

BACTERIAL INFECTIONS OF GENITAL TRACT

الإصابات البكتيرية للجهاز التناسلي

I. Specific Bacterial and protozoan infections

Pathological lesions were observed in the reproductive tracts of cows examined at post-mortem. Most of these were on the ovary, oviduct, uterus, vagina and vestibule.

1. Brucellosis

Brucellosis is found worldwide. It affects humans, domestic animals and wildlife. It is caused by *Brucella abortus*, *B. melitensis*, *B. suis*, *B. ovis* and *B. canis*.

Brucellosis has been extensively studied, partly because it causes widespread economic losses due to abortion and extended calving intervals and because it affects humans.

Transmission

1. Ingesting the bacteria.
2. Mucosa of the eye, nose and teat.
3. Endometrium if the cow is artificially inseminated with infected semen.

The disease is most serious in cows infected during pregnancy. The bacteria show a preference for the pregnant uterus, fetus and the lymph glands of the udder. Both the membranes and fetus respond to *Brucella* infection by increasing their production of erythritol, a simple carbohydrate, which increases the growth rate of the bacteria.

Signs:

1. Abortion at about 6 to 8 months of gestation. The organism may also produce toxins and allergens, cause vascular thrombosis, increase uterine motility, and disturb production of sex steroids and prostaglandins, contributing to abortion.

2. In some cases the dead fetus is not aborted, but is retained in a mummified or macerated form.
3. If a calf is born alive, it is likely to be weak and to contract calf scours easily. Many die soon after delivery.
4. Aborted material and vaginal discharges from infected females are heavily infected with Brucella, and these contaminate pastures, pens and buildings.
5. Organisms are also present in the milk of infected cows. Brucellosis is a professional hazard for cattle keepers and veterinarians.
6. Fetal membranes are commonly retained because of uterine inertia, placentitis or both.

Diagnosis

1. Bacteriological examination, culture of the organism.
2. Milk ring test (MRT) also called the Bang Ring Test; a drop of haematoxylin-stained antigen is added to 1 ml of milk.
3. In the spot agglutination test, also known as the Rose Bengal Test (RBT) or rapid plate agglutination test. RBT is performed on serum using stained antigen at pH 3.6. It is economical, simple to perform and gives results in 4 minutes. Like the MRT, it is used as a quick screening test.
4. Complement fixation test (CFT), which detects IgG1 and IgM antibodies. This is the most accurate and sensitive test for brucellosis and distinguishes between antibodies of infection and vaccination. However, it must be performed by a trained technician.
5. The enzyme-linked immune sorbent assay (ELISA) has been used to diagnose brucellosis,

Control

Brucellosis can be controlled through strict hygiene in the handling of potentially infected material and by vaccinating all animals.

2. Trichomoniasis (Bovine Venereal Trichomoniasis)

It is a venereal disease spread at service or by artificial insemination with improperly treated or handled semen; the disease causes endometritis, pyometra, abortion and sterility.

Etiological agent:

Trichomonas fetus causes trichomoniasis, a protozoan about 15 m long with an undulating membrane.

Signs:

1. Infertility.
2. Repeat breeding.
3. Delayed return to estrus after mating.
4. Early embryonic death and sometimes, abortion.
5. It may directly cause the death of the embryo or may do so via uterine endometritis and marked leucocytic diapedesis into the endometrium.

Diagnosis

1. A low 60- to 90-day non-return rate, together with a large number of repeat-breeding cows and cows that exhibit purulent vaginal discharges, endometritis, abortion and pyometra, might indicate trichomoniasis.
2. The symptoms of trichomoniasis and campylobacteriosis are similar. Both lead to irregular inter-oestrous intervals. They are best differentiated by isolating the causative agents.
3. Cervical and vaginal mucus can also be examined but this is only really useful during the first few weeks of infection.

Treatment and control

1. Treatment of infected cows with vaginal antiseptics has not been very successful. In animals with pyometra, it is better to enucleate the corpus luteum or to lyse it with prostaglandins. Treatment may be repeated 10 or 11 days later.
2. "Carrier" bulls and sexually active oxen can re-infect treated, recovered and susceptible females and should therefore be culled. Carrier bulls can be treated, but treatment is lengthy and should not be considered unless the bull is very valuable.

3. **Campylobacteriosis**

Venereal disease caused by *Campylobacter fetus* spp.

Signs:

1. Events subsequent to infection are similar to those described for trichomoniasis except that the migration of the organisms from the vagina and cervix appears faster.
2. In cows, infection is initially acute but eventually becomes chronic. Acute infection is associated with infertility and the chronic phase with abortion, although abortion may also occur in the acute stage.
3. Catarrhal vaginitis in the acute phase results in an increased production of clear, cloudy or muco-purulent discharge for 3 to 4 months.
4. Catarrhal cervicitis may result in a reddening of the cervix.
5. Abortion may occur at any time but usually occurs 5 to 6 months after endometritis and placentitis have occurred.
6. The bacteria may migrate into the oviducts and cause more permanent infertility due to salpingitis.

Diagnosis

1. Isolation of C. fetus from the bull or cows will confirm the diagnosis.
2. Campylobacter can be isolated from the genital secretions (sheath washings or semen) of bulls.
3. A direct Gram-stain smear of an aborted fetus, placenta or fetal stomach may reveal the short "S" shaped organisms sometimes called "flying seagulls".
4. A vaginal mucus agglutination (VMA) test will indicate infection in a herd but does not reliably indicate infection in individual animals

Treatment and control

1. Treatment should aim to cure the infected bull.
2. Fat-free cream containing 1% neomycin or polymixin can be applied to the penis and prepuce under sedation.
3. Streptomycin or erythromycin has also been used, but both have been associated with false cure in bulls and cows.
4. Cows can also be treated by infusing streptomycin or erythromycin into the uterus but this does not clear organisms in the vagina and cervix and the cow can be re-infected.

4. Leptospirosis

Bovine leptospirosis is a systemic disease characterized by fever and, sometimes, mastitis and abortion. Leptospirosis should be suspected when abortion occurs in cows showing other symptoms such as icterus and hemoglobinuria.

Etiology:

The disease is caused by *Leptospira* bacteria. These are spirochetes. Some 120 *Leptospira* serotypes:

- *Leptospira Pomona*.
- *L. canicola*.
- *L. Australia*.
- *L. icterohaemorrhagica*.
- *L. grippotyphosa*.

Signs:

1. Animals infected with *Leptospira* excrete the bacteria in their urine.
2. Pyrexia and reduced milk production.
3. In the pregnant cow, the organisms show an attraction for the uterus and attack the fetus or endometrial capillaries. This may result in abortion during the last trimester or the birth of a weak or dead calf.
4. Aborted fetuses show no characteristic lesions other than subcutaneous edema and fluid-filled cavities.
5. Fetal membranes may be retained, sometimes causing metritis and infertility.
6. If the bacteria invade the udder, they may cause mastitis or agalactia. The udder is flaccid and milk becomes thick, yellow and clotted.

Diagnosis

1. Leptospirosis should be suspected following abortion associated with acute illness and the presence of blood in the milk for some days.
2. Blood serology, despite major difficulties with interpreting the titers.

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3. The bacteria can be cultured but they are usually difficult to isolate from the fetus or membranes, because autolysis of the fetus between infection and abortion quickly results in the death of the bacteria.
 4. The bacteria are most readily isolated from the aqueous humor of the eye but can also be isolated from urine.

Treatment and control

1. Leptospirosis can be self-limiting. Therefore, all newly purchased animals should be kept in quarantine and tested for the disease. Hygiene measures outlined earlier for brucellosis should be applied in case of an abortion. Rodents on the farm should be controlled and contamination of drinking places should be avoided by isolating infected animals.
2. Treatment with streptomycin readily eliminates kidney infection.
3. Each aborting cow should therefore be treated with streptomycin at 25 mg/kg bodyweight.

5. **Salmonellosis.**

Salmonellosis is an important cause of abortion in cattle. It is also a zoonosis. *Salmonella dublin* and *S. typhimurium* are the most common causes of Salmonellosis in dairy cattle.

Signs.

1. Typical symptoms of Salmonellosis include septicemia, pyrexia and dysentery.
2. Pneumonia may also occur.
3. The bacteria are attracted to the uterus and together with severe enteritis, caused by endotoxins, and painful arthritis, cause abortion.

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4. Aborted fetuses show no striking features but membranes, retained in about 70% of the cases, are edematous and yellow, with pus-like exudates.

II. Non-specific bacterial infections

Many species of bacteria inhabit the vagina, uterus, and cervix of cows. Some are symbioses that become pathogenic when the animal is stressed; others are immediately pathogenic.

1. *Staphylococcus aureus*.
2. *Escherichia coli*.
3. *Pseudomonas pyocyanea*.
4. *Corynebacterium pyogenes*.
5. *Proteus mirabilis*.
6. *Streptococcus spp.*
7. *Pasteurella multocida*.
8. *Proteus vulgaris*.
9. *Klebsiella spp.*
10. *Listeria monocytogenes*.