CHLAMYDIA IN CATTLE, A CAUSE FOR CONCERN?

During the year 1996 farmers and vets alike were puzzled by a change in disease pattern in cattle that couldn’t be readily explained. Although, at this time, it looked as only single animals in a herd were affected, with hindsight it turned out to be far more widespread than previously diagnosed. The symptoms of the condition I refer to as Chlamydiosis are varying, Chlamydia infection may lead to different diseases in a given host species which are difficult to distinguish from diseases with similar symptoms but caused by other infectious agents. The genus Chlamydia comprises a unique class of bacteria that cause infection in men and animals. This intracellular pathogen develops within a vacuole inside the host cell, termed an inclusion. Like a virus, the organism replicates only within the host cell, hence Chlamydia are described as obligate intracellular parasites.

Lifecycle of Chlamydia

Chlamydia are members of the order Chlamydiales, family Chlamydiaceae, but the current taxonomic classification is, again, under review. The cause of concern for cattle are, at the moment, Chlamyophila psittaci and Chlamyophila pecorum. In literature Chlamydia in cattle (and sheep) have been described as belonging to two immunotypes. Type 1 (Chlamydia psittaci) was associated with abortions and genital and intestinal infections in cattle and sheep, Type 2 (Chlamydia pecorum) was isolated from animals with encephalomyelitis, polyarthritis and associated intestinal infections or conjunctivitis. Antibodies against one type don’t protect against the other and locally produced antibodies don’t protect against infection of other parts of the host’s body. Infection with Chlamydia causes long-time damage of the organ sites affected.

Chlamydia don’t seem to be very host or tissue specific, many strains produce generalized infections in several host species, others localize and cause pronounced inflammation in one or more tissue or organs of an infected host.

Most animals are latently infected, a well balanced host-parasite relationship represents the common nature of chlamydial infection. Under circumstances of stress the animal may shed organism in large numbers or may itself lapse into clinical disease.
Chlamydia are shed in nearly all excretions of the animal affected like faeces, birth fluids, saliva, milk etc. It has yet to be established at what point of live an animal becomes infected, this might well take place in utero at the earliest point as well as through milk or contact with body fluids of animals shedding the bacteria.

Back to the farm:
Symptoms in adult cattle are:

- Depression
- Lacrimation, Conjunctivitis
- Salivation
- Flu like symptoms with oculonasal discharge
- Pneumonia
- Milk drop
- Mastitis
- High cell counts
- Abortion
- “Downer” cattle
- Retained placenta
- Diarrhoea
- Polyarthritis
- Loss of condition
- Meningo- Encephalomyelitis

Calves and young stock are suffering from:
- Pneumoenteritis
- Joint ill/Polyarthritis
- Conjunctivitis
- Encephalomyelitis
Although from the beginning intensive Laboratory diagnosis was instigated to establish the cause of the disease, it took several months to rule out other infectious agents or mineral/trace element deficiencies or imbalances as cause for the condition.

The “culprit” was identified: Chlamydia, but what to do about is?
Treatment with Tetracycline proved useful but, in the long term for obvious reasons, there is no way in treating whole herds over a long period of time with antibiotics.
No commercial vaccine against Chlamydia was available except one against enzootic abortion in sheep. As this turned out to be a live vaccine the idea to use it as a last resort was abandoned after discussions with the manufacturers.
Meanwhile, the distribution of clinical signs within the herds was slowly progressing. More and more animals were found to suffer from one or more different symptoms of Chlamydiosis and it was obvious: There is a problem with the potential for disaster.
Meetings with farmers and vets were held and it was decided to contact the authorities and pharmaceutical companies for help.
This turned out to be the beginning of some kind of “never ending story”:
The local and regional animal health services in collaboration with the competent Ministry decided, after looking into publications that Chlamydia certainly was not responsible for the problem. As Chlamydia is a common organism in livestock and humans they couldn’t see any reason why, out of a sudden, the bacteria should cause the severe problems experienced. They took it the easy way: Blame the farmers. Farmers were urged to tighten their management systems, look into their feeding regimes, use more disinfectants and the problems would disappear! Vets should look for BVD/MD, IBR, BRSV and should refrain from upsetting their clients by the mentioning of the word Chlamydia.
But obviously, the problem refused to go away, in fact more farmers became aware of the changing pattern of common diseases in their cattle like milk fever, mastitis, lameness etc. that, only too often, proved fatal for the animals affected.
Eventually contacts were made with the pharmaceutical company Bayer Animal Health Germany and in 1998 the production of a vaccine for field trials commenced.
The agent was recovered from samples like nasal or vaginal swabs sent to the Bayer lab and after nearly one year the first batch of vaccine, containing both Chlamydia strains found in field infection, was ready to use.
Vaccination was frequently used on several farms during the last 4 years; the only flaw was in that the availability of vaccine was not always guaranteed. That led to intervals sometimes too long between administration of vaccine and resulted in times animals were not protected. During the course of the trial it has been experienced that best results were obtained when vaccination was carried out at least every 4 month.
The experience with vaccination from the farmers’ point of view can be summarized as follows:
- Losses of animals were reduced
- Milk yield increases
- Feed intake increases
- Somatic cell count decreased
- Fertility is improved
- Incidence of calf specific problems like scour, pneumonia etc. were reduced
- Use of antibiotics was cut by more than half
The overall impression is that the vaccine is very capable of reducing the problems on a herd basis but not in eliminating the agent or protecting new entrants into the herd from becoming infected.

There are still a lot of questions that need to be addressed:

- The zoonotic potential of Chlamydia is well known and there are findings suggesting different strains of Chlamydia might play a role in human diseases of the heart, the coronary system, Alzheimer’s disease and Multiple Sclerosis. Should there be any truth in this findings measures must be in place to protect humans to catch infection from animals and animal derived products. (MILK!)
- Research has to be done into the epidemiology of the disease with the target to develop a vaccine that is not only capable of reducing the effects of chlamydial infection but helps to prevent and eradicate disease.
- The viability of farming enterprises is severely compromised by the effects of chlamydial infection in animals used for food production. Milk has to be destroyed due to high cell counts, live weight gains in beef animals is far below average and the losses due to terminally ill animals might well exceed 10%. Another proportion has to leave premature due to poor performance or poor fertility. Financial losses are, in some cases, unbearable.
- The treatment with antibiotics of a large group of animals over a long period of time is not acceptable under the point of a raised awareness within the consumers on the use of antibiotics or microbiological substances in animals raised for food.
- Animal welfare is another issue that must be addressed in this context. Animals affected by Chlamydia suffer enormously and we are under the obligation to protect the animals in our care from pain and suffering.
- The distribution of Chlamydia infection in farmed animals throughout Europe should be determined and steps should be taken to set up a working group to deal with the problem and look for solutions accordingly.
- Only few scientists so far are aware that Chlamydia is not “only” a problem of abortion or pneumonia or mastitis but that the animal may suffer from more than one of the above mentioned symptoms. If a cow carries a calf this is not a proof to disregard Chlamydia from being the cause for polyarthritis in the same animal.

References:
1. http://www.chlamydiae.com
4. Blobel, Handbuch 5, Chlamydia, Page 447-531

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