Diseases of the Calf

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Objectives

- Pathology of Calf diseases
- Trends in diseases from CAHFS
- Mycoplasma
- Salmonella
- Investigating problems through case studies
History of the problem: Critical to making a diagnosis

- Number of animals affected
- Diarrhea?
- Bloat?
- CNS - central nervous system signs?
- Acute death?
- Housing?
- Treatments?
- Vaccination?
Submission of samples

Important to pick **right** animals for submission
- Try to send at least three animals

Try to pick animals that have not been treated!!!!!!!!!!

Do not send rotten animals:

Remember: Garbage in, garbage out
Congenital lesions

Cerebellar hypoplasia, hydrocephalus, facial anomalies, blindness:

Not commonly seen
Congenital lesions

- Hydrocephalus
Blind calves

- Vitamin A deficiency or BVD

Optic nerves – stenosis of canals
OUTBREAK OF CONGENITAL BLINDNESS IN DAIRY CALVES
Failure to thrive calves:
Diarrhea in calves:

- K-99 *E. coli*
- Attaching and effacing *E. coli*
- Rotavirus
- Coronavirus
- *Cryptosporidium*
- *Salmonella*
  - *Salmonella Dublin*
  - *Salmonella typhimurium*
  - *Salmonella newport*
  - Other *Salmonella* sp.
- *Clostridium perfringens*
- Coccidia
Enteritis

- **Bacterial**: 686 (40%)
- **Viral**: 706 (42%)
- **Protozoal**: 309 (18%)
- **Mycotic**: 1 (0%)
- **Infectious unknown**: 7 (0%)
Calf Diarrhea
Infectious Causes

- **E. coli** – mostly up to 4 days of age (ETEC, K99)
- **Salmonella** – first week (5-14 days?) (and 3 months)
- **Rotavirus** – second week
- **Coronavirus** – end of first through second week
- **Cryptosporidium** – usually second week
- **Giardia** -- ?
- **BVD** – first month; and any time
- **Eimeria** spp. (coccidiosis) – after 3 weeks …… others?
Enteritis - Bacterial

- **Salmonella**
  - 281 cases
  - 69%

- **K99 E. coli (ETEC)**
  - 43 cases
  - 11%

- **Attaching & Effacing E. coli**
  - 79 cases
  - 20%

- **Clostridium Perfringens**
  - 2 cases
  - 0%
E. coli diarrhea

K-99 E. coli: 1 to 5 day old calves
**E. coli diarrhea**

Attaching and effacing *E. coli*: usually between 3 and 21 days
Viral and protozoal diarrhea

- Rotavirus and Coronavirus
- *Cryptosporidium*

All tend to occur between 5 and 21 days of age with multiple agents responsible at the same time.
Rotavirus, Coronavirus and Cryptosporidium
Salmonella diarrhea

- *Salmonella typhimurium* and *S. newport*: Affects mostly 5 to 20 days of age.
  - Associated with feeding contaminated milk (hospital milk or unpasteurized or poorly pasteurized milk)
- *Salmonella dublin*: Most common in 30 to 90 days of age
The Case of Differential Mortality

OR: How come one dairy’s calves die more often than another?
Percent Passive Transfer

Percent

Poor  Good  Excellent

0  10  20  30  40  50  60
## Failure of Passive Transfer

<table>
<thead>
<tr>
<th>2004-2006 Total Protein</th>
<th>Dead</th>
<th>Alive</th>
<th>Odds Ratio</th>
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<tbody>
<tr>
<td>5.5+</td>
<td>36</td>
<td>714</td>
<td>1.0</td>
</tr>
<tr>
<td>5.0-5.49</td>
<td>89</td>
<td>1350</td>
<td>1.31</td>
</tr>
<tr>
<td>&lt;5.0</td>
<td>78</td>
<td>857</td>
<td>1.81</td>
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*p=0.002*
Clostridium perfringens enteritis
Coccidia

- Rarely in hutch calves.
- Problem in group pens: 60 to 180 days
- Severe bloody diarrhea
- Commonly seen after they return home 2-3 wks later (Due to coccidiostats used at calf ranch and not at the dairy)
- Treat with coccidiostats**
Coccidiosis
Septicemia in calves

- *E. coli*
- Streptococcus suis
- Actinobacillus equuli ssp haemolyticicus
- *Salmonella typhimurium* or *Salmonella newport*
- *Salmonella dublin*
- *Systemic Infectious herpesvirus infections (IBR)*
Salmonella
183
30%

Staphylococcus sp
1
0%

Streptococcus suis
4
1%

Mannheimia haemolytica
1
0%

Pasteurella multocida
3
0%

Actinobacillus equuli ssp. Haemolytica
6
1%

Bacterial
53
9%

E. coli
367
59%
E. Coli septicemia
E. Coli septicemia
Streptococcus suis septicemia
Actinobacillus equuli ssp haemolyticus
S. dublin
139
76%

S. newport
21
11%

S. reading
5
3%

Salmonella sp.
2
1%

S. typhimurium
16
9%
Salmonella septicemia

- *Salmonella typhimurium* and *S. newport*
  - 7 to 21 days old and associated with hospital milk
  - Acute death
- *Salmonella dublin*: Host adapted strain
  - 30 to 60 day old calves
  - Acute death, diarrhea followed by pneumonia
Cows can carry and shed in milk

Bile plug in gall bladder
Salmonella septicemia
Leptospirosis

- Rarely seen in calves
- Calves may have hemolytic crisis
Herpesvirus (IBR)

- Occasionally seen in young calves 1 to 7 days
- Acute death due to disseminated disease
- Probably due to in utero or parturition infection
- 7-14 d olds with omasal and rumen lesions (look like bacterial or mycotic rumenitis)
Case Study of Respiratory Disease

- Veal calves
- Housed indoors
- Expanded facility by 4-fold in the last several months
New Cases in July

Figure 2. New cases of pneumonia in a veal barn.
What’s wrong?

- Found *Mannheimia hemolytica*
- Malnutrition
- High density housing
- * = Use of pressure washer – increased humidity in a hot month inside
Respiratory disease

**Bacterial:**
- *Pasteurella multocida*
- *Pasteurella trehalosi*
- *Mannheimia haemolytica*
- *Histophilus somni (Haemophilus somnus)*
- *Mycoplasma bovis*
- *Arcanobacterium pyogenes*
- *E.coli* and other bacteria due to improper intubation or aspiration (foreign body pneumonia)
- *Streptococcus suis*

**Viral:**
- Bovine respiratory syncytial virus
- Infectious bovine rhinotracheitis virus (IBR)
Pneumonia

- Bacterial: 573 (94%)
- Viral: 25 (4%)
- Mycotic: 2 (0%)
- Noninfectious: 13 (2%)
Bovine Respiratory Syncytial Virus
Infectious Bovine Rhinotracheitis Virus
BVD

- Associated with bacterial infections
Respiratory Diseases: Bacterial

- *Pasteurella multocida*
- *Pasteurella trehalosi*
- *Mannheimia haemolytica*
- *Histophilus somni*
- *Mycoplasma bovis*
- *Streptococcus suis*
Pasteurella multocida, *Pasteurella trehalosi* and *Histophilus somni*
Mannheimia haemolytica
Respiratory Diseases: Bacterial
Arcanobacterium pyogenes
Respiratory Disease: Foreign Body Pneumonia
Respiratory Disease: Bacterial
*Mycoplasma bovis*
Mycoplasma Treatment

- Commonly used antibiotics do not work
  - Penicillin, Polyflex®, Naxcel®, Excenel®, and Excede® kill bacteria via the cell wall.
  - Mycoplasma: no normal cell wall.
  - Oxytetracycline has produced mixed results in treating Mycoplasma.

- Best results with Nuflor and Draxxin.

Mycoplasma Tx...

- Calves treated early respond fairly well, but unless treated long-term (10-14 days), 50-70% will relapse.
- Relapse results in more lung damage.
- Current recommendation: Provide continuous levels of antibiotics to these calves for 10-14 days.
- Work with your veterinarian on a treatment protocol
Otitis

- Mycoplasma bovis: 37%
- Pasteurella multocida: 19%
- Pasteurella trehalosi: 6%
- Bacterial: 13%
- Mannheimia haemolytica: 6%
- Arcanobacterium pyogenes: 19%
Otitis
Abomasal Disease

- Undetermined: 16%
- Bacterial: 14%
- Clostridial sp: 19%
- Mycotic: 19%
- Sarcina-like: 19%
- Infectious undetermined: 13%
Abomasal bloat

- Clostridial abomasitis:
- Sarcina-like bacteria:
Abomasal bloat

- Clostridial abomasitis:
Abomasal bloat

Sarcina-like bacteria
Abomasal lesions

- Mycotic abomasitis

- Abomasal ulcers
Bovine Papular Stomatitis

- Occurs in calves 7 days and older
- May form papules, or ulcers in oral cavity particularly on palate, gums around teeth and occasionally on lips
Atresia coli
Umbilical infections

- *E. coli* most common bacteria isolated
- Usually seen in calves less than 30 days of age
- Calves with umbilical infection have higher incidence of abdominal hernias
Joint infections

- *E. coli* and *Mycoplasma bovis*
Ocular disease

- Infectious Undetermined: 3 (27%)
- Bacterial: 1 (9%)
- Moraxella bovis: 7 (64%)
Ocular disease
*Moraxella bovis*
Ocular disease
BVD
Heart defects

- Ventricular septal defects common with some additional abnormalities present
- Cause of these is unknown
- See in calves any age but most commonly around 30 days when the calf cannot compensate anymore
- Present as respiratory cases
Exposure (cold) related problems

- Calves after 14 days lack adequate fat stores to maintain body heat during winter
- Need to feed more ration in inclement weather
Case of increasing mortality
Calves surviving by birth cohort (quarter) 2006

nQ1 = 255
nQ2 = 195
n = 39

Days on Calf Ranch

SURVIVAL DISTRIBUTION FUNCTION

STRATA:
- mq = 1
- Censored mq = 2
- mq = 3
- Censored mq = 3
Mortality Causes???

- 10-20 d olds with septicemia E coli and Salm
- Colostrum quality (handling) or poor colostrum quality from heat-stressed cows?
- Waste milk quality problems?
- Long transport in hot trailers?
HOT COWS HIGH HEAT, HUMIDITY TAKE TOLL ON LIVESTOCK, TOO

From: The Capital Times (Madison, WI) | Date: July 28, 2006 | Author: Oncken, John | More results for: heat stress cows death california 2006

Byline: John Oncken Special to The Capital Times

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The extended heat and humidity in the San Joaquin Valley of central California has resulted in the deaths of a much larger number of farm livestock than normal....
Torsion or intussusception of intestines
Ionophore toxicity

- Occurs in any age of calf that is feed ionophores
- Monensin, lasalocid, salinomycin, narasin and laidlomycin propionate
- Acute death with lesions consistent of heat failure
Gossypol (Cottonseed)

- Have not seen death due to heart lesions
- Feeding whole cottonseed less toxic
- Use caution in feeding cottonseed
Salt toxicity

- Excessive electrolytes in calf formula and/or water deprivation
- CNS symptoms (circling, blind, convulsions)
- Acute death
- Elevated sodium levels in brain (1800 ppm)
Copper toxicity

- Excessive copper in ration or excessive supplementation
- Acute death with hemolytic crisis/liver damage
Polioencephalomalacia

- Occur from 4 to 12 months of age
- Thiamine deficiency
- Feeding thiamine analogs in feed (Amprolium)
- High sulfates in water
- Rumen acidosis
Rumen acidosis
Mycotic infections due to antibiotic use

- Occasionally see as rumenitis, esophagitis or glossitis
- *Candida* infections most common
Cold water hemoglobinuria

- Ingestion of cold water (summer or winter)
- Urine dark brown to port wine color (hemoglobinuria)
- Usually occurs in group pens of calves that cannot fine water when moved or in calves with ice on water trough
- May want to rule out leptospirosis
Foot and Mouth Disease
The Case of the Thin Calves...
Preventing Early Demise

- Clean, dry calf (and navel) + colostrum
- Not involved in a dystocia
- Low exposure to pathogens
- Specific immunity
- Calories (Fat, CHO) and Protein
- Ventilation
- Protection from over exposure (heat & cold)
Dr. Adaska
Dr. Blanchard
Dr. Reynolds
Dr. King
Dr. Galvao
CAHFS
VMTRC
UC Davis
Various producers and veterinarians and students