



Australian Veterinary Prescribing Guidelines

Clinic Stewardship Champion:

For more information and further resources visit www.science.unimelb.edu.au/vetantibiotics

Equine

SURGERY

> **CLEAN SURGERY**
(e.g. field castration, elective arthroscopy)

No antimicrobial therapy indicated.

Unless:

- Surgical duration >90 mins
- Surgery involves an implant
- Surgical site infection would be a major threat (i.e. CNS)

Empirical choice: Penicillin and gentamicin.

DURATION OF THERAPY: Perioperative only (except implants [continue 7 days]).

> **CLEAN CONTAMINATED SURGERY**
(e.g. enterotomy, anastomosis, laryngotomy)

Empirical choice: Penicillin and gentamicin.

DURATION OF THERAPY: Stop within 24hrs

> **CONTAMINATED SURGERY**
(e.g. significant bowel leakage)

Empirical choice: Penicillin, gentamicin and metronidazole.

DURATION OF THERAPY: 24-48 hours

> **DIRTY SURGERY**
(e.g. pus present)

Use antimicrobial appropriate for infection (based on culture and susceptibility) and treat until cured.

ANTIMICROBIAL TIMING

IV: 30-60 mins prior to surgery, repeat benzyl penicillin every 80 minutes.

IM procaine penicillin: 3.5 hours prior to surgery.

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CELLULITIS

Primary cellulitis has no obvious underlying cause and is often more severe than secondary cases in which an underlying cause can be identified (surgery, joint injection, wound, blunt trauma).

DIAGNOSTICS

Fine-needle aspirate should be collected for culture and susceptibility testing. Care is needed for cellulitis occurring over synovial structures.

Empirical choice: Systemic antimicrobials:

Mild: Penicillin and gentamicin or trimethoprim/sulphonamide.

Severe: Penicillin and gentamicin ± IVRP with gentamicin (1/3 systemic dose, reduce systemic dose appropriately and give at same time).

DURATION OF THERAPY:

Mild: 3-5 days

Severe (pyrexia, marked lameness or non-weight bearing, diffuse progressive swelling): 10 days common, prognosis guarded.

Topical therapy: Cold water hosing and pressure bandage.

Analgesia especially if non-weight bearing as risk of laminitis in contralateral limb.

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* Notifiable disease in some Australian jurisdictions

WOUNDS

NO SYNOVIAL STRUCTURES INVOLVED:

No antimicrobials indicated, even if contamination of the wound is present.

Systemic antimicrobials only when:

- Systemically unwell
- Potential synovial involvement

SYNOVIAL STRUCTURE INVOLVED:

Lavage is almost always required for successful outcome. Systemic antimicrobials always indicated. Tetanus prophylaxis is critically important

Empirical choice: Penicillin and gentamicin should be initiated pending culture results.

DURATION OF THERAPY:

Case specific and requires clinical judgement based on C&S results.

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STRANGLES*

DIAGNOSTICS

Samples should be submitted for culture or PCR to confirm diagnosis and to differentiate *S. equi* from *S. zooepidemicus*.

TREATMENT

No antimicrobial therapy indicated in uncomplicated cases. Resolution depends on adequate drainage of abscesses.

A small percentage continue to shed (carriers).

Systemic antimicrobials are indicated in cases of:

- Respiratory compromise
- Metastatic disease (Bastard strangles) when drainage is not possible

Empirical choice: Penicillin.

DURATION OF THERAPY: 3-5 days, or until resolution of metastatic abscesses on ultrasound (May be weeks to months). Oral TMS may be considered an alternative although *in vivo* efficacy is variable.

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PNEUMONIA IN ADULTS

DIAGNOSTICS

Cytology, culture and susceptibility testing in all cases:

- Tracheal wash (ideally transtracheal)
- Pleural fluid (both thoracic spaces) if pleuro-pneumonia
- NOT APPROPRIATE to culture bronchoalveolar lavage specimens as samples are contaminated by the upper airway.

TREATMENT

Should be based on culture and susceptibility results.

Empirical choice:

Penicillin and gentamicin should be initiated pending results.

Add metronidazole if anaerobes are suspected (foul smell to tracheal fluid) or pleural effusion.

DURATION OF THERAPY: Guided by clinical response and downward trend in fibrinogen and SAA.

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SEPTIC ARTHRITIS

DIAGNOSTICS

Arthrocentesis should be performed to obtain fluid for cytological evaluation and for culture and susceptibility testing in all cases. Radiographs should be taken to investigate bone involvement.

TREATMENT

Based on culture and susceptibility results. Empiric therapy can be initiated while results pending.

Empirical choice: Systemic penicillin and gentamicin should be initiated pending culture results. Oxytetracycline is an alternative, especially if osteomyelitis is diagnosed.

Gentamicin should be used intraarticularly or via intravenous regional limb perfusion (1/3 systemic dose, reduce systemic dose appropriately and give at same time).

DURATION OF THERAPY: Based on resolution of clinical signs, longer if osteomyelitis is present.

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SINUSITIS

DIAGNOSTICS

Often secondary to underlying disease such as dental disease, paranasal cysts, trauma, fistulas or neoplasia. Thorough clinical and oral examination (± dental examination, sinus radiographs, endoscopy) essential to identify and treat underlying disease.

TREATMENT

First presentation: with no obvious dental or underlying disease. **No antimicrobial therapy indicated.** Treat with NSAIDs, mucolytics, promote drainage (feed on ground). Reassess after 7 days.

Persistent or recurrent cases: more comprehensive investigation. Address underlying cause and remove source of infection. Sinus lavage often required for successful outcome.

Systemic antimicrobials if no underlying cause identified after thorough investigation

Empirical choice: Trimethoprim / sulphonamide or doxycycline.

DURATION OF THERAPY: 5 days

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PERITONITIS

DIAGNOSTICS

Abdominocentesis must be performed for cytological evaluation and culture and susceptibility testing.

Differentiation between primary and secondary origins is critical as secondary peritonitis is typically due to leakage from the gastrointestinal or reproductive tracts and surgery should be considered.

TREATMENT

Start systemic antimicrobial therapy immediately following sample collection and de-escalate pending culture results.

Empirical choice: Penicillin and gentamicin and metronidazole.

DURATION OF THERAPY: Serial abdominocentesis should guide therapy and duration.

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SEPSIS IN FOALS

DIAGNOSTICS

Sepsis score can be used to assess risk (see website). Blood for culture and susceptibility should be collected and ideally repeated serially (12-24 hourly), but false negatives are common. Samples from suspected sites of infection (synovial samples, urine) should be considered.

TREATMENT

Based on culture and susceptibility results if possible. Start empiric therapy while results pending.

Empirical choice: Penicillin and gentamicin is recommended. Care with gentamicin if renal function is compromised. Intravenous trimethoprim / sulphonamide is an alternative.

DURATION OF THERAPY: 3-7 days is generally considered to be adequate, unless focal infection develops (i.e. septic arthritis).

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PATENT URACHUS

DIAGNOSTICS

Urine voided from umbilical stump as drops or a stream. Ultrasound evaluation to rule out omphalophlebitis. If no enlargement of the umbilical remnants identified, antimicrobial therapy is not indicated.

TREATMENT

No antimicrobial therapy indicated. Frequent topical antibacterial treatment with 0.5% chlorhexidine is recommended until patency resolves (generally around 7 days).

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OMPHALOPHLEBITIS (NAVEL ILL)

DIAGNOSTICS

Ultrasound evaluation should be performed to define the infected structure and to allow for monitoring with treatment.

TREATMENT

Empirical choice: Penicillin and gentamicin is most effective but often not tolerated well. Trimethoprim / sulphonamide or doxycycline are suitable alternatives that can be given orally.

DURATION OF THERAPY: Serial ultrasonographic examinations should be performed and therapy continued until disease resolves.

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FOOT ABSCESS

TREATMENT

No antimicrobial therapy indicated. Curette to establish drainage.

If recurrent consider underlying disease.

Systemic antimicrobials only when:

- Severe cellulitis is present
- Evidence of bony involvement (septic pedal osteitis) on radiographs

Ensure horses are vaccinated for tetanus.

DOSE RATES

ANTIMICROBIAL AGENT	RECOMMENDED DOSE	ROUTE	INTER-DOSING INTERVAL
Procaine penicillin*	22,000 IU/kg (22 mg/kg)	IM	12 hours
Benzyl penicillin	22,000 IU/kg (13 mg/kg)	IV	4-6 hours
Gentamicin*	Adults 6.6-7.7 mg/kg Foals 8.8-9.7 mg/kg	IV or IM	24 hours 36 hours
Trimethoprim / sulphonamide	30 mg/kg	PO or IV	12 hours
Doxycycline*	10 mg/kg	PO	12 hours
Oxytetracycline*	6.6 mg/kg	Slow IV	12 hours
Metronidazole*	20 mg/kg	PO	12 hours

*Many of the recommendations in this guide represent off-label use of antimicrobials. Compliance with the legal requirements of your jurisdiction is your responsibility.

RHODOCOCCAL PNEUMONIA

Rhodococcus equi is an intracellular pathogen, limiting effective antimicrobial options. Many subclinical foals spontaneously recover.

DIAGNOSTICS

Transtracheal wash: for cytology (intracellular coccobacilli) and culture

Thoracic ultrasonography: areas of consolidation with a diameter >1.0cm. Calculate **total abscess score** as the sum of the diameter (in cm) of all consolidations observed in both lungs

TREATMENT

Monitor and selectively treat foals with evidence of progressive lesions and clinical signs.

Empirical choice:

- No antimicrobials indicated if no fever or dyspnoea and abscess score <20cm
- Rifampin plus clarithromycin or azithromycin if abscess score >20cm, dyspnoea or febrile >2 days

Adverse effects: foals - hyperthermia, diarrhoea, mares of treated foals - severe enterocolitis, hyperthermia.

DURATION OF THERAPY: 2-4 weeks guided by clinical resolution.

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HIGH-RISK FOALS

Premature foals and those with neonatal encephalopathy ('Dummy Foal Syndrome') are at increased risk of sepsis. Failure of passive transfer should be addressed with plasma transfusion. There is no evidence for any benefit from prophylactic antimicrobials in place of plasma transfusion.

DIAGNOSTICS

Serial haematologic evaluation and sepsis score may guide necessity for antimicrobial therapy.

TREATMENT

Prophylactic therapy is warranted when leukopaenia is present or sepsis score is high.

Empirical choice: Penicillin and gentamicin.

Care should be taken in foals with impaired renal function. Trimethoprim / sulphonamide IV is an alternative.

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DIARRHOEA

> ACUTE DIARRHOEA DIAGNOSTICS

Faecal PCR available for *C. difficile*, *C. perfringens*, *Salmonella**, *Lawsonia*, rotavirus and coronavirus. Diagnosis of clostridial disease requires toxin test. Culture should be performed for *Salmonella*.

TREATMENT

Correction of dehydration and electrolyte/acid-base disturbances is the mainstay of treatment.

Antimicrobial therapy may exacerbate dysbiosis, and is only indicated for:

- Confirmed clostridial disease
- Foals <30 days with non-self-limiting diarrhoea, and older foals/adults at high risk of sepsis

Empirical choice: If clostridial disease: Metronidazole.

High risk sepsis: Penicillin & gentamicin, or trimethoprim / sulphonamide.

DURATION OF THERAPY

Clostridial: 2-5 days. High risk sepsis: 5-7 days, guided by clinical and haematological improvement.

> CHRONIC DIARRHOEA

Antimicrobial therapy rarely indicated.

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LAWSONIA (PROLIFERATIVE ENTEROPATHY)

DIAGNOSTICS

Diagnosis can be made via serology (ELISA) or by faecal PCR.

TREATMENT

Mild to moderate disease: Doxycycline PO. Severe disease: Oxytetracycline IV (in case GI absorption is reduced).

DURATION OF THERAPY:

Mild to moderate disease: 7-10 days doxycycline

Severe or late disease: 7 days oxytetracycline IV followed by 7 days doxycycline. Severe cases may require longer duration.

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ASIA-PACIFIC CENTRE FOR ANIMAL HEALTH



National Centre for Antimicrobial Stewardship



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