Abortion in Cattle

Causes of Bovine Abortion

- South Dakota State University Lab
  - Bacterial 14%
  - Viral 11%
  - Fungal 5%
  - Other infectious 2%
  - Lesions but no agent found 17%
  - No diagnosis 51%
- California Veterinary Diagnostic Lab
  - Protozoal 23%
  - Bacterial 17%
  - Viral 3%
  - Other 1%
  - Lesions but no agent found 16%
  - No diagnosis 40%

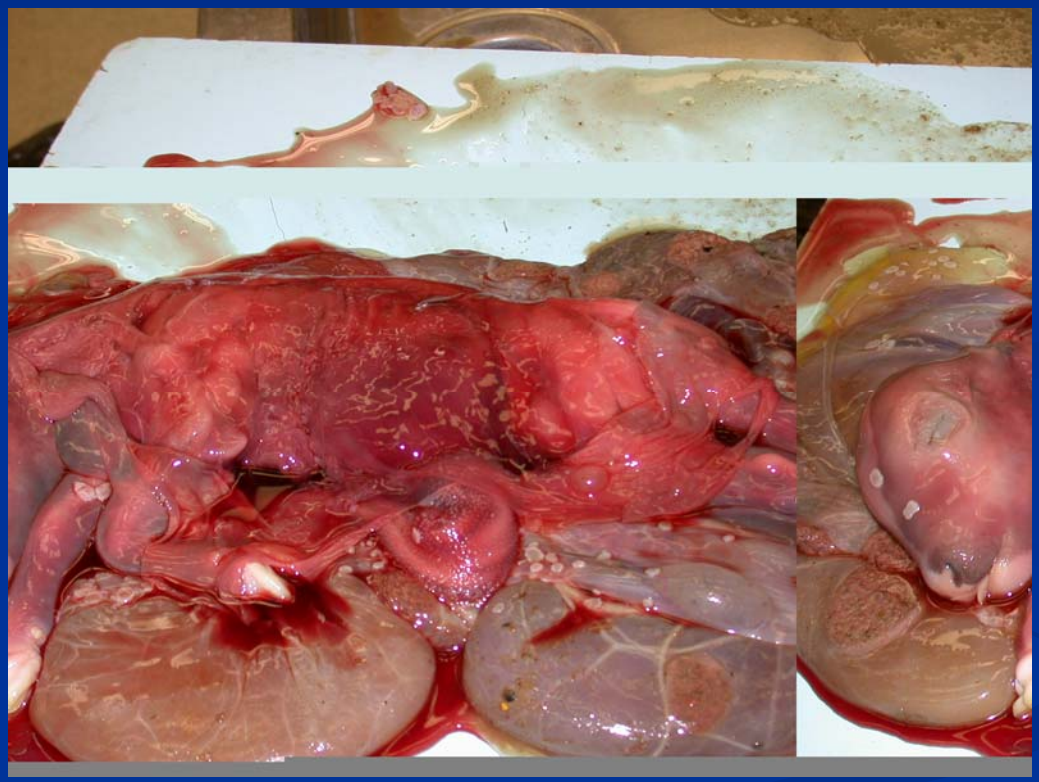
Brucellosis in Cattle

- *Brucella abortus*
- Important, but rare in U. S.
- Signs in dam inconsistent
- Abortion typically after 5th month
- Fetuses usually retained 48-72 hours
  - Fetus autolyzed
- Placentitis: edematous, brownish exudate on surface, necrosis, cotyledons yellow to brown
- Bronchopneumonia common
  - Both can be present with any bacterial or fungal abortion

Brucellosis in Cattle

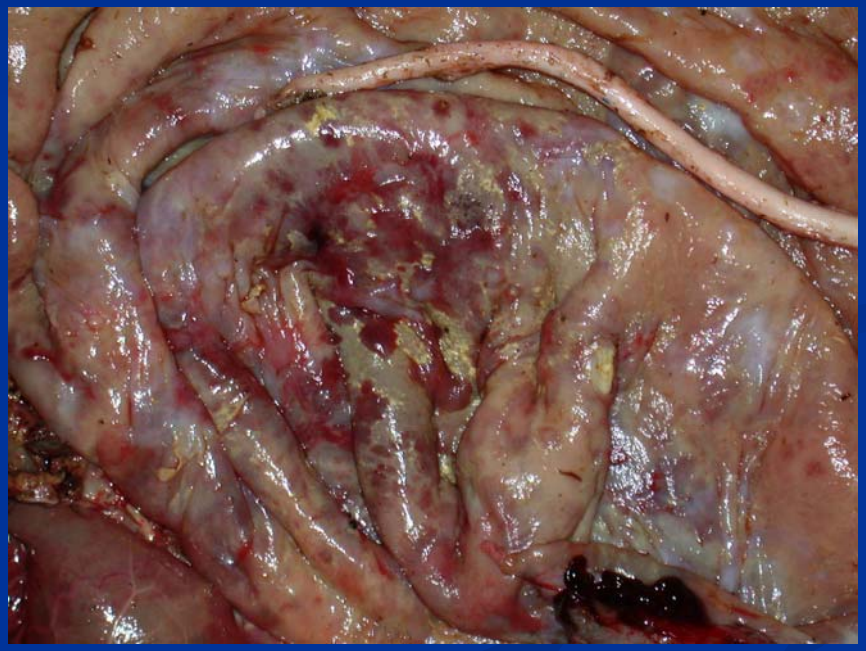
- Metritis and retained placenta common
- Orchitis in bulls
- **Cause of undulant fever in humans**
- Diagnosis: Isolation from calf, uterine fluid, milk
- Serology always important

Normal placenta/Neospora calf



Amnionic plaques

Placentitis




CENTIMETERS
04-10217

Campylobacter infection in cattle

- *C. fetus* subspecies *venerealis*
- Primarily causes embryonic death and infertility
- Occasional fetal death and abortion at 4-8 months
- Venereal transmission
- Obligate parasite of **bovine** reproductive tract
- Females not sterile: fertility returns after 4-8 months
- Bulls can be infected for life or recover

Campylobacter infection in cattle

- Gross lesions usually absent
  - Placentitis—most consistent finding
  - Can see fibrinous pericarditis, pleuritis, peritonitis
- Fetuses fresh or autolyzed
- Diagnosis:
  - isolate organism from fetus, fetal fluids, or uterine fluids
  - darkfield exam of stomach contents shows typical organisms
- Control: vaccination, AI
- Treatment: antibiotic treatment usually effective in bulls, less so in cows

Campylobacter infection in cattle

- ***C. fetus subsp fetus*** **and C. jejuni:**
  - Both cause sporadic bovine abortions
  - **Usually 4-8 mon gestation**
  - **Do not cause abortion storms**

Leptospirosis

- *Leptospira hardjo bovis* and *L. pomona* are most important
- Widespread problem
- Usually in 3rd trimester; can be at any stage
- Abortion and/or weak calves
- Cows healthy or icteric, hemoglobinuria, anemia, agalactia, mastitis, fever
- Usually no gross lesions in calves
  - can be icteric
  - fresh or autolyzed

Leptospirosis

- Diagnosis
  - Isolation difficult and impracticable
  - FA, PCR on fetal kidney, lung or placenta, urine from dam
  - Serology--difficult to interpret
    - Titers to L. pomona often >1:12,000
    - Titers to L. hardjo rarely >1:1,600, sometimes <1:100
    - Seroconversion in herdmates
    - Titers to vaccine can be 1:6,400 within 2 weeks; usually decline to <1:100 in 12 weeks
- Control and treatment: vaccination, tetracycline

Neospora caninum

- The most common cause in dairy cattle; also important in beef
- Fetuses typically 4-6 months & autolyzed
  - Can be mummified
- Some born alive and infected
  - Many clinically normal
  - A few with congenital CNS disease
- Canines are definitive host
  - Some outbreaks from contaminated feed
- Vertical transmission far more important

Neospora caninum

- Diagnosis
  - Microscopic lesions in brain, heart, muscle
  - IHC identification of organisms
  - Presuckling antibodies in fetuses or newborn
- Serology
  - Individual aborting cow
    - Positive results not diagnostic
    - Negative results, rules out N. caninum
  - Compare aborting vs. nonaborting cows
    - Can associate infection with abortion
  - Other uses:
    - estimate herd prevalence of infection
    - Identify congenitally infected animals
- Vaccine available

Tritrichomonas foetus

- Infertility is typical
- Pyometra
- Occasional abortion (usually < 5 months), retained placenta common
- No specific lesions in fetus
- Venereal transmission
- Diagnosis:
  - demonstration of parasite in abomasal contents, fetal tissues, or uterine discharge
  - isolation

Bovine Diarrhea Virus (BVD)

- *Pestivirus*
- Related to Border disease and classical swine fever (hog cholera) viruses
- Incidence has increased since 1972 (at least in midwest)
- Infertility; mummification; abortion; stillbirth, weak calves
- congenital anomalies—long list
- Stage of gestation affects outcome
  - < 125 days: fetal death with infertility, abortion, congenital anomalies; or immunotolerent persistently infected calves
  - After day 125: fetal death, weak calf, or the immune system can clear the virus and the calf is healthy

Infectious Rhinotracheitis Virus (IBR)

- Bovine herpesvirus 1
- Incidence has decreased dramatically in last 30-40 years
  - SDSU: 1968-72: 16% of 2,544
    1979-89: 5.4% of 8,962
- Most abortions after 4 months gestation
- Fetuses typically retained 48-72 hours
  - almost always autolyzed
- Microscopic: focal necrosis in liver
- Can affect 1 to over 50% of herd

Infectious Rhinotracheitis Virus (IBR)

- Abortions usually occur 1-2 months after initial infection of cow—**vaccination in face of outbreak will not help**
- Control
  - Vaccination is effective
  - Be sure to read the label and to heed any warnings
    - Modified live vaccines can be very effective in causing abortion

Arcanobacterium (Actinomyces) pyogenes

- Sporadic; any stage
- Most common bacterial cause in cattle, less common in sheep and pigs
- Lesions: autolysis, placentitis, pleuritis, peritonitis, white spots in lungs of fetuses <5 months
- Dam usually healthy
- Diagnosis: Isolation

Listeria monocytogenes

- Abortion, stillbirths, perinatal mortality in cattle, sheep, and goats
- Sporadic or multiple
- Dams often have fever, anorexia, retained placenta, metritis, but rarely CNS disease
- Often eating poorly preserved silage
- Fetuses autolyzed; can have placentitis, pneumonia, peritonitis, pleuritis
- Diagnosis: isolate organism

Other Bacterial Causes of Sporadic Abortion

- Escherichia coli
- Bacillus spp.
- Salmonella spp—cows often sick
- Pasteurella spp
- Streptococcus spp.
- Staphylococcus spp.
- Others

Mycotic abortion

- Common causes of abortion in cattle
- Usually sporadic, but can reach 10% in a herd
- Most common genera: *Aspergillus, Absidia, Rhizopus, Mucor, Mortierella.* Others possible
- Dams healthy
- Placentitis is consistent, pneumonia in about half of fetuses, dermatitis in a few
- Fetuses fresh (*Aspergillus* sp) or autolyzed (nonseptate)
- Diagnosis: demonstrate fungal hyphae in placenta

Epizootic Bovine Abortion (foothills abortion)

- Occurs in foothills region of California mountain ranges and in neighboring states—Oregon, Nevada, possibly others
- Late term abortions, fetuses fresh
- Generalized swollen lymph nodes
- Cause is unknown
- Spread by ticks—*Ornithodorus coriaceus*

Ureaplasma diversum

- Abortions late in gestation, weak calves, retained placenta, metritis, infertility in heifers
- Often single, but sometimes multiple
- Sometimes preceded by suppurative vulvitis
- Common inhabitant of vulva, vagina, prepuce
- Diagnosis: isolation or PCR of placenta, lung, abomasal contents plus demonstrate lesions in placenta and/or fetus
- Lesions: placentitis and lymphocytic pneumonia

Noninfectious Causes

- Plants
  - Pine needles (*Pinus ponderosa*): abortion, retained placenta, uterine hemorrhage, cow sick
  - Locoweed (*Oxytropis* and *Astragalus* spp.): abortion, fetal deformities
  - Broomweed (*Gutierrezia microcephala* and *G. sarothrae*): abortion and retained placenta
  - Ergot fungus (*Claviceps* sp.): abortion
  - Poison hemlock (*Conium maculatum*): abortion, arthrogryposis
  - Tobacco (*Nicotina* spp): arthrogryposis in pigs

Noninfectious Causes

- Plants
  - Goldenrod (*Solidago ciliosa*): abortion
  - Johnson grass (*Sorghum almum*): abortion
  - Subterranean clover (Trifolium subterraneum): infertility, abortion due to phytoestrogens
  - Moldy sweet clovers (*Melilotus* spp): abortion due to coumarins; rat poisons also
  - Cocklebur (*Xanthium strumarium*): abortion
- Heat Stress
  - Fever probably more important than environmental temperature

Noninfectious Causes

- Hypoxia—
  - carbon monoxide toxicity occasionally seen in swine or other animals housed in heated buildings
- Mycotoxins
  - Aflatoxin—abortions in animals acutely ill
  - Zearalanone—estrogenic, causes infertility, abortions are questionable
- Endotoxin
  - Cattle with gram negative mastitis
  - Gram negative vaccines???
- Glucocorticoids
- Nitrate—controversial.
  - Abortions at high levels of exposure.
  - Not proven at lower levels