Ovine Abortion – Investigation and management of outbreaks.

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Infectious agents

- *Bluetongue virus*
- Border disease (Ovine Pestivirus)
- *Brucella mellitensis/ovis*
- Campylobacter spp
- Chlamydophila abortus
- Listeria spp.
- Mycotic

- Salmonella spp.
- Toxoplasma gondii
- Q fever

Etc.......
## Ovine abortion diagnoses (ROI)

<table>
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<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Toxoplasma gondii</td>
<td>17%</td>
<td>21%</td>
<td>33.8%</td>
<td>18.4%</td>
</tr>
<tr>
<td>Chlamydophila abortus (EAE)</td>
<td>8</td>
<td>10%</td>
<td>5.8%</td>
<td>22.4%</td>
</tr>
<tr>
<td>Bacterial (abortifac.)</td>
<td>21%</td>
<td>19%</td>
<td>6.5%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Diagnosis not reached</td>
<td>56%</td>
<td>50%</td>
<td>43%</td>
<td>Not stated</td>
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</tbody>
</table>

**n**

175  
175  
240  
250  

Costs to Industry

UK cost estimates:

*Toxoplasma gondii*  Stg£11m/year

*Chlamydophila abortus*  Stg£23.8m/year

(Source Bennet & Ijpelaar, 2005)

Extrapolated to Irish Breeding ewe population
– Stg£4.5m/year (€5.2m)
Consequences of infection

- Abortion/Stillbirth
- Birth of growth retarded lambs
- Birth of weak lambs
- Increased peri/neonatal mortality
Dealing with an outbreak

- Isolate and mark/record ewes that have aborted from pregnant sheep (and breeding cattle)

- Submit products of abortion for laboratory investigation (FM***)

- Maternal serology

- Look at the flock – assess body condition/signs of clinical disease in ewes

- Treat?
- Vaccination/Culling
- Using lab results, advise on control measures.
RVL – Necropsy of ovine foeti

- Costs €6.35
- Gross examination of foetal membranes and foetus
- Culture of foetal stomach contents /foetal membranes
- Chlamydial LPS test (foetal membranes or coat swab)
- Histology (where suitable).
Maternal serology

- *Toxoplasma gondii*
- *C. abortus*
- *Salmonella spp. (O & H)*
- Border disease
- Q fever
- etc.......

- Toxo + C. abortus + 
  Salmonella = 12.65 /ewe
**Chlamydophila abortus**

- Formerly *Chlamydia psitacci var. ovis*
- Significant cause of abortion in the UK and Ireland.
- Possibly under diagnosed due to sampling issues.
- Principle pathology is in the placenta – suppurative placentitis with vasculitis.
- Inclusions (Histo H&E and IHC)
- Serological test available (maternal).
- Chlamydial LPS detection
**Chlamydophila abortus**

- Enzootic Abortion in Ewes (EAE)

- Significant cause of ovine abortion.

- **Clinical signs** – abortion, weak lambs or normal lambs
Epidemiology of EAE

- Transmission at lambing
- High loads of organism in infected foetal membranes
- Route of transmission
- Latent infection (persistence year to year).
- Strong immunity (but chronic infections reported)
EAE control

- Isolate ewes that have aborted from pregnant animals
- Remove the products of abortion and dispose safely.
- Disinfect where possible.
- Antibiotic treatment of pregnant sheep is described but is it of benefit?
- Vaccination – 3 vaccines in the UK
  - In Ireland – Enzovax (live)
  - In UK - Midiavac (inactivated) and Enzovax
Enzovax - revaccination

- Challenge studies have demonstrated that protection against Enzootic abortion and excretion of *Chlamydophila abortus* post-challenge is undiminished for at least three lambings post vaccination with Enzovax.

- Field studies in endemically infected flocks maintaining a policy of vaccinating incoming ewes with Enzovax indicate that enzootic abortion levels remain very low in ewes vaccinated 4 years previously.
Treatment

- LA tetracycline at 20mg/kg intramusc and again two weeks later if the ewe has not yet lambed.

- Field trials equivocal (Greig et al, Vet Rec, 1982)

- Experimental results (Aitken et al, Vet Rec, 1982, Rodolakis et al, Ann Rech, Vet., 1980) are more convincing

- Experimentally infected pregnant ewes by sc route with an abortion causing strain of Chlamydia psittaci on d95 gest.
- Injected groups with LA tetracycline at 10, 20 or 30 days post infection

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Days gest</th>
<th>Dead lambs</th>
<th>Viable lambs</th>
</tr>
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<tbody>
<tr>
<td>Uninfected</td>
<td>10</td>
<td>145.5 (2.6)</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Inf, not treated</td>
<td>8</td>
<td>132.9 (9.5)</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Infected d105</td>
<td>8</td>
<td>142.5 (2.0)</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Infected d115</td>
<td>8</td>
<td>141.5 (2.7)</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Infected d125</td>
<td>8</td>
<td>143.8 (1.7)</td>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>
EAE - Zoonosis

- Risk to pregnant women
- Risk to farm workers – avoid mouth to mouth!
- Hand hygiene
- Wear gloves when handling dead lambs and foetal membranes.
  (Respiratory protection if risk of aerosols).
- Caution also needed with vaccine (live)
Campylobacteriosis

- Campylobacter jejuni and C.fetus subsp fetus.
- C.coli also recorded.
- Niche – the intestinal tract of warm blooded animals and birds.
- Survives for short times (days) outside gut.
- In abortion cases there is a suppurative placentitis and endometritis, +/-bronchopneumonia in the foetus, characteristic hepatic lesions (if present)
- Strong immunity follows outbreak.
- Abortions usually occur in last six weeks of gestation.
Campylobacteriosis

- Risks
- Contaminated environments
- Moist, damp conditions in buildings or at pasture

Seven flocks diagnosed with Campylobacteriosis in 2009 in Ireland.
Control

- Isolate aborting ewes from pregnant group
- Tetracycline LA may help protect exposed ewes.

- Review risk factors in environment –
  - Water source/clean troughs
  - Building or pasture conditions
  - Presence of aborting sheep

- Eliminate exposure of pregnant sheep to potential risks
- Suggestion that mixing ewes that have aborted with non-pregnant breeding sheep will generate immunity and confine the outbreak to one breeding season.
Campylobacter - zoonosis

- Leading cause of enteritis in man
- Wear gloves when handling the products of abortion and dispose of safely
- Disinfect hands
Listeriosis

- Diagnosed by culture of the organism from foetal membranes, foetal stomach contents or foetal liver.

- *L. monocytogenes* or *L. ivanovii*

- Abortions at any stage of gestation, no specific pathology

- Penicillins or Oxytetacycline may be used. Treatment of ewes that have aborted is indicated to treat subsequent metritis.
Salmonellosis

- S. dublin, S. typhimurium, S. abortus ovis.
- Shed in faeces and lochia of infected animals
- Easily isolated from foetus and foetal membranes
- Potentially zoonotic

- Treatment? Vaccination?
Toxoplasmosis

- Oocysts shed in faeces of infected cats.
- Contaminated feed/pasture.
- Wide intermediate host range.
- Maternal, placental and foetal infection.
- Significant cause of abortion and “barren ewes”.

- Sheep abort once and have a solid immunity.
- Vaccine available (Toxovax).
Toxoplasmosis

Diagnosis –
Maternal serology

Histology – Placental mineralization
Foetal Brain – non-suppurative encephalitis

Organism may rarely be seen within lesions (IHC can be used for confirmation).

PCR tests.