Systemic and topical therapy of pyoderma

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Introduction

- cutaneous bacterial infection → pyoderma
  . common
  . anatomic, physical and immunological causes
- satisfactory resolution :
  . symptoms’ disappearance
  . relapsing hazard elimination
* 95% pyoderma → secondary
  - identify and manage primary problem!

Introduction

- surface pyoderma (hot spot and intertrigo)
  . usually needs only topical treatment
- superficial and deep pyoderma
  . need systemic and topical treatment

Antibiotic features

- efficacious for S. intermedius and S. schleiferi
- high concentration into the skin
- better if bactericidal
- few side effects
- easy to administer (< 2-3 times/day)
- should penetrate into the skin at high [%]
- cheap / no rapid developing of antibiotic-resistance

Antibiotic spectrum of action

- preferable a narrow spectrum
- intestinal flora disorder ??
- predisposition to Malassezia’s infection
- e.g.: erythromycin, lincomycin, clindamycin, beta-lactamases resistant penicillin
- don’t use beta-lactamases sensible antibiotics
- > 70% S. intermedius produce beta-lactamases
- e.g.: penicillin, amoxicillin, ampicillin

Antibiotic tissue distribution

- anatomic reasons
  - only 4% of the cardiac flow reaches the skin
  - no blood circulation in the epidermis
- pharmacokinetics
  - beta-lactamases antibiotics 40-60%
  - cephalosporins 20-40%
  - tetracyclines spread slightly in the skin
**Antibiotic**

**Bacteriostatic vs. Bactericidal**
- **Bacteriostatic**: e.g. macrolides
  - Immunocompetent animals
  - Single and short therapy
- **Bactericidal**: e.g. cephalosporins
  - Also for immunosuppressed animals
  - Deep pyoderma
  - Repeated and prolonged therapy

**Antibiotic Resistance**
- Often in superficial pyoderma: empirical choice
- Antibiotic sensitivity test indications:
  - Deep pyoderma
  - Prolonged therapy
  - Previous empirical therapy with no results
  - Previous antibiotic-therapies, several relapses
  - Rod-shaped bacteria on cytology

**Antibiotic Adequate Period**
- Superficial pyoderma → 3-4 weeks until 7-14 days after the clinical resolution of the lesions
- Deep pyoderma → 4-8 weeks until 14-30 days after the clinical resolution of the lesions
* Important to perform clinical and cytological examination under antibiotic-therapy

**Canine Pyoderma**

**Definition and Therapy**
- **Surface pyoderma**
- **Therapy**:
  - Cleaning with topical disinfectants
  - Chlorhexidine digluconate 0.5% - gel
  - Topical antibiotic
  - Mupirocin cream
  - If associated to other lesions and sites:
    - Antibiotic PO x 2-3 weeks
**CANINE PYODERMA**
*pyotraumatic dermatitis “hot spot”*

- Surface pyoderma
- THERAPY:
  - cleaning with topic disinfectants
    - chlorhexidine digluconate 0,5% or diluted povidone-iodine / topic - systemic steroids
  - systemic antibiotic (if satellites’ lesions)
  - until clinical resolution
  - investigate parasitic and allergic causes

**CANINE PYODERMA**
*Definition and Therapy*

**CANINE PYODERMA**
*folliculitis*

- Superficial pyoderma
- THERAPY:
  - shampoo-therapy
    - chlorhexidine digluconate 0,8% - 2%
    - benzoil peroxide
    - ethyl lactate
    - triclosan
  - AND SYSTEMIC ANTIBIOTICS*

**CANINE PYODERMA**
*furunculosis / cellulitis*

- Deep pyoderma
- THERAPY:
  - shampoo-therapy
    - chlorhexidine digluconate 2% - 4%
    - benzoil peroxide
    - ethyl lactate
    - triclosan
CANINE PYODERMA

*furunculosis / cellulitis*

- Deep pyoderma
- THERAPY:
  - shampoo-therapy
    - with foam x 10-15 minutes
    - 2 x week x 2-3 months
  - clip the coat
- AND SYSTEMIC ANTIBIOTICS*

THERAPY

- INFO
  - cost → €
    - € cheap
    - € quite cheap
    - € expensive

- INFO
  - side effects → S.E.
    - S.E.☺ few
    - S.E.☺ some
    - S.E.☺ many

- compliance → C.
  - C.☺ good
  - C.☺ fair
  - C.☺ poor

ANTIBIOTICS - systemic therapy

- first appearance pyoderma
  Trimethoprim-sulfa
  15-30 mg/kg/ po q12h - bactericidal

  € S.E.☺ C.☺

Erythromycin
  10-15 mg/kg/ po 8h - bacteriostatic

  € S.E.☺ C.☺

ANTIBIOTICS - systemic therapy

<table>
<thead>
<tr>
<th>Drug</th>
<th>side effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>trim-sulfa</td>
<td>vomit and diarrhoea, kerato-congiuntivitis sicca, drug reaction, hepatic necrosis</td>
</tr>
<tr>
<td>use gastro protector + blood examinations</td>
<td></td>
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</table>

* antibiotic-resistance
## Antibiotics - Systemic Therapy

### Drug | Side Effects | Notes
--- | --- | ---
**Erythromycin** | Vomit and diarrhoea, TID, lincomycin cross-resistance | *Antibiotic-resistance, use gastro protector*

- First appearance pyoderma - g-e bacterial infection assoc.

- Lincomycin
  - 20 mg/kg po q12h - bacteriostatic

- Clindamycin
  - 5 mg/kg po q12h for superficial infections and 10 mg/kg/12h for deep infections - bacteriostatic

- Tylosin
  - 20 mg/kg po q12h bacteriostatic / bactericidal

### Drug | Side Effects | Notes
--- | --- | ---
**Lincomycin** | Vomit and diarrhoea rare, BID, clindamycin cross-resistance, quite expensive | *Antibiotic-resistance*

- Recurrent superficial pyoderma and deep pyoderma
  - Cephalosporins 1° gen.
    - Cefalexin
      - 20-30 mg/kg po q12h bactericidal
    - Cefadroxil
      - 10-20 mg/kg po q12h bactericidal

### Drug | Side Effects | Notes
--- | --- | ---
**Cefalexin** | Vomit and diarrhoea not frequent, BID, quite expensive, good tissue penetration | *Antibiotic-resistance rare*

- Recurrent superficial pyoderma and deep pyoderma
  - Cephalosporins 3° gen.
    - Cefovecin
      - 8 mg/kg sc q14 days - bactericidal
## ANTI BI OTICS - systemic therapy

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<tr>
<td>cefovecin</td>
<td>possible side effects if use combined to furosemide, ketoconazole, &amp; FANS</td>
</tr>
<tr>
<td></td>
<td>good compliance, good tissue penetration, expensive, broad bacterial spectrum</td>
</tr>
<tr>
<td></td>
<td>Staphylococcus intermedius, Streptococcus beta-emoliticus, Escherichia coli Pasteurella multocida</td>
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<td>* antibiotic-resistance: new product</td>
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</table>

- recurrent superficial pyoderma and deep pyoderma

### Potentiated penicillins

- Amoxicillin and clav. acid
  - 20-25 mg/kg q12h - bactericidal

### Rifamycins

- Rifampicin
  - 10 mg/kg po q12h - bactericidal

## ANTI BI OTICS - systemic therapy

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<td>amoxicillin + c.a.</td>
<td>vomit and diarrhoea not frequent, BID expensive, broad spectrum</td>
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<td>* antibiotic-resistance rare</td>
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## ANTI BI OTICS - systemic therapy

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<tr>
<td>rifampicin</td>
<td>vomit and diarrhoea frequent, BID unexpensive, hepato-toxicity and rapid developing of antibiotic-resistance (10 14 dd maximum), orange, saliva, urine, faeces (pill stain)</td>
</tr>
<tr>
<td></td>
<td>* good tissue penetration (granulomas, pyogranulomas)</td>
</tr>
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</table>

## ANTI BI OTICS - systemic therapy

- rod-shaped bacterial or mix cutaneous infections

### Quinolones

- Enrofloxacin
  - 5-10 mg/kg/ po q24h bactericidal
- Marbofloxacin
  - 2 mg/kg/ po q24h
- Ciprofloxacin
  - 10 mg/kg/ po q24h

### enrofloxacin

- not in dogs < 1 yo (developmental cartilage abnormalities), expensive, but SID & broad spectrum

- * good tissue penetration
**ANTI BI OTICS - systemic therapy**

- rod-shaped bacterial or mix cutaneous infections
  - **Aminoglycosides**
    - **Amikacin**
      - 10 mg/kg/ im, sc q12h bactericidal
    - **Gentamycin**
      - 2mg/kg/ im, sc q8h bactericidal

**PYODERMA - topical therapy**

- Useful and often associated with systemic therapy
- Appropriate product
- Contact time (10-15 min.)
- owner’s compliance
  - explain
  - motivate

**ANTIBIOTICS - systemic therapy**

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<tr>
<td>amikacin</td>
<td>nephro-toxicity, BID-TID, expensive, narrow spectrum (Gram neg.) * check renal function</td>
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**PYODERMA - topical therapy**

- product’s choice:
  - immersions (chlorexhedine, povidone iodine)
  - shampoos
  - lotions, sprays
  - ointments, gels

- goals:
  - Debris and bacteria removal
  - Antibiotic strengthening
  - Useful in relapsing prevention
**PYODERMA - topical therapy**

- owner's compliance:
- animal's temperament
- animal's size
- length's coat
- bathroom space's availability
- season
- wash frequency
- washing and product's cost
- perfume, foaminess

**PYODERMA - topical therapy**

- Immersions and hydrotherapy
- Shampoos
- Topical medicated ointments

**PYODERMA - topical therapy**

- Immersions and hydrotherapy (exp. deep pyoderma)
- Disinfectants to add into the water
  - chlorhexidine (2-4%)
  - povidone iodine

  x 10-15 min. 1-2 v/die x 3-7 dd

**PYODERMA - topical therapy**

- Shampoo-therapy (all kinds of pyoderma)
- Healing actions
  - Foam massage on the coat
  - Detergent vehicles
    usefull to remove tissue debris
  - Promote a better contact between active molecules and the skin

**PYODERMA - topical therapy**

- Shampoo-therapy
- ETHYL LACTATE

  properties
  - antibacterial effect (ethanol)
  - acidifying action (lactic acid )
  - degreasing, comedonolytic

  disadvantages
  - could excessively dry the skin
  - could cause dermatitis and contact irritation

**PYODERMA - topical therapy**

- Shampoo-therapy
- BENZOYL PEROXIDE - max 2,5-3%

  properties
  - anti-bacterial activity
  - keratolytic properties
  - degreasing, comedonolytic, follicular flushing (demodicosis)

  disadvantages
  - could excessively dry the skin
  - could cause dermatitis and contact irritation
  - temporary staining of the hair coat
PYODERMA - topical therapy

- Shampoo-therapy
- CHLORHEXIDINE DIGLUCONATE 0.5 - 4%
  properties
  . well tolerated antibacterial agent
  . anti-bacterial and anti-fungal broad spectrum activity
  . it is non-irritating and rarely sensitizing
  . not inactivated by organic substances (e.g. pus)
  . good residual activity
  disadvantages
  . it has not the follicular flushing action (benzoyl peroxide)
  . High concentrations could stain the coat of light-coated dogs

PYODERMA - topical therapy

- Shampoo-therapy
- SULFUR 2% and SALICYLIC ACID 2%
  properties
  . antibacterial, antipruritic and keratoplastic action
  . keratolytic action (sulfur with salicylic acid)
  disadvantages
  . in case of known hypersensitivity
to acetylsalicylic acid or to sulfamidics

PYODERMA - topical therapy

- Shampoo-therapy
- DICHLOROFEN
- properties
  . antibacterial and keratoplastic action
  . it is non-irritating

PYODERMA - topical therapy

- Shampoo-therapy
- OCTOPIROX - piroctolamine
- properties
  . antibacterial action
  . keratin high affinity

PYODERMA - topical therapy

Correct shampoo application
- 2-3 v./week → decrease with amelioration...
  excessive use → cutaneous dryness
daily use CUTANEOUS MOISTURIZING
  . glycerine
  . propylene glycol
  . urea
  . lactic acid

- Shampoo-therapy (pyoderma – seborrhea)
- topical antibiotic ointments
  localized infections
  . pododermatitis
  . chin acne
ctrl 10-15 min. that dog doesn’t lick itself
PYODERMA - topical therapy

- topical antibiotic ointments
  - MUPIROCIN
    . bactericidal action – Gram positive
    . pH acid
    . no systemic absorption
    . good tissue penetration (granulomas)

PYODERMA - topical therapy

- topical antibiotic ointments
  - NEOMYCIN
    . bactericidal action
    . sensitizing effect
    - irritation action / allergy x protract using
    . inactivated by organic substances

PYODERMA - topical therapy

- topical antibiotic ointments
  - POLIMYXIN B e BACITRACIN
    . bactericidal action
    . poor tissue penetration
    . inactivated by organic substances

PYODERMA - topical therapy

- topical antibiotic ointments
  - FUSIDIC ACID
    . bactericidal action – Gram positive
    . good tissue penetration
    . not inactivated by organic substances
    . in combination with g/c + antibiotic
    . limited use in vet. derm.

PYODERMA

Relapses or not recovery

- Correct diagnosis?
- Identification of the underlying causes?
- Management mistakes:
  - Antibiotic-therapy too short
  - Antibiotic not able
  - Use of corticosteroids (topic or systemic)

PYODERMA

Relapses or not recovery

- Relapsing few days from the antibiotic suspension
- Antibiotic-therapy too short
- Repeat the antibiotic-therapy with an adequate period of time
PYODERMA

Relapses or not recovery

- Relapsing few weeks or months from the antibiotic suspension
- recurrent pyoderma
- identification and cure of underlying cause
- if done: idiopathic

PYODERMA - topical therapy

- MAINTENANCE ANTIBIOTIC-THERAPY
  - recurring pyoderma (months-years)
    - cefalexin
    - clavulanated amoxicillin
  - Pulse - therapy
    - full dosage in alternate weeks
    - full dosage in the first 3 days of the week
    - full dosage in the first week of the month
  - Daily treatment under-dosages
    - full dosage (very expensive) – ½ o ¼ dosage

PYODERMA - topical therapy

- MAINTENANCE ANTIBIOTIC-THERAPY
  - recurring pyoderma (> 7 days)
  - Pulse - therapy
  - recurring pyoderma (> 7 days)
  - Daily treatment under-dosages

PYODERMA - topical therapy

- MAINTENANCE ANTIBIOTIC-THERAPY
  - Daily treatment under-dosages
  - in vitro studies
    - bacterial structural alteration
    - better phagocytosis
    - better serum bactericidal action
    - reduction bacterial adhesion to the corneocytes
    - bacterial enzyme processes alteration

the end