

Poult Enteritis Mortality Syndrome: How Much Do We Know After Ten Years?

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The emergence of Poult Enteritis Mortality Syndrome (PEMS) in the Southeastern United States ~10 years ago proved devastating to the turkey industry. A great deal of time and money has been applied to understanding the etiologic agent(s) of PEMS. The questions remain: what do we know about PEMS and what progress has been made in understanding enteric diseases of turkeys in general? One of the greatest achievements of the research is the development of diagnostic tests that are specific to different enteric viruses.

Etiologic Agents

Efforts to isolate the causative agent resulted in the identification of several potential infectious agents including: viruses (adenovirus, turkey enteric coronavirus [TCV], coronavirus-like particles, enterovirus, astrovirus, reovirus, and others); bacteria (*Salmonella*, *Escherichia coli*, *Campylobacter*, and *Clostridia*); and protozoa (*Cryptosporidia*, *Cochlosoma*, and *Spironuclea [Hexamita]*). Attempts to reproduce PEMS with a single agent have been unsuccessful, suggesting that PEMS may be a multifactorial disease or a single agent that has not yet been isolated and identified. The ability of different viruses and bacteria to reproduce certain clinical signs of PEMS makes identifying a specific PEMS agent difficult.

In the summer of 2001, researchers at several Universities, the USDA, and diagnostic laboratories joined with turkey companies in North Carolina, Virginia, and Pennsylvania to perform a “blind study” monitoring turkey flocks from one to five weeks of age for disease. The studies were led by researchers at North Carolina State University. These studies were important for several reasons: 1. obtain information about what are circulating in clinically healthy versus enteric flocks; 2. determine at what age turkey poults are shedding different agents; 3. determine if any agent is most likely involved in PEMS; and finally 4. compare the different diagnostic tests available.

The preliminary results of the study suggest that only the astrovirus is statistically-related to PEMS. Independent of PEMS, these studies show that we need to begin diagnosing flocks for individual disease agents, similar to how we expect to be diagnosed if we go to the doctor with a complaint, rather than based on clinical signs. How would one begin to do this?

Case Study:

You visit one of your growers and you notice the house has increased mortality and flushing. The flock is two weeks of age. What should you do?

1. Immediately increase the security of the house. You don't want this to spread to surrounding houses.
2. Collect fecal samples, serum, or intestines for diagnostic testing.

Who can you contact about testing?

Contact the team at North Carolina State University. They know which laboratories are testing for the different agents and can test for many infectious agents. Currently the laboratories with different diagnostic tests include:

1. **North Carolina State University** – Salmonella, Campylobacter, Cryptosporidia, and TCV. **Need to collect serum for the TCV test.**
2. **Purdue Diagnostic Laboratory (Tom Hooper)** – Indirect immunofluorescence assay for TCV, rotavirus D and A strains, bovine coronavirus, infectious bronchitis virus-like TCV, enterovirus. The enterovirus test is questionable. **Need to collect intestines for these tests.**
3. **Ohio State University (Mo Saif)** – Electron Microscopy for astrovirus, TCV, bovine coronavirus, and torovirus. Also, molecular tests for astrovirus. **Need to collect intestines and feces for these tests.**
4. **Iowa State University (Don Reynolds)** – ELISA for torovirus. **Need to collect serum for the test.**
5. **Poultry Diagnostic Research Center, University of Georgia (Holly Sellers)** – Molecular tests for astrovirus, coronaviruses (all strains), and reovirus. **Need to collect feces for these tests.**
6. **IN THE NEAR FUTURE!! – North Carolina State University (Andrea Miles and Jim Guy)** - Molecular tests for astrovirus, coronaviruses (all strains), and reovirus. Specific enterovirus tests and a serologic-based test for astrovirus available soon. **Need to collect feces for these tests.**

We now have the technology to test for specific enteric agents of turkeys. This will be very useful in helping the industry determine which infectious agents are circulating in diseased flocks, at what ages turkeys are most susceptible to different agents, rapidly detect if a newly emerging agent is circulating, and finally aid in the development of intervention strategies.

Future research needs to continue to develop diagnostic tests that are useful for all laboratories and will detect either the presence of the agent or the specific antibody response. Rather than diagnose a flock that has diarrhea as an “enteric flock” why not determine exactly what the flock has and call it “astrovirus-enteritis” or “torovirus-enteritis.”

Is this really important? Absolutely. Each of these agents has distinct properties and infected flocks may need to be handled differently. Obviously, if a flock has a bacterial infection, one can treat with antibiotics. However, if the problem is a virus, treatment is more limited. If you have a virus like astrovirus that can thrive in the house and water long after the diarrhea is gone, clean-up will have to be thorough to avoid infecting the next flock. By identifying what is in the house, we can better develop methods to stop the transmission of future birds.

The service people are invaluable in the success of both the research and intervention strategies. You are the eyes and ears of the industry. Your input and knowledge of the flock history is important. By working with you, the researchers can develop diagnostic tests that use samples that are easily collected, from the appropriate age birds, and determine the best way to manage the different diseases. This is increasingly important in a world where there is heightened security and any new “emerging” disease will be under close scrutiny. Especially in food animals.