INFECTIOUS DISEASE EMERGENCIES

My lecture today:

- INFECTIOUS DISEASE EMERGENCIES
  - HOW TO RECOGNIZE THEM?
  - 7 CLINICAL CASES
- ANTIBIOTIC TREATMENT FOR ID EMERGENCIES
INFECTIOUS DISEASE EMERGENCIES

• Diseases with clinically and microbiologically prooven infections that can have as an complication:
  • Irreversible tissue or organ damage with permanent loss of function
  OR
  • DEATH, if not promptly and adequately treated

Timely and appropriate intervention may significantly improve outcomes!
INFECTIOUS DISEASE EMERGENCIES

- SEPSIS
  - MENINGOCOCCEMIA
  - SEPTIC SHOCK
  - TOXIC SHOCK SYNDROME
  - ACUTE ENDOCARDITIS

- CNS INFECTIONS
  - BACTERIAL MENINGITIS
  - BRAIN SUPPURATIVE INFECTIONS
  - HSV ENCEPHALITIS

- SEVERE PNEUMONIA (*S. PNEUMONIAE, LEGIONELLA, MRSA*)

- NECROTIZING SOFT TISSUE INFECTIONS

- EPIGLOTTITIS

SPECIAL SETTINGS:

- NEUTROPENIC FEVER
- ASPLENIAS

- SEVERE C. DIFFICILE DIARRHEA

- TETANUS, BOTULISM

- WEIL’S DISEASE

- MALARIA

- TBC MENINGITIS

- CHOLERA

- EBOLA
INFECTIOUS DISEASE EMERGENCIES

TREATMENT INCLUDES:

- EARLY AND ADEQUATE ANTIBIOTIC TREATMENT
- AND DIFFERENT SYMPTOMATIC MEASURES
  - FLUID RESUSCITATION
  - INOTROPES
  - THROMBOPROPHYLAXIS
  - ADEQUATE NUTRITION
  - SOMETIMES SURGICAL INTERVENTIONS ("SOURCE CONTROL")

ICU monitoring, treatment and care
INFECTIONOUS DISEASE EMERGENCIES

RECOGNITION

• HIGH FEVER (>39.4 °C !), SHIVERING
• TACHYCARDIA
• TACHYPNEA
• HYPOTENSION AND/OR
• ALTERED CONSCIOUSNESS
• SPECIFIC SKIN CHANGES
  • MOTTLING
  • TOXIC OR HAEMORRHAGIC RASH
  • PAIN UNDER THE SKIN LESION

Quickly evaluation for severe form of infectious disease!
SKIN EXAMINATION

Peripheral vasoconstriction

Courtesy of Marija Santini, MD, PhD, ID specialist, CC subspecialist, University Hospital for Infectious Diseases, Zagreb, Croatia
SKIN EXAMINATION

- Janeway lesions (*S. aureus* endocarditis)
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SPECIAL PUPULATIONS:
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- CHOLERA
- MALARIA
- HSV ENCEPHALITIS
- TBC MENINGITIS
- EPIGLOTITIS
ID WORST NIGHTMARE

Meningococcal sepsis
CASE 1 – PREVENTABLE DISEASE

• 19 Y healthy F
• 2015.
• Fever 39.7 °C, chills, shivering
• vomiting and diarrhea
• pain in the legs, unusually cold hands
• rush
• hypotensive, tachycardic, tachypnoic
CASE 1 – PREVENTABLE DISEASE

- Shock
- Multiorgan failure
  - ARDS
  - DIC
  - Acute renal failure
- Despite complex ICU treatment
  - DEATH IN 3 days
- Blood cultures: *Neisseria meningitidis* (group C)

TH: ceftriaxone – at admission
MENINGOCOCCAL DISEASE

The difficulties in identifying meningococcal disease:

• clinicians in the community see so few cases in clinical lifetime
• the classic clinical features of meningococcal disease (eg, hemorrhagic rash, meningismus, and impaired consciousness) appear late in the illness

Early rush
MENINGOCOCCAL DISEASE

• **Worrisome signs** — Based on the retrospective review of 448 children with meningococcal disease, signs and symptoms suggesting early sepsis include*:
  
  • Leg pain (in 31 to 63 patients, exl. Infants)
  • Cold hands and feet (in 35 to 47%)
  • Abnormal skin color (eg, pallor or mottling)
    – (17 to 21%)

MENINGOCOCCAL DISEASE

• Treatment
  • Ceftriaxon 1-2 gr iv

• Ceftriaxone in Primary care
  • Not possible in Croatia

• Ambulance service
  • Not possible

• Hospital’s ED
  • Possible (?)

For discussion:
Why there is no ceftriaxone in primary care and ambulance service in Croatia?
MENINGOCOCCAL DISEASE

Pre-hospital administration of antibiotics by ambulance personnel

- Evidence supporting the life-saving effect of early antibiotic in cases of suspected meningococcal sepsis is inconclusive
- No randomized controlled trials (nor are they likely to occur)

- Pro

- Contra

Special theme – Meningococcal disease
CASE 2 – GET THE SHOT, NOT THE FLU

- 33 Y F Našice
- 2/2018
- 3 days fever 38 °C, 3 days fever 39.5 °C, cough, difficult breathing, vomiting, diarrhea
- 10 weeks pregnant, previously healthy
- her boyfriend is febrile and coughing too
CASE 2 – GET THE SHOT, NOT THE FLU

• 37.9 °C  RR 118/39  pulse 130/min,  Sat O2 90% (10L O2/min)  GCS 15
• Septic shock, respiratory and renal failure
• Intubation, mechanical ventilation
• Severe septic shock – high doses of norepinephrine – peripheral vasoconstriction
• miscarriage

TH/Ceftriaxone, vankomycin

Blood cultures: BHS group A  Penicillin + Clindamycin  ...SURVIVED
Sepsis and septic shock are medical emergencies and we recommend that treatment and resuscitation begin immediately.

Best Practice Statement
Antibiotics

- We recommend that administration of IV antimicrobials be initiated as soon as possible after recognition and within 1 h for both sepsis and septic shock.

  (strong recommendation, moderate quality of evidence).

- We recommend empiric broad-spectrum therapy with one or more antimicrobials to cover all likely pathogens.

  (strong recommendation, moderate quality of evidence).
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CASE 3 – The clock is ticking...

- 74 y old F, 2/2018.
- Fever 39.4 °C, 6-7 days  DG: sinusitis  TH: amoxicillin+clavulanic acid tbl. (2 days)
- On the 7. day altered consciousness + fever
- No parenteral antibiotic for 4 hours since first medical contact in one tertiary referral hospital
- Examined by the neurologist and transferred to our ED
CASE 3

The clock is ticking...

- Lumbar puncture:
  - 20,224 cells/3 µl (96% polymorphs)
  - proteins 6.98 g/L, glucose 0 mmol/L
- *S. pneumoniae* (R penicillin (oral), I penicillin (parenteral), R macrolides, R cefuroxim (oral and parenteral))

Sensitive: ceftriaxone

DG/ Pneumococcal sepsis and meningitis

...SURVIVED BUT WITH NEUROLOGIC SEQUELAE

Courtesy of Marija Santini, MD, PhD, ID specialist, CC subspecialist, University Hospital for Infectious Diseases, Zagreb, Croatia
Figure 1. Algorithm for clinically suspected bacterial meningitis.

*Contraindications for a lumbar puncture without previous imaging include focal neurological deficits (e.g., hemiparesis), brainstem signs like pupillary changes, new onset seizures, and a severely reduced level of consciousness.
BACTERIAL MENINGITIS TREATMENT

• In adults, initial empiric treatment should provide adequate therapy for *Streptococcus pneumoniae* and *Neisseria meningitidis*

  **CEFTRIAXON**

• Increasing resistance of *S. pneumoniae* to beta-lactam antibiotics (including ceftriaxone) has prompted recommendations to initiate empiric antibiotic therapy with a regimen consisting of **VANCOMYCIN AND CEFTRIAXONE**

• Don’t forget Listeria monocytogenes! (even in the immunocompetent patient)

  **AMPICILLIN**
TIMING OF TREATMENT OF BACTERIAL MENINGITIS

• NOT ONLY HEART ATTACK AND STROKE DESERVES „GOLDEN HOUR“!
• BACTERIAL MENINGITIS DESERVES IT TOO!

The European Federation of Neurologic Societies (EFNS) recommends the commencement of antibiotic therapy in bacterial meningitis within 60 min*.

The Infectious Disease Society of America (IDSA) suggests that antibiotics should always be administered whenever the diagnosis of meningitis seems likely, not differentiating between the pre-hospital and in-hospital situations**

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CASE 4 – WHY AZITROMYCIN?

- 31 y F, Bjelovar, 2/2018
- Previously healthy, smoker
- 6 days fever 40 °C, shivering
- Cough from 1st day (reddish)
- Primary care: azitromycin 3 days
- Allergies: penicillin - rush

SEVERE PNEUMOCOCCAL (STAPH?) PNEUMONIA

Hospital TH/ ceftriaxone + linezolid

...RECOVERED
CASE 5 – WHY NOT AZITHROMYCIN?

• 33 Y, M
• Ex IVDU, smoker
• Transfer to UHID Zagreb from SEE regional center (hospitalized for 8 days):
  • fever 40.1 °C, diarrhea, cough – 6 days
  • DG/bacterial pneumonia
    • meropenem, vancomycin, metronidazol
  • deterioration – ICU, MV, ARDS
  • Legionella urin Ag positive

SEVERE LEGIONELLA PNEUMONIA TH: AZITHROMYCIN ...RECOVERED
CASE 5

ICU treatment

- **UHID admission:** 6/12/2014
- **VAP (BAL MDR A. baumanii 1000 CFU/ml):** 6/13/2014
- **UHID discharge:** 8/11/2014

### 2014

- **Day 1:**
  - azithromycin: 6/12/2014 - 6/19/2014
  - moxifloxacin: 6/20/2014 - 7/1/2014
  - am/sul+col: 6/14/2014 - 7/6/2014
  - pip/taz: 7/13/2014 - 7/19/2014
  - MV: 6/12/2014 - 7/16/2014
CASE 6 – LISTEN TO THE PATIENT!

- 47 Y F
- no comorbidities
- Patient complained of severe right inguinal pain that spreads to the right leg
- small pale skin lesion on the inside of the right thigh imponing as cellulitis
- Abdominal US and CT showed signs of appendicitis
- was admitted to the clinic for abdominal surgery for suspected appendicitis and operated – no appendicitis was find

CT showing right leg subcutaneous emphysema, fat infiltration with intramuscular fluid collection
CASE 6 – LISTEN TO THE PATIENT!

• Over a few hours skin of right leg was turning violet with the development of large fluid filled blisters (bullae)

• DG/Necrotizing fasciitis
  • 12 h after first examination

• Patient was empirically started on clindamycin, ciprofloxacin and metronidazole, later penicillin

SHOCK – ICU - 2 operations - BHS-A (bloodculture) - leg amputation - DEATH
CASE 7 – DOC, I’AM ASPLENIC!

• 35 y M
• Asplenic (trauma), vaccinated Pneumo 23
• Fever 40 °C, vomiting, diarrhea
  • Ambulance service diagnosed viral gastroenteritis!?
• Next day – shock – ards – acute renal failure

17 hours after disease started
CASE 7 – DOC, I’AM ASPLENIC!

• ICU
• VV ECMO for ARDS
• Ceftriaxone

• *Streptococcus pneumoniae* (blood cultures)

...SURVIVED

48 hours after disease started
CASES

Community acquired infectious diseases emergencies

1. SEPSIS - MENINGOCOCCEMIA
   - ceftriaxone

2. SEPTIC SHOCK
   - ceftriaxone +
   - flucloxacillin

3. BACTERIAL MENINGITIS
   - ceftriaxone +/-
   - ampicillin

4. SEVERE PNEUMONIA
   - ceftriaxone +/-
   - azithromycin/vancomycin

5. NECROTIZING FASCITIS
   - ceftriaxone/penicillin +
   - clindamycin

6. SEPSIS IN ASPLENIC PATIENT
   - ceftriaxone
   - -

7. NEUTROPENIC FEVER
   - piperacillin+tazobactam +/-
   - vankomycin

Almost all this conditions can be health-care associated! - Give treatment as soon as possible (according to hospital epidemiology)
MY VIEWPOINT AND SUGGESTIONS

• Infectious disease emergencies are not well recognized
• When recognized, they are not adequately and promptly treated (lack of knowledge and bad work conditions)

1. Education in medical schools
   1. ID rounds should be on 5th or 6th year
   2. At least 2 months of ID and CM (2 weeks of antimicrobial treatment, 1 week of infectious disease emergencies)
   3. Teach about “golden hour” for all infectious disease emergencies

2. Education on specialisation and after...