Basic principles of antibiotic use

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1. Is antibiostatical treatment indicated based on clinical findings?

Obvious bacterial infection

- Localized infections: buccal space abscess, vestibular abscess, retropharyngeal abscess etc.

- Infections with characteristic clinical findings: dental infections, cellulitis, streptococcal tonsillitis, infectious mononucleosis etc.
2. Urgency of the situation?

- **Non-urgent situation:** mild infection, which does not require treatment until the diagnosis is not established.

- **Urgent situation:** the patient with suspected severe infection:
  - Localized infection
  - Bacterial meningitis (brain abscess)
  - Cavernous sinus thrombosis
  - Cervical necrotizing fascitis
  - Mediastinitis
  - Sepsis
3. Have appropriate clinical specimens been obtained, examined and cultured

- Standard cultivation
- Gram stain
- Latex agglutination (Strep test®)
- Appropriate cultures – anaerobic and aerobic cultures
- Antibiotical treatment can be modified when the pretreatment cultures become available
- Follow up cultures are less reliable than initial pretreatment cultures
4. What organisms are most likely to be causing the infection?

- **Type** of focal infection
- **Epidemiologic features**: hospital vs. community acquired infections, prior antibiotic use, etc.
- **Prior culture data**: surveillance cultures in immunocompromised patients
Ludwig’s angina

(a) This patient had painful cellulitis within the submandibular and sublingual spaces.
(b) Brawny edema was present within the floor of the mouth, pushing the tongue upwards.

Courtesy of University of Sheffield School of Dentistry, UK.
Dental and periodontal infections

- Related to poor hygiene and increasing age
- Diabetes and hormonal disturbances (puberty and pregnancy)
Infections of oral mucosa: gangrenous stomatitis

- Poor oral hygiene
- HIV infection, measles
- Smoking
- *Fusobactrium nucleatum, Borrelia vincenti, Provotella melaninogenica*
- Gram stain + aerobic and anaerobic
Actinomycosis - diagnosis and management

- Head and neck swelling
- Poor dentition
- Discharging sinuses with sulfur granules
- Material is cultured under anaerobic conditions
- Intravenous benzylpenicillin (3-6 weeks) followed by oral penicillin (6-12 months)
- Alternatively amoxicillin i.v.
Infections of salivary glands

- **Mumps** (markedly decreased incidence – MMR vaccination)

- **Bacteria** (patients over 60 years, diabetes, chronic illnesses)

- **Viruses** – parainfluenza virus, coxsackievirus, echovirus, Epstein-Barr virus and HIV
Clinical features and pathogens

- **Mumps** – paramyxovirus

- **Primary bacterial parotitis** – *Staph. aureus, Strep. pyogenes, viridans streptococci and Haemophilus influenzae*

- **HIV associated salivary gland swelling** – cytomegalovirus (CMV)
5. If multiple antibiotics are available to treat pathogen, which agent would be the best?

- Prior antibiotic allergies
- Antibiotic penetration - brain abscesses etc.
- PH - aminoglykosides are much more effective in an alkaline medium
- Potential side effects - chloramphenicol – occurrence of aplasia
- Bactericidal (bc) vs. bacteriostatic agents - in lifethreatening infections or in immunocompromised patients bc antibiotics are necessary
6. Is an antibiotic combination appropriate?

- **Synergism** - one antibiotic enhances the activity of another
  (measured by time killing curves)
  - serial inhibition of microbial growth
  - one antibiotic enhances the penetration of another (penicillin and aminoglycoside)

- **Broad spectrum of activity** – in sepsis of unclear etiology

- **Infection due to multiple organisms** – orocervical abscess
Disadvantages of multiple antibiotics

- **Risk of drug sensitivity or toxicity**
- **Risk of colonization with resistant organism**
- **Possibility of antagonism** (i.e., penicillin and tetracyclin)
- **Higher cost**
- **False sense of security**: the use of multiple agents to cover all organisms is not possible and may be associated with complications
7. Are there special considerations related to host factors?

- Genetic factors
- Pregnancy and lactation:
  
  A. antibiotics considered safe - penicillins, cephalosporins, erytromycin base;
  
  B. antibiotics to be used with caution - aminoglykosides, vancomycin, clindamycin, imipenem-cilastatin and cotrimoxazole

- Renal and liver functions
8. What are important adverse reactions?

- **Clindamycin** – *Clostridium difficile*-mediated diarrhea, allergic reaction

- **Penicillin V** (phenoxyethylpenicillin) – mild to serious allergic reaction

- **Amoxicillin-clavulanate** – allergy, diarrhea, hepatotoxicity, *C. difficile*-mediated diarrhea, maculopapular rash with infectious mononucleosis and chronic lymphocytic leukemia
9. What is the appropriate dose?

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<thead>
<tr>
<th>Generic name</th>
<th>Oral regimen</th>
<th>Intravenous regimen</th>
</tr>
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<tbody>
<tr>
<td>phenoxy methylpenicillin</td>
<td>500mg q6h</td>
<td>1.2g q4h*</td>
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<tr>
<td>amoxicillin-clavulanate</td>
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<tr>
<td>fluconazol</td>
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* benzyl penicillin
References


