Doses

■ **HORSES:**

a) For treatment of equine protozoal myeloencephalitis (*S. neurona*): Using the oral pellets and the provided cup: Top dress at the rate of 1 mg/kg bodyweight for 28 days. If horse's bodyweight is in between two graduations on the dosing cup, fill the cup to the higher of the two marks. (Label information; *Protazil*®—Schering-Plough)

■ **DOGS/CATS:**

a) For coccidiosis: 25 mg/kg PO once. (Greene, Hartmannn et al. 2006)

Monitoring

■ Clinical efficacy (neuro exams)

Client Information

■ Must be dosed daily as prescribed to be effective

■ Will not necessarily return a horse to "normal"

Chemistry/Synonyms

Diclazuril occurs as a white to light yellow powder. It is practically insoluble in water and alcohol.

Diclazuril may also be known as diclazurilo, diclazurilum, R 64433 and by the trade names, *Clinicox*®, *Protazil*®, and *Vecoxan*®.

Storage/Stability/Compatibility

Diclazuril pellets should be stored at room temperature (15–30°C).

Dosage Forms/Regulatory Status

VETERINARY-LABELED PRODUCTS:

Diclazuril Oral Pellets 1.56% in 2 lb. and 10 lb. containers: *Protazil*® (Schering-Plough); (Rx) Approved for use in horses not intended for food. One 2 lb. bucket will treat an 1100 lb. horse for 28 days. **Note:** At the time this monograph was written (Summer 2007), this product was approved, but not yet marketed.

Diclazuril 0.2% Type A Medicated Feed Article in 50 lb. containers; *Clinicox*® (Schering-Plough). Approved for use in broiler chickens.

HUMAN-LABELED PRODUCTS: None

DICLOFENAC SODIUM

(dye-***kloe***-fen-ak) **Surpass®**

NON-STEROIDAL ANTIINFLAMMATORY (NSAID)

Prescriber Highlights

- NSAID approved for topical use in horses for local control of joint pain & inflammation
- Appears well-tolerated at recommended dosage

Uses/Indications

The equine topical cream (*Surpass*®) is labeled for the control of pain and inflammation associated with osteoarthritis in tarsal, carpal, metacarpophalangeal, metarsophalangeal, and proximal interphalangeal (hock, knee, fetlock, pastern) joints for use up to 10 days duration. While, theoretically, diclofenac could be used systemically (orally) in other veterinary species, there are approved and safer alternatives.

Pharmacology/Actions

Diclofenac is a non-specific inhibitor of cyclooxygenase (both COX-1 and COX-2). It may also have some inhibitory effects on lipooxygenase. By inhibiting COX-2 enzymes, diclofenac reduces the production of prostaglandins associated with pain, hyperpyrexia, and inflammation.

Pharmacokinetics

When diclofenac is administered topically to horses via the 1% liposomal cream, it is absorbed locally, but specific bioavailability data was not located. Peak levels in transudate obtained from tissue cages were about 80 ng/mL; levels stay increased from 6 hours to at least 18 hours after administration. At the dosages recommended for the topical cream, most of the drug remains in the tissues local to the administration point, but detectable levels in the systemic circulation may occur. In humans, diclofenac is more than 99% bound to plasma proteins. It is metabolized in the liver and the metabolites are excreted primarily into the urine.

Contraindications/Precautions/Warnings

Topical diclofenac should not be used in horses hypersensitive to it or any component of the cream. It has not been evaluated in horses less than one year old.

Exceeding the recommended dosage or treating multiple joints may cause adverse effects.

Adverse Effects

The topical cream in horses appears to be well tolerated. One case of a horse developing colic during therapy has been reported. Other adverse effects that may be seen include weight loss, gastric ulcers, diarrhea, or uterine discharge. In the FDA's adverse reaction database local reactions (inflammation, swelling, alopecia) have been reported.

Reproductive/Nursing Safety

Reproductive safety for topical diclofenac has not been investigated in breeding, pregnant or lactating horses.

Overdosage/Acute Toxicity

When overdoses are administered topically to horses, adverse effects may occur including weight loss, gastric ulcers, colic, diarrhea, and uterine discharge. Treatment is supportive.

For small animals, there were 255 exposures to diclofenac sodium reported to the ASPCA Animal Poison Control Center (APCC; www.apcc.aspca.org) during 2000–2006. In these cases 241 were dogs with 24 showing clinical signs, 12 reported cat exposures with no reported clinical signs, and the remaining 2 cases were birds with no reported clinical signs. Common findings in dogs recorded in decreasing frequency included vomiting, diarrhea, bloody diarrhea, melena and polydipsia.

This medication is a NSAID. As with any NSAID, overdosage can lead to gastrointestinal and renal effects. Decontamination with emetics and/or activated charcoal is appropriate. For doses where GI effects are expected, the use of gastrointestinal protectants is warranted. If renal effects are also expected, fluid diuresis is warranted.

Drug Interactions

When used topically at recommended dosages, there are no reported drug interactions in horses.

Laboratory Considerations

No specific laboratory interactions or considerations were noted.

Doses

■ **HORSES:**

a) For the control of pain and inflammation associated with osteoarthritis in tarsal, carpal, metacarpophalangeal, metatarsophalangeal, and proximal interphalangeal (hock, knee, fetlock, pastern) joints using *Surpass*® topical cream: Apply a five inch ribbon twice daily over the affected joint for up to 10 days. Wear rubber gloves and rub cream thoroughly into the hair covering the joint until cream disappears. (Label information; *Surpass*®—Idexx)

Monitoring

■ Efficacy

■ Adverse effects

Client Information

■ Clients should be instructed to use as directed, not to increase the dose (area applied) or duration (not too exceed 10 days), or adverse effects may occur.

■ Clients should wear protective gloves (non-permeable) when applying the cream.

■ A client information sheet is supplied with the medication and should be given to the client.

Chemistry/Synonyms

A phenyl-acetic acid derivative non-steroidal antiinflammatory agent, diclofenac sodium occurs as a white to off-white, hygroscopic, crystalline powder. It is sparingly soluble in water, soluble in alcohol and practically insoluble in chloroform and ether.

Diclofenac may also be known as: GP-45840, diclofenacum or diclophenac; many trade names are available for diclofenac products outside of the USA.

Storage/Stability/Compatibility

Unless otherwise labeled, diclofenac sodium products should be stored in airtight containers and protected from light. The commercially available 1% cream (*Surpass*®) should be stored at temperatures up to 25°C (77°F); protect from freezing.

Dosage Forms/Regulatory Status

VETERINARY-LABELED PRODUCTS:

Diclofenac sodium (liposomal) 1% topical cream in 124 gram tubes, *Surpass*® (Idexx); (Rx). Approved for use in horses.

HUMAN-LABELED PRODUCTS:

Diclofenac Tablets: 50 mg (as potassium); *Cataflam*® (Novartis); generic; (Rx)

Diclofenac Delayed-release Tablets: 25 mg, 50 mg, 75 mg & 100 mg (as sodium); *Voltaren-XR*® (Novartis); generic; (Rx)

Diclofenac Sodium Gel: 3% (1 g contains 30 mg diclofenac sodium) with benzyl alcohol in 25 g & 50 g; *Solaraze*® (SkyePharma); (Rx)

Diclofenac Sodium/Misoprostol Tablets: (each tablet consists of an enteric-coated core containing diclofenac sodium surrounded by an outer mantle containing misoprostol) 50 mg/misoprostol 200 mcg & 75 mg/misoprostol 200 mcg; *Arthrotec*® (Searle) (Rx)

Diclofenac sodium is also approved as a topical ophthalmic agent (see the ophthalmology drug appendix).

DICLOXACILLIN SODIUM

(di-klox-a-***sill***-in) Dynapen®

ANTI-STAPHYLOCOCCAL PENICILLIN

Prescriber Highlights

- Oral isoxazolyl (anti-staphylococcal) penicillin
- Contraindications: hypersensitivity to penicillins; do not use oral medications in critically ill patients
- Most predominant adverse effects are GI in nature
- Must dose orally quite often (q6–8h); expense, efficacy & owner compliance may be issues

Uses/Indications

The veterinary use of dicloxacillin has been primarily in the PO treatment of bone, skin, and other soft tissue infections in small animals when penicillinase-producing Staphylococcus species have been isolated. Because of its low oral bioavailability and short half-life, other drugs with good staph coverage are usually employed.

Pharmacology/Actions

Cloxacillin, dicloxacillin and oxacillin have nearly identical spectrums of activity and can be considered therapeutically equivalent when comparing *in vitro* activity. These penicillinase-resistant penicillins have a narrower spectrum of activity than the natural penicillins. Their antimicrobial efficacy is aimed directly against penicillinase-producing strains of gram-positive cocci, particularly Staphylococcal species. They are sometimes called anti-staphylococcal penicillins. There are documented strains of Staphylococcus that are resistant to these drugs (so-called methicillin-resistant Staph, MRSA), but these strains have not yet been a major problem in veterinary species. While this class of penicillins does have activity against some other gram-positive and gram-negative aerobes and anaerobes, other antibiotics (penicillins and others) are usually better choices. The penicillinase-resistant penicillins are inactive against Rickettsia, mycobacteria, fungi, Mycoplasma and viruses.

Pharmacokinetics

Dicloxacillin is only available in oral dosage forms. Dicloxacillin sodium is resistant to acid inactivation in the gut but is only partially absorbed. The bioavailability after oral administration in dogs is only about 23% and in humans has been reported to range from 35–76%. If given with food, both the rate and extent of absorption is decreased.

The drug is distributed to the liver, kidneys, bone, bile, pleural, synovial and ascitic fluids. However, one manufacturer states that levels of the drug that are achieved in ascitic fluid are not clinically therapeutic. As with the other penicillins, only minimal amounts are distributed into the CSF. In humans, approximately 95–99% of the drug is bound to plasma proteins.

Dicloxacillin is partially metabolized to both active and inactive metabolites. These metabolites and the parent compound are rapidly excreted in the urine via both glomerular filtration and tubular secretion mechanisms. A small amount of the drug is also excreted in the feces via biliary elimination. The serum half-life in humans with normal renal function ranges from about 24–48 minutes. In dogs, 20–40 minutes to 2.6 hours have been reported as the elimination half-life.