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Treating Pneumonia in Beef Cattle

Pneumonia in cattle is a common and sometimes frustrating problem. Use of antibiotics to treat these cattle is just as common and sometimes can be just as frustrating. Most of us think of pneumonia as a single condition, because that is the way we perceive it. Calves and older cattle exhibit an increased respiratory rate (rapid breathing rate or panting), fever (rectal temperature > 102.5ºF, often > 104ºF), coughing, loss of appetite, and nasal discharge (mucous). Pneumonia has several different causes and varies in severity from mild to rapidly fatal. We all know from experience the condition can be unpredictable.

Pneumonia is an inflammation of the tissues of the lungs that results from the response of the animal to an infectious agent, either a virus or bacteria, or in most cases both. Common viruses that can initiate pneumonia in cattle include: IBR (infectious bovine rhinotracheitis virus; a herpes virus), BRSV (bovine respiratory syncytial virus), PI_3 (parainfluenza 3 virus), BVD (bovine virus diarrhea virus), certain rhino viruses, and a host of uncommon viruses that can affect cattle. Often the virus infection will cause damage to the lung tissue and then bacteria will invade the compromised tissues. The bacteria most often involved include *Mannheimia hemolytica* (formerly *Pasteurella hemolyticum*), *Pasteurella multocida*, and *Histophilus somni* (formerly *Hemophilus somnus*). These bacteria are never far from cattle and are particularly adept at invading lung tissue damaged by viruses. Other bacteria commonly involved in pneumonia include *Mycoplasma bovis* and *Arcanobacterium pyogenes* (formerly *Actinomyces pyogenes*). These are more Latin names than anyone really wants to consider; however, the principal organism involved can influence treatment options.

As you recall, antibiotics have no effect on viruses (IBR, BRSV, etc) and will kill bacteria only if that particular strain of bacteria is susceptible to the antibiotic drug being used. Also, the dose of the antibiotic must be high enough and must be given long enough to kill the bacteria involved in the pneumonia. Bacteria can develop resistance to certain antibiotics and this resistance can be transferred from one generation of bacteria to the next. Therefore, strains of antibiotic-resistant bacteria can develop.

What are some of the criteria used to decide which antibiotic to use for pneumonia cases? The first consideration has to do with the likely organism(s) involved with the pneumonia process. This is usually based on based on past experience, your veterinarian's recommendations and specific signs of the disease. The cost of the antibiotic; if a cheaper drug will work, we usually select that drug. The route of administration (subcutaneous [sub-Q], intramuscular [IM], intravenously [IV], or orally), can be an important consideration. Additionally, the number of times that treatment is required is an important consideration. Whether or not

the drug is given in an extra-label manner and thus would require a veterinarian's prescription can be important. Any potential adverse side effects must be considered. All antibiotics have both advantages and disadvantages to carefully consider.

The chart below lists many of the antibiotics labeled for use in treating pneumonia or BRD (bovine respiratory disease). The brand name, generic drug name and the company that markets the drug is listed in the first column. The second column notes the general class of antibiotic. This is important information for producers and veterinarians when selecting a product to use in sick animals that are not responding to initial therapy. If an animal (or group) is not responding it is prudent to select the second drug from a different class. For example, if a group of calves with pneumonia are not responding to a tetracycline it would be advisable to use a cephalosporin or fluoroquinolone instead of another tetracycline. The third column lists the diseases, pathogens (bacteria names), and/or conditions that the drug is licensed for use as a therapeutic agent. In other words, the company has submitted data to the FDA that proves this drug is effective in the therapy of the disease, pathogen(s), or conditions listed. These are the diseases that this drug can legally be used to treat without a veterinarian's prescription. Most antibiotics are licensed for use in the treatment of Bovine Respiratory Disease (BRD) complex. Microbiologists commonly re-name organisms during "slow times"—the bugs are the same, just the names have changed. I have abbreviated some of these terms in the chart for brevity—*M. hemolytica*, *P. multocida*, and *H. somni* for example. Some antibiotics are labeled for treatment of other diseases—anaplasmosis, Footrot, woody tongue, and pinkeye are examples. If the condition you are treating is not on the label, you are using the drug in an extra label manner and must have a veterinarian's prescription for this use.

The fourth column is the approved route(s) of administration for the drugs. Again, if you use another route of administration this constitutes extra label use of the antibiotic. The fifth column is the duration of therapy or the time the drug is actively fighting the infection. The numbers in this column are on the label or I extrapolated them from data on the label and/or in the literature. These are my estimates based on my understanding of the data if a length of therapy is not listed on the label. The sixth column contains some of the listed warnings or adverse effects. This information should always be noted before administering any drug to cattle. The seventh column contains the label withdrawal time for the product when used in the manner outlined on the label. If the product is used in any extra label manner the withdrawal time will be determined by the veterinarian writing the prescription for its extra label use. Remember, the withdrawal time is the minimum time from the last treatment until the animal can go to slaughter. The final column notes whether this drug can be used in an extra label manner at any time. Some of the drugs like the fluoroquinolones cannot be used in an extra label manner, period! Others like Excede® probably should not be used except as labeled.

It is important to consult with your veterinarian on the best and safest uses of antibiotics for your operation. We currently have a large number of very good antibiotics available to treat our cattle; however, if we misuse these products they may be pulled from the market. We must be responsible and accountable for the way we use these drugs in food producing animals.

Table 1. Antibiotic Comparison Chart

Trade Name (generic name) Company	Drug Class	Label Indications: Diseases or Problems	Route of Administration	Duration of Therapy	Warnings & Adverse Effects	Withdrawal Time	Extra Label Use
A 180® (danofloxacin) Pfizer	Floroquinolone	BRD M. hemolytica & P. multocida	SubQ	48 hours	Not for use in dairy cattle	4 days	No
Adspec® (spectinomycin) Pfizer	Aminoglycoside	BRD M. hemolytica, P. multocida, H. somni	SubQ	24 hours		11 days	Yes
Baytril® 100 (enrofloxacin) Bayer	Floroquinolone	BRD M. hemolytica, P. multocida, H. somni	SubQ 2 dose rates	3-5 days	Not for use in dairy cattle	28 days	No
Biomycin® 200 (oxytetracycline) Boehringer-Ingleheim	Tetracycline	BRD M. hemolytica , P. multocida	SubQ or IM	72 hours		28 days	Yes
Draxxin® (tulathromycin) Pfizer	Macrolide	BRD M. hemolytica, P. multocida, H. Somni	SubQ	7 days	Not for use in lactating dairy cows	18 days	Yes
Excede® (ceftiofur) Pfizer	Cephalosporin	BRD M. hemolytica, P. multocida, H. Somni	SubQ Ear	6-7 days	Injection in the artery in the ear can kill cattle. Not for use in dairy cows	Zero Withdrawal Time	Not Advised

Excenel®RTU (ceftiofur) Pfizer	**Cephalosporin**	**BRD M. hemolytica, P. multocida, H. somni Footrot Metritis**	**IM or SubQ**	**3-5 days or 48 hours based on dosage and route of administration used**		**48 hours**	**Not Advised**
Liquimycin® LA200 (oxytetracycline) Pfizer	**Tetracycline**	**BRD M. hemolytica, P. multocida, H. somni Pinkeye Footrot E. coli scours Woody tongue Lepto pomona Metritis**	**IM or SubQ**	**24-48 hours based on dosage and route of administration**		**28 days**	**Yes**
Micotil® 300 (tilmicosin) Elanco	**Macrolide**	**BRD M. hemolytica**	**SubQ**	**2 days**	**Accidental Injections in humans can be fatal**	**28 days**	**Not advised**
Naxcel® (ceftiofur) Pfizer	**Cephalosporin**	**BRD M. hemolytica, P. multocida, H. somni Footrot**	**IM or SubQ**	**24 hours**		**Zero withdrawal time**	**Not Advised**
Nuflor® (florfenicol) Schering-Plough	**Phenicol**	**BRD M. hemolytica, P. multocida, H. somni Footrot**	**IM or SubQ**	**24-48 hours depending on route of administration IM or SubQ**		**IM 28 days SubQ 38 days**	**Yes**

Tetradure® 300 (oxytetracycline) Merial	**Tetracycline**	**BRD M. hemolytica, P. multocida, H. somni Pinkeye Footrot E. coli scours Woody tongue Lepto pomona Metritis**	**IM or SubQ**	**7 days**		**28 days**	**Yes**

Another drug that is very helpful in treating cattle with pneumonia is Banamine® (flunixin meglumine). This drug is in the class we refer to as non-steroidal anti-inflammatory drugs (NSAIDS). This drug helps the animal recover by controlling the inflammatory process (including fever) that occurs with these infections. This is similar to the way aspirin or Tylenol works when you have a respiratory infection. This product is very well tolerated and a real adjunct for therapy. Banamine® is labeled for use in cattle with respiratory disease or mastitis. The drug is labeled for intravenous (IV) injection and must be given slowly to avoid adverse reactions. The withdrawal time for meat (slaughter) is 4 days after the last treatment. Because the drug is labeled for IV administration, if you plan on using the drug IM (intramuscular injection) you must get a prescription from your veterinarian with an appropriate withdrawal time. To use Banamine® IM without a prescription is a violation of extra-label drug use law.

We have some powerful and effective drugs to combat this condition in cattle and we all need to use them wisely. That includes discussing their prudent use with your veterinarian, obtaining any necessary prescriptions, and observing all withdrawal times and precautions.

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