?
5. What is the causative therapy?
6. Is any specific prevention available?
7. Where do the ticks mainly live? Describe the environments the most dangerous because of ticks occurrence?
8. Is there any connection between flu like symptoms the patient suffered from few days before the onset of acute meningitis?

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Case report3

Student, 19 yrs. after returning home from ski course in the evening he feels fatigue after the journey, goes to bed with headache. In the morning his mother wakes him up with difficulties. He has a fever, has a strong headache and nausea, is somnolent. The mother calls the emergency service.

Objective at the time of admission to emergency:

fever 40 °C, pulse 126/min, blood pressure 110/65, patient is vomiting, has strong headache, not painful petechial hemorrhages on legs, arms and trunk, the communication with him is difficult

Questions:

1. Which infection is from the beginning suspected?

2. Which biological samples will be obtained ?

Lumbar puncture was performed – collected CSF stained by Gram staining

3. Describe the photo – can you identify the causative agent of disease?

4. Which bacteria is it?

5. Which serogroups cause this disease the most often?

6. Do you know another clinical forms of this infection?

7. Do you know a specific area of epidemic occurrence of this bacteria?

8. Does any specific prevention of this disease exist?

9. What is the mode of transmission of this bacteria?

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Case report 4

Male, 56 yrs., HIV +, he felt strong fatigue for 2 weeks and therefore he asked for a control visit in AIDS center for tomorrow, he undergoes treatment according to schedule. He has suffered for chest pain and cough for 2 weeks, in the evenings temperature about 37,3 – 37,5 °C. He tried to sweat, today a strong headache occurred, fever of 38,4 °C with vomiting and photophobia – he wears sunglasses. He is brought to the hospital by his friend because he moved confusedly at home. Anamnesis: He takes the medicaments against HIV regularly, 3 weeks ago he and his friend visited an uncle who breeds pigeons, except of this visit he was at home all the time. He works at home at the home office.

Objective: 38,5 °C, ataxia, somnolence, strong headache, slight cough, photophobia – the patient refuses to take off the sunglasses, he is slightly confused, other vital functions are normal.
Haematological examination: 125 CD4+ / μ l

Questions:

1. Which biological samples will be obtained?
2. Think about the following relation: HIV +, contact with birds, with pigeons!! And what about the cough with higher fever, meningeal irritation, fever – which staining according to other possible microbial etiology will be still added??

Laboratory examination:

CSF: Gram staining, staining by ink
Describe prepare: Gram staining –

Staining by ink –

3. Which biological specimens will be obtained?
4. Which etiology according to patient's basic disease may be suspected?
5. Which agent is apparently the causative agent of this described infection? (due to microscopy and anamnesis)
6. What is therapy of this infection?

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Case report 5

Female patient 52 yrs., admitted to the hospital for 5 days lasting vertigo, headache, repeated vomiting, temperature 38 °C.

Anamnesis: she lives and works in the family farm (sheep and cattle breeding), she tries to live healthfully, drinks sheep milk and eats the home made sheep cheese. DM 1st type in anamnesis. Last 14 days she feels tired with flu-like symptoms and mild diarrhoea (took Smecta and Endiaron for 2 days and felt better but then the recent status).

At admission: Fully conscious, well orientated, inability to flex the neck, mild ataxia, nausea. Temperature 37,8 °C,

Laboratory examination: CRP 128 mg/l, normal blood count, sent to NMR (nuclear magnetic resonance) because of CNS infection suspicion – 3 focuses of 3-4 mm in medulla oblongata, cerebellum and upper part of cervical spinal cord.

Questions:

1. Which microbiological agent according to patient anamnesis data is suspected?
2. What was the possible source of patient's infection?
3. Describe the course of other forms of this infection
4. In which patients is this infection especially dangerous?
5. What is the medicament of choice of this infection therapy?

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Case report 6

Female 72 yrs. is sent to infectious diseases department by general practitioner for 10 days lasting temperature of 37,2 – 37,8 °C accompanied by headache worsening day after day. The woman has been coughing for several months, she suffered from mild rhinitis (allergy?). She takes over the counter medicaments (Analergerin /cetirizin/; and Analergerin Neo /levoceterizin/); 2 months ago the cough was worse and GP prescribed Augmentin (amoxicillin-clavulanate acid) for 14 days. She became a bit better then, she was recommended to clear the bronchi from mucous. Several months ago she was treated with doses of corticoids for 12 weeks (for arthritis). GP thinks that the chronic bronchitis is the result of patient life-long work in agriculture.

At admission to department of infectious diseases: Temperature 37,6 °C, slight cough, patient complains of being sleepy last 3 days, feels slightly disorientated, has headache, she sweats more intensively during the night.

Questions:

1. Which infections according to age, clinical symptoms and life-long patient working anamnesis are suspected?

2. Which biological specimens will be immediately collected and which examination will you suggest?

Because of the status and age the patient is hospitalized (somnolence, intensifying headache).

Laboratory examinations results:

CRP 70mg/l, haematologic examination normal findings

Sputum – Gram staining microscopy - negative, Ziehl-Neelsen staining negative.

PCR from sputum sample – multiplex bacterial DNA negative, mycobacteria negative

CSF – lymphocytes (120/μl), lowered saccharides and slightly chlorides, PCR for mycobacteria positive (*Mycobacterium tuberculosis*)

3. Is it really CNS infection caused by mycobacteria even though sputum sample is negative for mycobacteria by PCR?

4. Which therapy will be administered?

5. How long will the therapy approximately last (in months)?

6. How high the mortality rate may be in basillary tuberculosis and why is it called „basillary“?

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7. Why Ziehl-Neelsen staining is used for mycobacteria identification?

8. Do you observe mycobacteria in stained smear? Which arrangements of bacteria in sputum sample is typical?

9. Why mycobacteria are cultivated in culture media in long tubes? How long does a classic mycobacterial cultivation last?

10. Which culture media for mycobacterial cultivation are used?