Atypical Interstitial Pneumonia is becoming typical.

Atypical Interstitial Pneumonia, commonly known as AIP, continues to be a considerable problem in the beef industry. We don’t know a lot about AIP, but we do know the following:

1. The highest incidence rate is in July and August.
2. It occurs four times more in heifers than in steers.
3. Most cattle will have been on feed at least 90 days.
4. It is associated with a high rumen pH (> 6.0).
5. There is no treatment for AIP.

AIP and Bovine Respiratory Syncytial Virus (BRSV) have the same gross lesions. It was once thought that BRSV was the cause of AIP, but that has been ruled out. BRSV can cause respiratory death but it is a different mode of action that AIP. We then thought that AIP was caused by an allergic reaction to dust. This also turned out to be false.

We have two types of pneumonia in cattle: bronchopneumonia and interstitial pneumonia. Bacteria and contamination cause bronchopneumonia. It is confined to the ventral (bottom) and cranial (front) areas of the lung. The infected areas will be hard and dark. These areas could have areas of pus if the animal is chronic.

Bronchopneumonia usually comes from something being brought down the trachea into the lungs. The animal succumbs to the disease due to a large dose of pathogen (bacteria or virus) or a suppressed immune system. Viruses, such as IBR, cause a secondary bacteria infection by knocking out the cilia (small hairs) in the trachea. The cilia bring up the mucus from the lungs and that is how the animal gets rid of the bacteria. If this does not occur the bacteria and contamination will stay in the lungs and cause pneumonia. Bacteria, such as Pasteurella, are normally found in the sinuses of cattle. After the cattle are stressed, the bacteria are inhaled into the lung and causes pneumonia.

Interstitial means within the spaces or areas of tissues or organs. Interstitial pneumonia generally occurs from something in the bloodstream being carried to the lungs. As I will explain, toxicants, viruses and sometimes bacteria can be transported in the blood to the lungs. Since interstitial pneumonias come from the blood, they affect the entire lung not just the cranial and ventral portions like bronchopneumonia. A virus lives 90% of its life in the cells of animals or humans. The viruses sometimes can’t replicate by themselves, so they steal the DNA or RNA factory from the animal’s cells to replicate. Sometimes the viruses will kill the cell and render it useless. Toxicants will generally cause inflammation (swelling) or kill the target cells.

AIP is a non-infectious form of interstitial pneumonia. It is caused by a toxicant named 3-MEIN. Animals consume lots of protein from our rations. These proteins are made up of long chains of amino acid. Tryptophan (an essential amino acid) is converted to 3-methylindole (3-MI) in the rumen by bacteria. The 3-MI is transported in the blood to the lungs. In the lungs there are enzymes that convert 3-MI to 3-MEIN. 3-MEIN then
is toxic to the pneumocytes (cells in the lungs). This toxic insult causes the pneumocytes to swell.

The swollen lungs are quite large and heavy when presented at necropsy. It is no wonder that the cattle have difficulty breathing. The increased cellular mass in the lungs decreases the areas for air. Also, the animal has trouble exhaling due to the fact that the lungs are too big for the chest cavity and don’t want to decompress.

Clinical signs of AIP come on very quickly. We will generally see AIP in larger cattle. The cattle will present themselves in grave respiratory failure. Their backs will be swayed and they will be breathing out of their mouths. Most of these animals will stand around a water tank. They are thirsty but can’t stop panting long enough to get a drink.

Effective treatment for AIP is non-existent. The use of anti-inflammatory agents such as dexamethasone and Banamine has not been rewarding. In heavy animals, it is hard to sometimes tell an AIP case from bronchopneumonia. Therefore, it is recommended that the animals be treated as a pneumonia case. Good animal husbandry and low stress movement are imperative. A lot of the animals will not make it to the hospital due to the stress and decreased lung capacity. Using a trailer to move these animals may save their life. Another way to relieve the animal’s stress is to have a shaded area in the hospital. These types of practices should be limited AIP pulls.

Prevention has been lacking in the area of AIP. We have tried feeding Vitamin E and aspirin on arrival to prevent AIP but neither had an effect. The jury is still out on the effects of shade and water sprinkling on AIP. Basically, what I am trying to say is that we know what causes AIP in the feedyard, but we don’t know how to prevent it before it happens and we don’t know how to treat it after it occurs.