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Early Mortality (Omphalitis)

Early mortality in a flock can have several causes or contributing factors but one of the most common causes is bacterial infection of the navel (omphalitis) and/or yolk sac. In this article we hope to discuss omphalitis and other factors which can impact early mortality rates.

What is normal mortality?

Typical total mortality in a broiler flock will account for 4-5% of the population over the course of 6-7 weeks. This number will vary slightly from one farm to the next dependent upon a number of factors. Some producers will be able to achieve <4%. The majority of these losses often occur in the first week and ideally total mortality at 7 days of age is 1% or less. The most common cause for first week losses, as mentioned above, is bacterial infection of the navel (omphalitis) and/or yolk sac. It is important to consider that mortality can also be due to starveouts, dehydration, contamination of hatchery administered vaccinations, improper incubation conditions, fungal infection, viral infection, nutritional deficiencies and/or toxicity. Environmental conditions may also play a role in the mortality rate regardless of what the initial cause is.

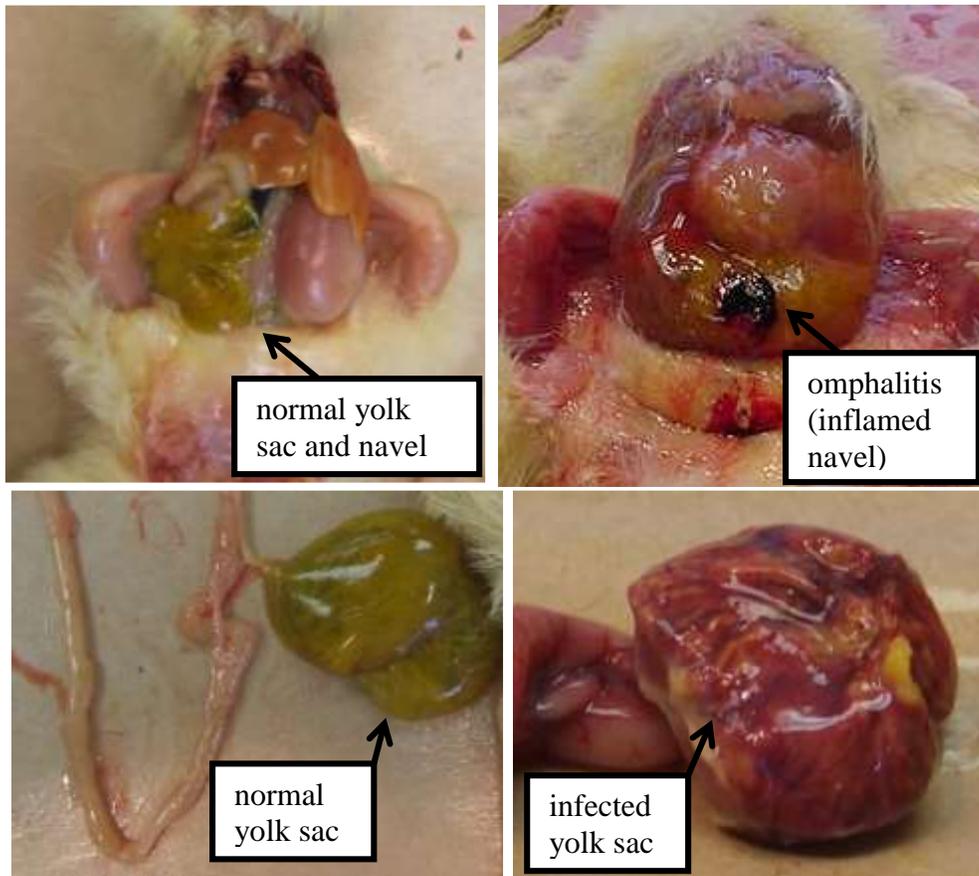
What is omphalitis and/or infected yolk sac and how does it happen?

The term omphalitis is a reference to inflammation of the navel (belly button). Bacterial infection of the navel will cause omphalitis. Since the navel is very closely associated with the yolk sac infection of this organ often occurs simultaneously with infection of the navel (figure 1).

Despite appearances the surface of an egg is not clean and there are numerous bacteria present. This is one of the reasons that hatching eggs are carefully graded upon arrival at the hatchery. Obviously, dirty eggs are removed as are any eggs with evidence of shell defects or cracks. The reason for all of this work is to try and minimize the risk of bacterial infection and omphalitis 21 days down the road when the eggs hatch. Until approximately 20 days of incubation the yolk sac is outside of the chick's body but at 20 days of incubation the yolk sac should be mostly internalized and the navel should be in the process of closing. This is one of the reasons why the progress of chicks as they hatch is closely monitored. It is important that a hatch is not pulled too early as too many birds will have open and unhealed navels as this point. Significant efforts are made to maintain a high level of sanitation within a hatchery environment as any open/unhealed navels are an invitation for omphalitis and infected yolk sac to occur. Therefore, it is important for the hatching egg producer and the hatchery to work closely together to ensure the best quality hatching egg possible and to minimize the chances of omphalitis once the eggs hatch.

Unfortunately, there are cases where hatching egg contamination occurs or there may be a breakdown in sanitation and the level of bacterial contamination overwhelms the control measures in place. In these instances a percentage of chicks are exposed to bacterial challenge and omphalitis can occur.

Figure 1:



Picture courtesy of PHS

Bacterial species that commonly cause omphalitis/infected yolk sac

There are a number of different bacterial species capable of causing omphalitis/infected yolk sac.

The most commonly isolated bacterial species is *E. coli*.

- Normally present in poultry environments and a normal part of the intestinal microflora in poultry. Infection with *E. coli*, and most other bacterial species associated with omphalitis, can occur when an opportunity arises such as excess contamination of egg shells, cracked hatching eggs, open/unhealed navels at hatch and/or poor sanitation.

Other commonly isolated species include:

- Enterococcus species (usually *E. faecium*, *E. faecalis* or *E. durans*) - much like *E. coli*, are a normal part of the intestinal microflora in poultry.
- *Pseudomonas aeruginosa* - a water loving bacteria and can contaminate lines that supply drinking water to birds (both at broiler breeder and broiler barns), water to machines used for washing eggs, and water to incubators and hatchers for maintaining humidity.
- *Staphylococcus* species - also normally present in poultry environments, as part of the normal microflora on the skin of both animals and humans.

As one can see based on this information a number of bacterial challenges are normally present. The prevention of omphalitis and infected yolk sac, therefore, relies heavily on the measures taken by the hatching egg producer and the hatchery to prevent overwhelming challenge and infection. When

increased bacterial challenge does occur minimizing the outcome relies heavily on the conditions in the hatchery at hatch, preventative measures that can be taken around this time point, and on the conditions the birds are placed in at the farm. Excellent brooding conditions at placement can mean the difference between 1.5% and >2% mortality during the first week. Any added stress that occurs during the first week (improper temperature, poor water quality or temperature, poor ventilation, poor access to feed, etc.) can further set the chick back, making the fight against infection and disease that much more of a challenge.

Treatment of early mortality

The first step taken in the treatment of early mortality should be an investigation into the underlying cause. While bacterial infection is generally the most common cause it should not be assumed that is the problem. In some cases, if flocks are affected with another condition, such as dehydration, some of the treatments used for bacterial infection can actually be toxic to a dehydrated bird.

Another factor to consider when determining treatment of early mortality is when to treat. Many cases of omphalitis/infected yolk sac are due to *E. coli* and mortality generally decreases by the time the flock is 6-7 days of age. In general, treatment for omphalitis/yolk sac infection is not recommended unless mortality persists beyond this period of time. This allows severely affected sick and/or lame birds, which will not respond to treatment, to be identified and culled from the flock. A concern regarding early treatment is that the result may be that birds which should be culled are missed as the medication makes them 'feel better'. However, these birds are unable to clear infection due to the nature of the initial challenge. In these cases, birds will temporarily improve only to relapse later in the cycle. There are, of course, cases where early omphalitis challenge is so severe that early treatment is warranted so it is important to consider each case individually when discussing the decision to treat a flock.



This article was written by the veterinarians of Poultry Health Services Ltd. Poultry Health Services is a private veterinary practice providing diagnostics for Alberta poultry producers as members of the Poultry Health Centre of Excellence (PHCE). Bird submissions can be submitted to the PHCE via Government offices in Edmonton, Airdrie and Lethbridge. Please call 403-948-8577 if you have a mortality problem or want help making a submission.

References/Further reading

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