# **Basic principles of antibiotic use**

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# **1. Is antibiotical 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, celullitis, streptococcal tonsillitis, infectious mononucleosis etc.

- **2. Urgency of the situation?**
- Non-urgent situation: mild infection, which does not require treatment untill 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 disturbancies (puberty and pregnancy)
- Streptococcus spp., Peptostreptococcus spp., Veillonella spp., Lactobacillus spp., Corynebacterium spp., Bacteroides spp., Prevotella spp., Actinomyces spp., Fusobacterium nucleatum

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)
- Alternativelly 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 pathogenes

### <u>Mumps</u> – 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 lifetheatening 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?

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- <u>Clindamycin</u> Clostridium difficile-mediated diarrhea, allergic reaction
- <u>Penicillin V</u> (phenoxymethylpenicillin) mild to serious alleric reaction

<u>Amoxicilllin-clavulanate</u> – allergy, diarrhea, hepatotoxicity,
 *C. difficile*-mediated diarrhea, maculopapular rash with infectious mononucleosis and chronic lymphocytic leukemia

# 9. What is the appropriate dose?

Generic name	Oral regimen	Intravenous regimen
phenoxymethylpenicillin	500mg q6h	1.2g q4h*
amoxicillin-clavulanate	625mg q8h	1,2g q8h
cefuroxime	500mg q12h	750mg q8h
metronidazol	250mg q12h	400mg q8h
clindamycin	300mg q6h	450mg q8h
fluconazol	100mg q12h	200mg q12h

\* benzylpenicillin

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