Course of Abortion

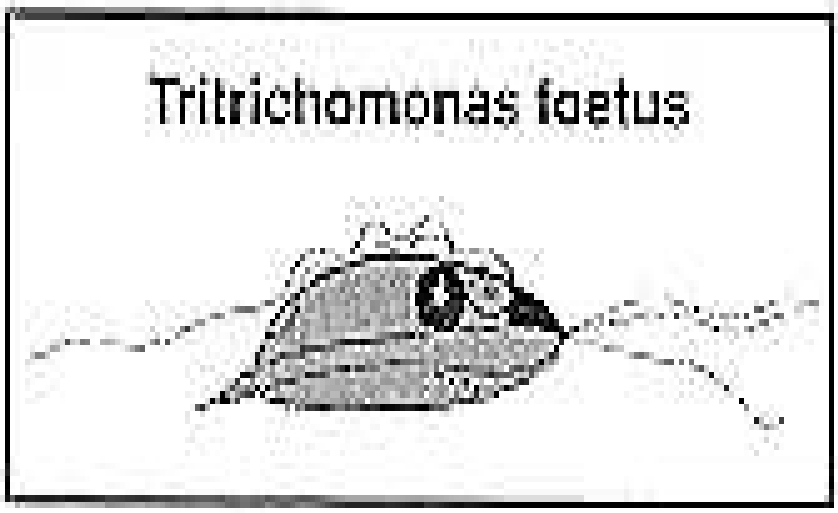
Contents

Abortion in cattle

By Dr.Hassan AbdEl-Sabour

Trichomoniasis

- **The cause is Trichomonas fetus, (**flagallated protozoan, very fragile and does not last long outside the reproductive tracts of cattle, killed rapidly by drying, excessive heat and antiseptic.



Routes of infection:

A) Venereally:

***natural service (infected bull)**

***A.I. (infected semen)**

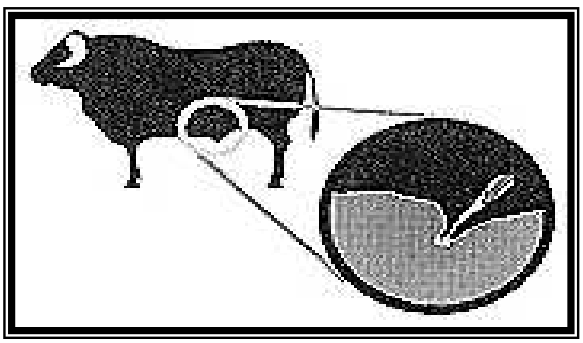
B) Mechanical transmission:

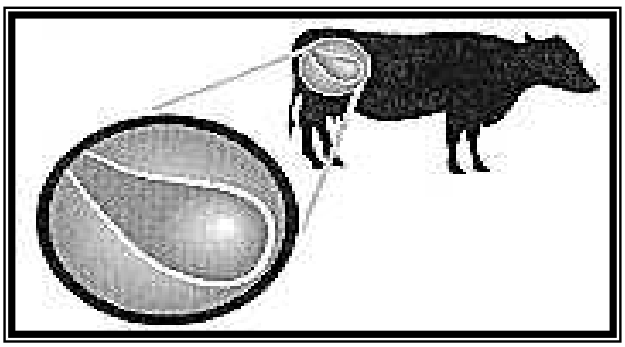
Unsanitary gynacological equip.Contaminated A.V.

Pathogenesis:

In Bulls : in the folds of the penis and sheath. Bulls often show no signs and produce normal sperm. Bulls, approximately four years of age and older, usually become permanent carriers.

In Cows : T. foetus grows in the vagina and uterus.





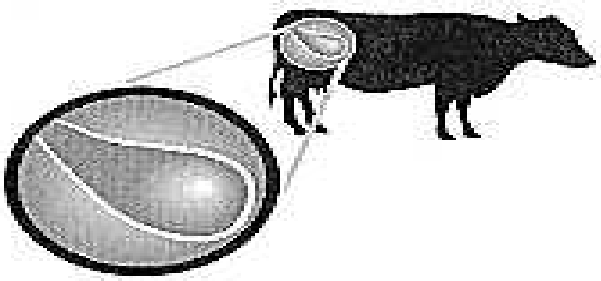
Pathogenesis:

*At Coitus ⟶ semen + trichomonads

cervix vagina (Mult.)

T. foetus ⟶ mucinase enzyme ⟶ Viscosity of estral muus

Migration to the uterus
Edematous metritis
(hinders implantation)
Early embryonic deaths
Placentitis
Closed Pyometra
(8 days)



Symptoms:

In the female

1. Drop in CR (Irregular repeat breeder)
2. In 5% calf dies before 5th pregnancy and pass through the vagina (Abortion). (intact membran and fetus)
3. In another 5% of cows develop pyometra.
4. Some cows shows catarrhal vaginitis.
5. a small number of cows may be able to carry the infection and still deliver a normal live calf (carrier)
6. These symptomes appear in the herd following the introduction of new cows or bulls to the herd.

In the male No any clinical signs
semen picture is normal.

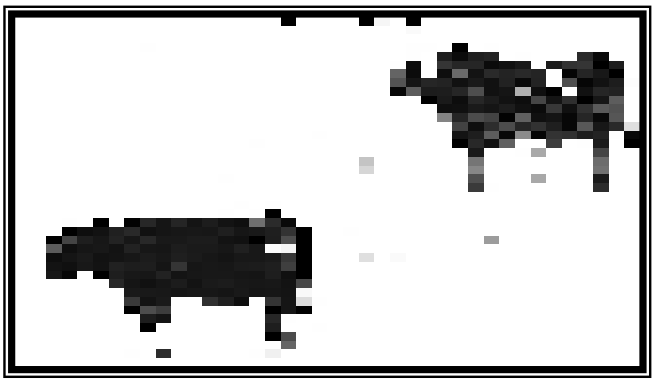
Diagnosis:

selective media (materials from fetal, stomach, vaginal discharge)..

1. Herd history and symptoms
2. Agglutination test on vaginal mucus (+ve reaction in about 30-80 after infecting service).
3. The material: vaginal mucus, fetal contents from stomach, liver, lungs and placenta. Cultured on selective media and incubate at 37oC in 10% CO2

In the male

1. **Culture of the material (preputial sheath washing)**



Treatments:

The non infected group

Should be bred with clean bull, or semen by AI

The infected group

Stop breeding for 3 months
Treat animals with pyometra
Examine the animals regularly by Vaginal mucus Agg. Test.

The bulls

Withdrawal of the penis out of the prepuce undder
*** Epidural anesthesia or bilateral internal pudendal nerve block of th dorsal nerve of the penis**

Treatments:

The bulls

- **Trypoflavin solution 1%, ointment 0.5%**
- **Acriflavine 1%, ointment**
- **H2O2 3% (at 8-9 atmospheric pressure)**
- **Chloramine sol 0.3-0.5% (at 8-9 atmospheric pressure)**
- **Sodium iodide 10mg|100 kg BW in 500 ml dist water injected IV. (3-4 doses at 48h interval).**

Campylobacteriosis (Vibriosis)

- **It is a venereal disease of cattle Characterized by:Infertility*early embryonic deaths**

*** late abortion**

Etiology

- **Campylobacter fetus,**
- **Motile or non motile organism**

***Gram stain (-ve), short comma-shaped rods or double spiral shaped filament**

***Grow slowly and difficulty on most lab. media.**

C. Fetus is pathogenic for human and causes|:

Undulating fevers, Placental infection, Abortion

***Ovine, bovine and human Campylobacteriosis are closlly related genetically (human get infection from contact)**

Serological types

C. Fetus venerealis

C. Fetus intestinalis C. bubulus (non pathogenic)

Pathogenesis:

C. Fetus intestinalis: In gut of animals but not in the genital tract of cows (abortion in sheep and cattle).

C. Fetus venerialis: only in the female genital tract, fetus and placenta and in the prepuce and semen of the bull.

C. Fetus venerialis Service|infected bull (after 7 days) uterus ⟶ local immunity⟶ after about 13 weeks ⟶elimination of the infection or may stay for 8-18 moths

Bulls under 5 years difficult to infect, but that over 5 years may become a chronic infection.

Males and females may become carrier.

Symptoms:

In the female

1. **The cow may fail to become infection after coitus**
2. **Endometritis and salpingitis, no vaginitis or cervicitis A slight mucopurulent exudate in the vagina, increase cloudy estral mucus.**
3. **Failure of conception (E. Emb. D.)**
4. **Prolonged estrus cycle (27-53 days average 32 days). When the fertiliyed ovum destroid after 14 days.**
5. **Abortion from 4 to 7-8 months of gestation (early abortion without RP, late abortion with RP).**

Symptoms:

In the female

1. **Aborted fetus shows autolytic changes, sc odema, thin bloody fluid in the body cavities. In stomach may present thick yellow turbid material contains many Mos**
2. **Lesion in the placenta: RP resemble those of brucella abortion, intercotyledonary spaces being filled with a thick purulent, viscid material. Cotyledon greyish white in color with chessy exudate between caruncles and fetal cotyledon, thickened and odematus membranes.**

In the male No any clinical signs in recently infected bull

Lack of libido (excessive sexual load), lose weight.

Treatments:

In the cows

- **The disease is self limiting after the development of immunity**
- **I.u. infusion with 2 millions IU penicillin and 3-4 gm dihydrostreptopmycin.**

In the bulls

500 μg terramycin in dist. Water and mixed with polyethyleneglycol, from which 20 ml injected into the urethra and the remainder massaged into the penile and preputial mucosa for 12-15 minutes. Trypoflavin, Bovoflavin ointment and washing.

Control and eradication

1. **Prevention of the used of communal bull**
2. **Proper AI service should take over**
3. **All bulls kept in AI centers should be tested every 3 months using culture fluorescent antibody test technique, positive bulls must be slaughtered.**
4. **All cows should be examined by both culture and vaginal mucus agglutination test. Infected cows must be isolated and free one should be served by clean bulls.**
5. **Free cows vaccination with killed adjuvant vaccine.**

Brucellosis

- It is an important cause of abortion and sometimes infertility in domestic animals (cattle, sheep and goats).

Characterized by:

Late stormy abortion
Placental retention
Calf mortility, loss of milk production
Infertility
Costs of vaccination and erradication programs.

Etiology

Brucella abortus

- non motile, small non sporing organism

***Gram stain (-ve), bacilli or coccobacilli**
***destroyed by disinfectant and exposure to 65oC but can survive for a very long times in water, wet soil, bedding manure.**

Incubation period

50-250 days directly proportional to the stage of fetal devlopment at the time of exposure.

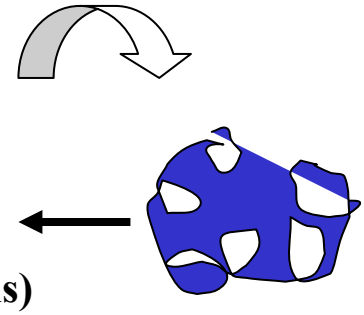
Routes of infection

Oral ingestion **Skin (intact, lacerated)**
Inhalation (air-born inf.) **AI (infected semen)**
Mucus membrane (conjunctiva)

Pathogenesis:

After infection

Brucella → penetrates m.m. of (upper digestive tract eye or skin)



Lymph nodes (acute lymphadinitis)

Macrophages (multiply and servive)

Bacteraemia → spleen, mammary gland, super mamm. lymph nodes and pregnant uterus

Pathogenesis:

After infection

In pregnant uterus → penetrates epith. Of the chorion (proliferate) → Placentitis

Endometritis

Ulceration of the ut. epith lining

↓

Invasion of the allantochorion

↓

Infection of the fetal Bl. Vessels

↓

Death of the fetus due to endotoxins of brucella

Loss of placental function

After Abortion

M.os. Leave the uterus → invading Bl. Vessels reestablishment in the lymph nodes

Symptoms:

Abortion in pregnant cows (6th to 8th month)

The aborted fetus is:

- **Hairless to fully developed.**
- **Stained with meconium**
- **Subcutaneous oedema**
- **Body cavities are filled with reddish serous fluid**

The Placenta is:

- **Retained**
- **Necrotic changes in cotyledon**
- **Thicknening of the intercotyledonary area (leathery)**

Diagnosis:

selective media (materials from fetal, stomach, liver, lung, spleen, vaginal discharge).

1. **Herd history and symptoms (Stromy abortion)**
2. **Demonstration of the organism in direct smears from: Fetal stomach content, Vaginal dischare, placenta Staining modified Ziehl-Neelsen stain.**
3. **Isolation and identification on selective media (Furrell' medium)**

4. **Serological detection of specific antibodies in serum of the aborted cow**
   a) Rose bengal plate test
   b) Agglutination test (Titer 1|40 in non vaccinated and 1|80 in vaccinated)
   c) Compliment fixation test (CFT)
5. **Hitopathology**
6. **Milk ring test**

Treatments:

In recently infected non pregnant:

single dose of 10 mg oxytetracycline

In infected pregnant cows: less than 5 months

Two doses of 10 mg Oxytetracycline with 12 days interval

In infected pregnant cows after 5 months USELESS

Control and eradication

Milk samples (cows and buffaloes) → Milk ring test
(+ve must be cultured on selective media)

Blood samples (male and females) → Serological T.
+ve **-ve**
Removed and sloughter **retested after 3 months**
until 3 successive clear test obtained

Abortion in sheep and goat

- Abortion in sheep and goats due to:
  *Infectious
  *non-infectious agents

Some agents act directly on the fetus, placenta → (Primary abortion)

Others, because of systemic disturbance → (Secondary abortion)

Campylobacteriosis

It cause epizootic ovine abortion

Characterized by:

- **not** a venereal disease
- late abortion (after 3 Months)
- stillbirth, birth of weak lamb

Etiology

- **Campylobacter fetus,**
- **The same serotype affects cattle and man.**

Pathogenesis

The ram is not a factor in the transmission of the disease (may be an intestinal carrier)
Ingestion of the Mos. during the last two months of pregnancy
Incubation period (7-25 days) from the infection to the abortion.
Some birds act as reserviors of the infection.

Symptoms

Late abortion.
Stillbirth, birth of weak lambs.
following abortion, metritis may occurs.
placenta shows placentitis with odema and necrosis of the cotyledons.
Aborted fetus: s.c. blood-steined edema
excessive fluid in the body cavities
fetal liver contain mecrotic foci 10-20mm ϕ

Diagnosis:

Clinical symptoms
Culture of the Mos
Direct microscopical examination
Immunoflurescent techniques
PCR

Control and prevention:

Isolation the affected ewes and surviving lambs.
Dead fetei, placenta should be burned.
Disinfection of the lambing area.
Penicillin and streptomycin (300,00i.u. and 1 gm respectively).
Killed bacterin (vaccine) before breeding (yearly)

Brucellosis

It cause enzootic ovine abortion
Characterized by:

- a venereal disease (rare)
- late abortion
- stillbirth, birth of weak lamb

Etiology

- **Brucella melitensis (common cause of abortion especially in goat).**
- **Brucella abortus (rare in sheep).**
- **Brucella ovis with lower pathogenicity (ram epididymitis org.).**

Methods of transmission

Ingestion of the Mos. During lambing
Droplet inhalation
Conjunctival membrane
Through lacerated skin
Venereal after mating (rare)

Symptoms

Late abortion.
fever and lamness
outbreaks of abortion is rare.
B. ovis causes ram wastage
placenta shows placentitis with odema and necrosis of the cotyledons, thickned intercotyl. area (leathary)
Aborted fetus: s.c. blood-steined edema
excessive fluid in the body cavities

Diagnosis:

Clinical symptoms
Culture of the Mos
Direct microscopical examination (modified ziehl-Neelsen stain)
CFT

Control and prevention:

General hygiene at lambing.
Vaccination (alum-precipitated B. ovis bactrin s.c. in 2 doses 30-60 days apart then single injection each year.

Toxoplasmosis

It a serious cause of abortion in sheep.
May infect all domestic animals.

Characterized by:

- **early fetal resorbtion.**
- **Abortion at last trimester.**
- **Mummification**

Etiology

- **Toxoplasma gondii**
- **Protozoa infect all domestic animals, but only serious in sheep.**
- **It is found as an oocyst in cat feces.**
- **Intrauterine infection of the newborn.**
- **If the dam has antibodies (no intrauterine infection).**

Methods of transmission

Ingestion of the Mos.

Symptoms

Early fetal resorbtion.
Mummification.
Abortion at last trimester (2-3 weeks before term).

placenta gross lesions of the cotyledons (numerous grey-white foci).
histologically : focal area of necrosis and organisms.
Aborted fetus: Leukoencephalomalacia in the CNS of stillborn lambs (fetal brain).
excessive fluid in the body cavitie

Diagnosis:

Clinical symptoms
Culture of the Mos
Histology of cotyledons, fetal brain
CFT

Control and prevention:

General hygiene and eradication of .
Vaccination (alum-precipitated B. ovis bactrin s.c. in 2 doses 30-60 days apart then single injection each year.

Abortion in Mare

Cause of Abortion/ Time of Gestation	Gross Findings and Clinical Signs	Diagnosis: Samples to Submit and Lab Procedure
Early Embryonic Death (EED) **0-40 d Eariy Fetal Death**	Maternal malnutrition, twin pregnancy, history of maternal stress, uterine disease, poor conformation of vulva, vagina, cervix Early (EED) signs: often none Later (EFD) signs: aborted fetus	Repeated gynecologic exams, fetal and maternal serum samples, antigen/ antibody compatibility

Cause of Abortion/ Time of Gestation	Gross Findings and Clinical Signs	Diagnosis: Samples to Submit and Lab Procedure
Equine Viral Arteritis (EVA) 5-10 mo	**Mare:** depression, fever, **anorexia,leukopeniakeratitis, diarrhea, colic, edema of limbs and ventral abdomen, generalized vascular necrosis Fetus: aborted 7-10 d after first signs of illness in mare, usually autolyzed because death 2**-4 d prior to abortion, ± pleural effusion, petechial hemorrhage, if non-autolyzed- usually no gross lesions	Histopath -Serology -Virus isolation -Check stallion since virus can be transmitted via semen 

Cause of Abortion/ Time of Gestation	Gross Findings and Clinical Signs	Diagnosis: Samples to Submit and Lab Procedure
Twinning 6-9 mo (=most common non-infectious cause)	**Twinning** 6-9 mo (=most common non-infectious cause)	**Twinning** 6-9 mo (=most common non-infectious cause)
Pathologic Twisting of the Cord 6-9 mo	Fetal anoxia due to pathologic twisting of the cord diagnosed by twisting of the cord **and** localized swelling and discoloration of the cord, causing vascular obstruction. Cord is usually abnormally long (>90 cm).	**Histopathology** Optional

Cause of Abortion/ Time of Gestation	Gross Findings and Clinical Signs	Diagnosis: Samples to Submit and Lab Procedure
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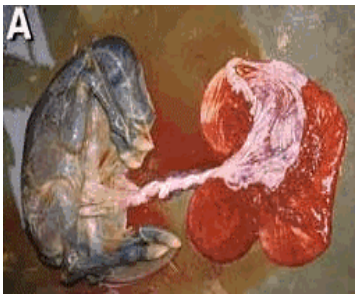
Pathologic Twisting **of the Cord** 6-9 mo	Fetal anoxia due to pathologic twisting of the cord diagnosed by twisting of the cord **and** localized swelling and discoloration of the cord, causing vascular obstruction. Cord is usually abnormally long (>90 cm).	Histopathology Optional

Cause of Abortion/ Time of Gestation	Gross Findings and Clinical Signs	Diagnosis: Samples to Submit and Lab Procedure
Leptospirosis 6-11 mo	**Fetus:icterus, enlarged/yellow liver** **Placenta: thickened allantochorion or exudate**	Histopath **Immunofluorescencefor spirochetes in aborted tissues (kidney, liver, placenta)**

Cause of Abortion/ Time of Gestation	Gross Findings and Clinical Signs	Diagnosis: Samples to Submit and Lab Procedure
Bacterial: *Strep.zaoepidemicus* others: *E.coli, Pseudomonas,Staph., Klebsiella,Enterobacter, Taylorella equigenitalis* (CEM)	Usually ascending infection **Fetus:** gross lesions are non-specific, ± enlarged liver, ± increased fluid in body cavities; organisms most consistently isolated from fetal stomach contents **Placenta:** area of the chorioallantois around the cervical star is edematous and thickened, ± chorion covered in brown	Fetal stomach contents, placenta, liver, kidney, and lung for culture -**Histopathology:** Exudate, cloudy fluid in the amniotic cavity. The time from infection to the abortion depends on the presences of septicemia

Cause of Abortion/ Time of Gestation	Gross Findings and Clinical Signs	Diagnosis: Samples to Submit and Lab Procedure
EHV-1 (Rhinopneumonitis9-1 l mo. can be 5-11 mo.)	**Fetus:** Aborted 3 wks - 4 mo post mare exposure -Liver: enlarged with subcapsular pinpoint to 5mm grey/ white foci of necrosis Lungs: severe edema,esp.interlobular septa, ± white foci of necrosis (like liver) -Pleural/Abdominal cavities: excessive yellow fluid ± Pericardial effusion and epicardialpetchiae ± jaundice of mucous membrane	Tissues in formalin for histopath-intra-nuclear inclusion bodies -Virus isolation (fetal lung, liver, adrenal, lymph nodes) -FA -Fetal serology 

Cause of Abortion/ Time of Gestation	Gross Findings and Clinical Signs	Diagnosis: Samples to Submit and Lab Procedure
EHV-1 (Rhinopneumonitis 9-1 I mo can be 5-11 mo)	If bom alive - dies within hours to days **Placenta**:±edematous, ± no rupture of cervical star,fetus usually still attached to fetal membranes, ± premature placental separation **Mares/Farm;** asymptomatic/abortion storms	Repeated gynecologic exams, fetal and maternal serum samples, antigen/ antibody compatibility 

Other Causes of Equine Abortion:

•**Hormones:** Progesterone deficiency, prostaglandin F2alpha, oxytocin,glucocorticoids

•**Poisonous Plants, Drugs:** Fescue, locoweed, sudan grass, sorghum, phenothiazine,organophosphates thiabendazole.

Guide to Management of EHV-1 Abortion

- **EHV-1 causes abortion, respiratory disease and CNS disease.**
- **It is closely related to EHV-4 which mostly causes respiratory disease, but has caused abortion.**
- **EHV-1 spreads via the respiratory tract, but aborted foetuses, foetal membranes and fluids are a particularly dangerous source of infection.**

Prevention of abortions

1. Segregate pregnant mares from all other horses.
2. Maintain in small groups based on foaling date.
3. Avoid stress in pregnant mare groups.

4. Do not introduce mares into established foaling groups.
5. Do not transport mares late in gestation (within two months of foaling).
6. Pregnant mares from broodmare sales are common sources of EHV-1.

7. Vaccination is available as an aid in the control of EHV-1 abortion when used in conjunction with appropriate management practices.

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Abortion in cattle

By Dr. Abdel-Rahman Abdel-Magied

Specific or coital diseases

Campylobacteriosis Vibirosis

•It is an enzootic infectious diseases caused by the organism campylobacter fetus previously known as Vibrio fetus.

•It Gram-ve, motile with a single polar flagellum, curved to spiral rods. It is appear as an "S" shaped with one or two or three spirals from direct smears of stomch contents of aborted foetus and vaginal discharges .

•The organism is killed by disinfected and dryness, but can resist deep freezing of semen.

•*Incidence: In infected cattle, abortion rate 5-20%

Campylobacter Fetus.

Rout of infection: -

1- Venerally at natural service from infected bull or A.I. (infected semen).
2- Infection can spread from cow to cow by improperly cleaned instruments
3- In the male infection occurs on serving an infected cow or at semen collection with contamination of A.V**.**

***Incubation period** **:** from 7-9 days

Symptoms in the female:

1- Drop of conception rate and infertility
2- Mucopurnlant vaginal discharge in newly served cow
3- Anoestrum is due to embryonic death and persistence of C.L
4- Abortion in 5-20% or more of infected cow
5- Retention of the placenta may follow abortion

Diagnosis

The breeding history is important, since Trichomonas fetus cause early abortion and reabsorption of foetus.

A- Direct methods

1- Isolation of the C.fetus from the aborted foetus (foetal stomach contents, liver, lung) and placenta or vaginal mucus of genital tract.

a- The organism can be demonstrated in direct smears

With dilute carbol fuchsine and Gram's stain for detection of morphology and staining affinity of the isolated organisms

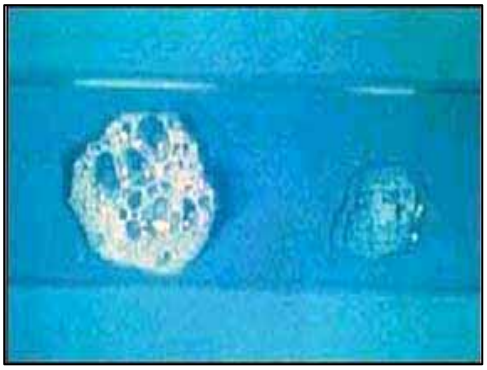
b- Vaginal mucous samples

may be collected from infected cow by sterile glass pipette or by mean of a sterile aluminium tampon (composed of an aluminium tube, 25cm in length and 1.5 cm in diameter and aluminium wire provided with a well-fixed piece of cotton at

one end) and sterilized in hot air oven at 160^{0}C for 2 hours. Mucous for culture should be collected at time of estrous where the mucous flow is at maximum and antibodies at the minimum and the organism is multiplying. The collected mucous was transferred from collected pipette into sterile bottles Culture of suspected materials on Campylobacter selective medium and blood agar medium containing 1/50ooo briliant green . All the cultured plates were incubated at 37^{0}C in an Co_2 incubator which provides an atomosphere of about 10% Co_2. The incubated plates were checked for growth after 48 and 72 hours, but they not discarded as negative before the end of the 5th day.

1- Motility test:

by hanging-drop method:-



2- Catalase activity:-

by placing a drop of H_2O_2 on a slide And a loopful of the isolate. The presence of gas bubbles within 10 seconds was considered as catalase –positive.

3- Growth temperature:

by incubation of one plate of Campylobacter selective medium and blood agar medium containing 1/50ooo briliant green at 25^{0}C and 42^{0}C for 3 days (Campylobacter fetus does not grow at 42^0 C)

5- In the bull:

The collected semen samples were transferred to sterile bottles and diluted with sterile phosphate buffered saline. Few drops of the diluted semen were spread onto 2 plates of Campylobacter selective medium and blood agar medium containing 1/50ooo briliant green. All the cultured plates were incubated at 37^{0}C in an Co_2 incubator which provides an atomosphere of about 10% Co_2

B- Indirect methods:

1- Vaginal mucus agglutination test (V.M.A.T.)

to detect the locally produced antibodies in the vagina and cervix (which appear in the vaginal mucus between 4 to 10 weeks after infection and remain for a period of 2.5-16months

2- Direct fluorescent Antibody Test (FAT):-

From suspected materials

Treatment and Control

•1- Intrauterine therapy e.g. Penicillin (2 million I.U.) and 3-4 gram dihydrostreptomycin.

2- Prevention of the use communal bulls and a proper of I.A.

3- All bulls should be tested every 3 month's

4-Vaccination of free cows, by using killed adjuvant vaccine

Ц- TRICHOMONOSIS

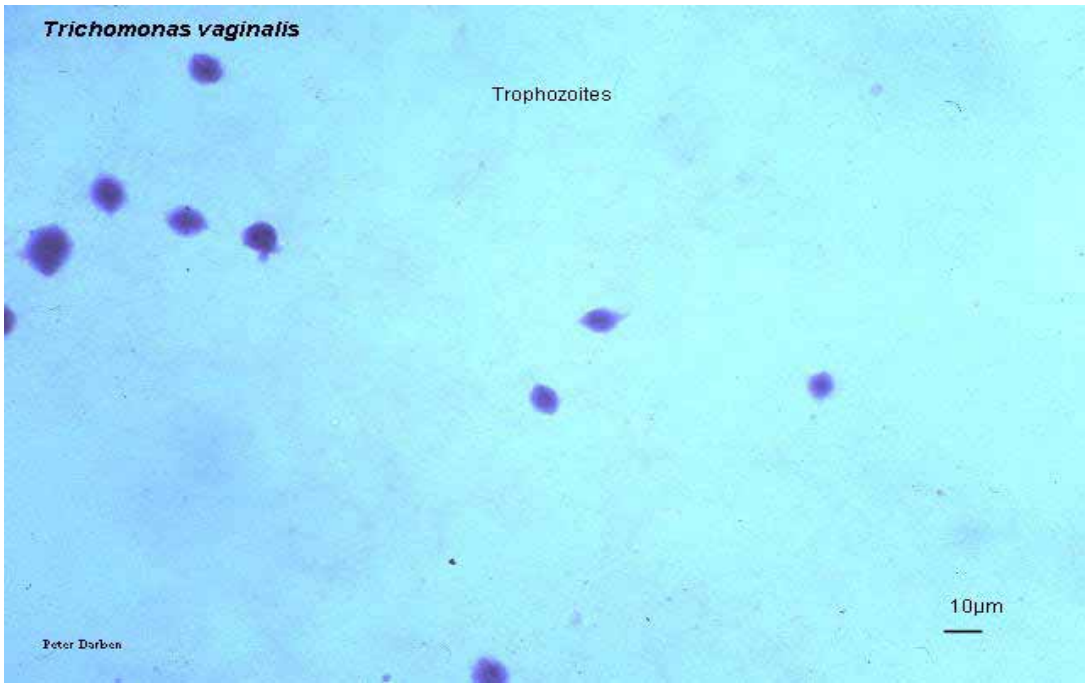
Difinition:

Bovine venereal trichomonosis is caused by Tritrichomonas foetus, a flagellate protozoan. It is world-wide in distribution and at one time was of major economic importance as a cause of abortion and infertility, especially in dairy cattle

Transmission of the disease is primarily by coitus, but mechanical transmission by insemination instruments or by gynaecological examination can occur. The organism can survive in whole or diluted semen at 5°C. Bulls are the main reservoir of the disease as they tend to be long-term carriers, whereas most cows clear the infection spontaneously. For these reasons samples from bulls are usually preferred for diagnosing and controlling the disease

Identification of the agent:

Tritrichomonas foetus is a flagellate, pyriform eukaryotic protozoan, approximately 8–18 µm long and 4–9 µm wide, with three anterior and one posterior flagellae and an undulating membrane. Organisms move with a jerky, rolling motion



Tritrichomonas foetus

DIAGNOSTIC TECHNIQUES:

Diagnosis of trichomonosis is based on the clinical history, signs of early abortion, repeated returns to service, or irregular oestrous cycles. Confirmation depends on the demonstration of organisms in placental fluid, stomach contents of the aborted fetus, uterine washings, pyometra discharge, or vaginal mucus. In infected herds, the most reliable material for diagnosis is either preputial or vaginal washings or scrapings

The number of organisms varies according to the phase of the oestrous cycle, being highest 3–7 days after ovulation. In the infected bull *T. foetus* organisms are present in highest numbers on the mucosa of the prepuce and penis.

1- Sample collection: -

A number of techniques for collecting preputial samples from bulls or vaginal samples. Samples can be collected from bulls by scraping the preputial and penile mucosa with an artificial insemination pipette or metal brush, by preputial lavage.

The samples must be submitted to a laboratory and cannot be delivered within 24 hours, a transport medium should be used (e.g. Winters' medium, buffered saline solution with 5% fetal bovine serum, or skim milk, with or without antibiotics

For samples collected by preputial wash it is necessary to process the sample by centrifuging. The sediment is then examined and inoculated into culture media. The organisms may be seen under a standard light microscope using a magnification of 100 or more. Culture media should be examined microscopically at intervals from day 1 to day 7 after inoculation. The organisms may be identified on the basis of characteristic morphological features. The pear-shaped organisms have three anterior and one posterior flagellae.

2- Culture: -.

Several media can be used. The CPLM (cysteine/peptone/liver-infusion maltose) medium, BGPS (beef-extract/glucose/peptone serum) medium, Clausen's medium (Neopeptone-Lemco-liver extract glucose), Diamond's trichomonad medium, Oxoid's Trichomonas medium. Culture media should be examined

microscopically at intervals from day 1 to day 7 after inoculation. The organisms may be identified on the basis of characteristic morphological features. The pear-shaped organisms have three anterior and one posterior flagellae.

3- Alternative tests:-

1- Mucus agglutination test:-

A mucus agglutination test was detects about 60% of naturally infected cows, antibody levels varying according to stage of oestrus. Mucus samples are collected from the cervical region of the vagina, preferably a few days after oestrus. Antibodies appear in cervical mucus about 6 weeks after infection, and persist for several months. Antibodies may also be found in preputial secretions . The mucus agglutination test is most useful as a herd test, being capable of detecting latent or recently cleared infections. It is specific and does not cross-react with *Campylobacter foetus* or *Brucella abortus*, but lacks sensitivity

2- Intradermal test Tricin

An intradermal test for diagnosis of bovine trichomonosis has been reported The injection site is in the skin of the neck, similar to the site used for the tuberculin test. A dose of 0.1 ml of the 'Tricin' antigen is injected intradermally and the reaction is measured 30–60 minutes later. The reaction consists of a shallow plaque observed visually and showing an increase of >2 mm in skin thickness.

3- Immunohistochemistry on tissues:-

4-PCR

VACCINATION: -

Whole cell vaccines for cows have been shown to offer protection and are available commercially as either a monovalent 'bacterin' or part of a polyvalent vaccine also containing Campylobacter and Leptospira spp. (CL-vaccine). These products show efficacy in the female but not in the bull.

11-Non -specific diseases:-
A- Cantegious diseases

Bovine brucellosis

Is usually caused by Brucella abortus, less frequently by B. melitensis, and rarely by B. suis. Infection is widespread in. several countries.

Clinically

The disease is characterised by one or more of the following signs: abortion, retained placenta, orchitis, epididymitis and, rarely, arthritis, with excretion of the organisms in uterine discharges and in milk. Diagnosis depends on the isolation of Brucella from abortion material, udder secretions or from tissues removed at post-mortem. Presumptive diagnosis can be made by assessing specific cell-mediated or serological responses to Brucella antigens

Brucella abortus, B. melitensis and B. suis are highly pathogenic for humans, and all infected tissues, cultures and potentially contaminated materials must be handled under appropriate containment conditions.

Identification of the agent:

In cattle, the disease is mainly produced by the Brucella abortus and occasionally by Brucella melitensis. The organism is small, non-motile, non-sporing, Gram –ve bacilli or coccobacilli. Demonstrated with Modified Ziel-Neelsen stain The organism can be destroyed by disinfectants and by 10 min. exposure to tem. of 650C , but can survive for long time (months or years) in water, manure, bedding

DIAGNOSTIC TECHNIQUES

There is no single test by which a bacterium can be identified as *Brucella*. A combination of growth characteristics, serological and bacteriological methods is usually needed.

Collection and culture of samples:-

For the diagnosis of animal brucellosis by cultural examination, the choice of samples usually depends on the clinical signs observed. The most valuable samples include aborted fetuses (stomach contents, spleen and lung), fetal membranes, vaginal secretions (swabs), milk, semen and arthritis or hygroma fluids. From animal carcasses, the preferred tissues for culture are those of the reticulo-endothelial system)i.e. head, mammary and genital lymph nodes and spleen), the late pregnant or early post-parturient uterus, and the udder

1- Tissues:

Samples are removed aseptically with sterile instruments and macerated using a 'Stomacher' or tissue grinder with a small amount of sterile phosphate buffered saline (PBS), before being inoculated on to solid media

2-Vaginal discharge

A vaginal swab taken after abortion or parturition is an excellent source for the recovery of *Brucella* and far less risky for the personnel than abortion material. The swab is then streaked on to solid media.

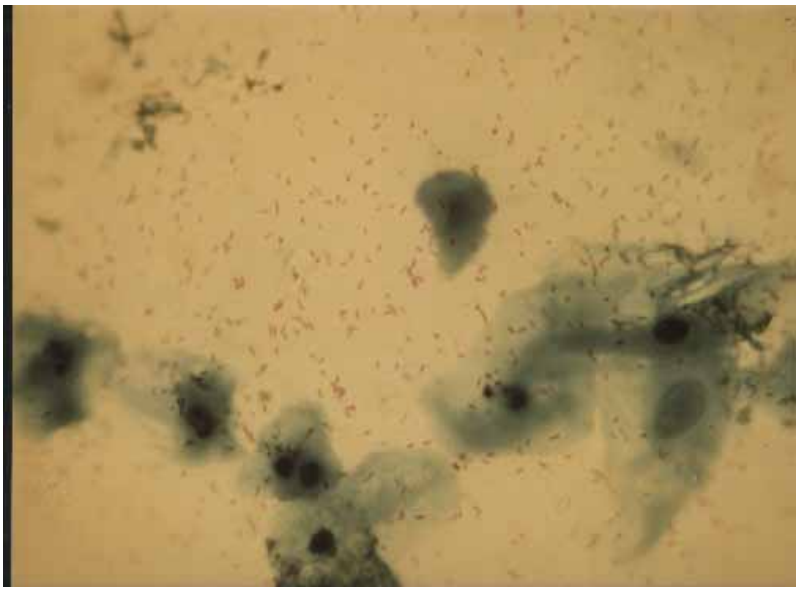
3- Milk:

Samples of milk must be collected cleanly after washing and drying the whole udder and disinfecting the teats. It is essential that samples should contain milk from all quarters, and 10–20 ml of milk should be taken from each teat. The first streams are discarded and the sample is milked directly into a sterile vessel. The milk is centrifuged at ٢٠٠٠***g*** for 15 minutes in sealed tubes (to avoid the risk of aerosol contamination of personnel), and the cream and deposit are spread on solid selective medium, either separately or mixed. If brucellae are present in bulk milk samples, their numbers are usually low, and isolation from such samples is very unlikely

2- Staining methods:-

Brucella is coccobacilli or short rods measuring from 0.6 to 1.5 µm long and from 0.5 to 0.7 µm wide. They are usually arranged singly, and less frequently in pairs or small groups. Brucella is Gram negative. Stamp's modification of the Ziehl–Neelsen method.

Brucella organisms stain red against a blue background. DNA probes or polymerase chain reaction (PCR) methods currently under development can be used to demonstrate the agent in various biological samples



Brucella abortus organism isolated from stomach contents stsines by Modefied Ziel-Nealsen

2-Culture

A-media:-Basal

Direct isolation and culture of *Brucella* are usually performed on solid media.A wide range of commercial dehydrated basal media is available, e.g. *Brucella* medium base, trypcase (or tryptone)–soy agar (TSA). The addition of 2–5% bovine or equine serum is necessary for the growth of strains such as *B. abortus* biovar and many laboratories systematically add serum to basal media, such as blood agar base (Oxoid) or Columbia agar (BioMérieux), with excellent results. Other satisfactory media, such as serum–dextrose agar (SDA) or glycerol dextrose agar, can be used.

B- Selective media:-All the basal media mentioned above can be used for the preparation of selective media. Appropriate antibiotics are added to suppress the growth of organisms other than Brucella. The most widely used selective medium is the Farrell's medium, which is prepared by the addition of six antibiotics to a basal medium.

4- Serological and allergic skin tests:

The buffered Brucella antigen tests, i.e. rose bengal test and buffered plate agglutination test, the complement fixation test, the enzyme-linked immunosorbent assay (ELISA) or the fluorescence polarisation assay, are suitable tests for screening herds and individual animals.

5- Buffered Brucella antigen tests (prescribed tests for international trade): -

a- Rose Bengal Test: -This test is a simple spot agglutination test using antigen stained with rose bengal and buffered to a low pH, usually 3.65 ± 0.05.The RBT is very sensitive. However, like all other serological tests, it could sometimes give a positive result due to S19 vaccination or due to false-positive serological reactions (FPSR).

b- Buffered plate agglutination test: -

6- Complement fixation test:-

CFT is a widely used and accepted confirmatory test although it is complex to perform, requiring good laboratory facilities and adequately trained staff to accurately titrate and maintain the reagents.

7- Enzyme-linked immunosorbent assays (prescribed tests for international trade:-

Indirect ELISA:

The I-ELISA is a highly sensitive test but it is sometimes not capable of differentiating between antibody resulting from S19 vaccination or other FPSR

8-Brucellin skin test

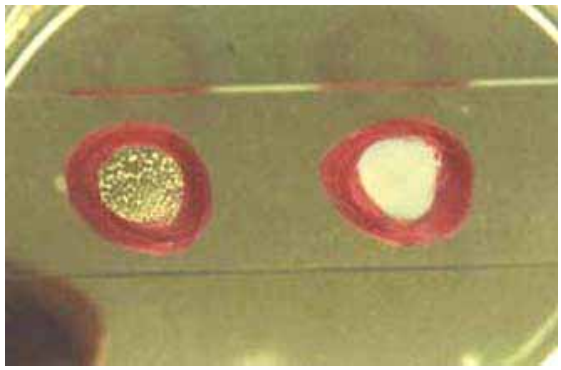
The brucellin intradermal test is one of the most specific tests in brucellosis (in unvaccinated animals)

An alternative immunological test is the brucellin skin test, which can be used for screening unvaccinated herds, provided that a purified (free of sLPS) and standardised antigen preparation (e.g. brucellin INRA) is used.

9- Serum agglutination test:-

SAT has been used with success for many years in surveillance and control programmes for bovine brucellosis. Its specificity is significantly improved with the addition of EDTA to the antigen.

TUBE AGGLUTINATION TEST



SLIDE AGGLUTINATION TEST

10-ring test Milk-

An efficient means of screening dairy herds is by testing milk from the bulk tank. Milk from these sources can be obtained cheaply and more frequently than blood samples .

When a positive test result is obtained, all cows contributing milk should be blood tested. The milk I-ELISA is a sensitive and specific test, and is particularly valuable for testing large herds. The milk ring test (MRT) is a suitable alternative if the ELISA is not available.

In lactating animals, the MRT can be used for screening herds for brucellosis. In large herds (>100 lactating cows), the sensitivity of the test becomes less reliable. False-positive reactions may occur in cattle vaccinated less than 4 months prior

to testing, in samples containing abnormal milk (such as colostrum) or in cases of mastitis Therefore, it is not recommended to use this test in very small farms where these problems have a greater impact on the test results

Vaccination of calves with *B abortus* Strain 19 or RB51 increases resistance to infection. Resistance may not be complete, and some vaccinated calves may become infected, depending on severity of exposure. A small percentage of vaccinated calves develop antibodies that may persist for years, which may confuse diagnostic test results

a- Brucella abortus strain 19 vaccine The most widely used vaccine for the prevention of brucellosis in cattle is the *Brucella abortus* S19 vaccine, which remains the reference vaccine to which any other vaccines are compared. It is used as a live vaccine and is normally given to female calves aged between 3 and 6 months as a single subcutaneous dose of 5–8 x 1010 viable organisms

b- Brucella abortus strain RB51 vaccine:- Strain RB51 has largely replaced Strain 19. It is a rough attenuated strain and does not cause production of antibodies, which are detected by most serologic tests.

c- Brucella melitensis strain Rev.1 vaccine

2-LEPTOSPIROSIS

Definition :

Leptospirosis is a contagious disease of animals and humans caused by infection with any of the pathogenic members of the *genus* Leptospira

Identification of the agent:

The internal organs (such as liver, lung, brain, and kidney) and body fluids (blood, milk, cerebrospinal, thoracic and peritoneal fluids) of clinically infected animals gives a definitive diagnosis of acute clinical disease or, in the case of a fetus, chronic infection of its mother. the kidney, urine, or genital tract of animals without clinical signs is diagnostic only of a chronic carrier state

The demonstration of leptospires in blood and milk of animals showing clinical signs suggestive of acute leptospirosis is considered to be diagnostic. However, isolation from blood is not often successful because bacteraemia is transient and not always accompanied by clinical signs.

The demonstration of leptospires in body fluids or internal organs (usually kidney, liver, lung, brain, or adrenal gland) of aborted or stillborn fetuses is considered to be diagnostic of chronic leptospirosis of the mother, and is evidence of active infection of the fetus

Diagnosis:

1- Culture:

Culture should be carried out in a semisolid (0.1–0.2% agar) medium containing 1% bovine serum albumin (BSA) and either Tween 80 (e.g. Tween 80/BSA medium).

Addition of 0.4–1% rabbit serum to semisolid culture medium enhances the chances of isolating some fastidious leptospiral serovars. Cultures should be incubated at 29 +/- 1°C for at least 16 weeks, and preferably for 26 weeks.

Leptospires may also be demonstrated by a variety of immunochemical staining techniques, e.g. immunofluorescence.

Polymerase chain reaction (PCR)-

Serological tests:

:Two tests have a role in veterinary diagnosis:

1-1- Microscopic agglutination test (MAT)

2-Enzyme-Linked Immunosorbent Assay (ELISA)

1- VACCINES:-Leptospiral vaccines for veterinary use are suspensions of one or more strains of pathogenic *Leptospira*

3-Listerosis

Difinition: Listerosis is primarily a disease of the central nervous system, but in herd infections, a small proportion of animals abort between the fourth and seven month of gestation

Listeria monocytogenes: It is Gram-positive coccoid to short rods shaped are seen single or in pairsor in short chains, motile, non-sporulated, aerobic or micro-aerobic, Grows well at room temperature and at 37^0C on all media, produce Beta-haemolysis on blood agar

Causes: Listeria monocytogenes

*Symptoms:

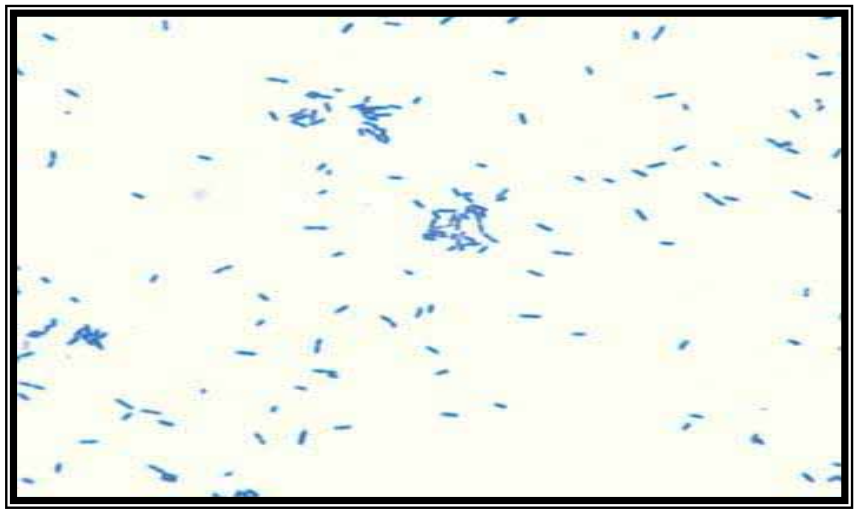
A- Nervous manifestations

B- Abortion of pregnant animals at about 4-7 month of gestation

*Diagnosis:

1- Symptoms and clinical finding

2- Demonstration of the causative organism from direct smears (placenta and foetal liver) and stained with Gram's stain



Listeria monocytogenes

3-**Culture swabs on blood agar medium at 37^0C produced Beta-haemolysis**

4-Detection of antibodies in the serum of infected animals using SAT and CFT test

Non –Cantegious diseases

A-Tuberculosis
B-Corynobacterium
C-Staphyloccous
D-Streptococcus
E- Other microorganisms

BOVINE TUBERCULOSIS

Bovine tuberculosis is a chronic bacterial disease of animals and humans caused by Mycobacterium bovis. In a large number of countries bovine tub Bovine tuberculosis is an infectious disease caused by M. bovis, and is usually characterised by formation of nodular granulomas known as tuberclleserculosis is a major infectious disease among cattle, other domesticated animals

Definition

It is acid- fast bacilli ,rods shaped arranged in pairs or small clumps, non-motile, non-sporulated

Cause: Bovine type
The infection of the uterus, vagina and vulva is mostly occurs secondary infection from primary focus in the body of cattle and buffaloes in Egypt %١٠-٨ Incidince

Symptoms:

1-Reduced fertility with anoestrus or irregular estrus
2-Genital discharges with pus
3-Abortion of pregnant animals in late gestation (8-9th month). It may occasionally occur during 4-5th month
4-General condition is bad and the animal is emaciated

Diagnosis

1- Rectal examination may reveal lesion in the ovary, F.T. and uterus

2-**Symptoms and clinical finding**

3-**Isolation of the causative** organism from uterine discharges (the organism is most frequency after calving and abortion

a- **Direct smear** from affected parts by used of a **Peteroff,s method** (The sample is mixed thoroughly with an equal volume of 4% caustic soda, placed in the incubator at 370C for 2o minutes, centrifuged at 3000 r.p.m. for 30 minutes, the supernatant is poured off. The deposit is neutralized with HCL and smear stained with Zihel-Neelsen show the acid-fast bacilli).

b- **Cultivation** on a suitable medium (Lowenstein-Jensen medium) of the sample directly or better still after treating with caustic soda at 370C for at least week to 2weeks

2-Guinea pig inoculation

The material is injected subcutaneously in 2 guinea-pigs, one is to be killed after3-4 weeks, if it does not show lesions of tuberculosis, the other should be killed 4-6 weeks later

a- Haemoagglutinstion test .

b- Allergic test orTuberculin test

1-Subscutenous one: It is depend on recording the temperature after injection of the tuberculin, a rise temperature was considered positive

2-Double interadermal: It is depend on a rather local reaction

3-Opthalmic test: It is depends on instillation of tuberculin in the eyes and oberservation of inflammation of the conjunctiva in positive cases

Control: Positive diagnosed animals should be condemned*

2- Culture of *Mycobacterium bovis:*

In order to process specimens for culture, the tissue is first homogenised using a pestle and mortar, stomacher or blender a blender followed by decontamination with either an acid or an alkali, such as 5% oxalic acid or 2–4% sodium hydroxide. The mixture is shaken for 10 minutes at room temperature and then neutralised. The suspension is centrifuged, the supernatant is discarded, and the sediment is used for culture and microscopic examination. For primary isolation, the sediment is usually inoculated on to a set of solid egg-based media such as Lowenstein–Jensen. Cultures are incubated for 8 weeks at 37°C with or without CO2. The media should be in tightly closed tubes to avoid desiccation.. When growth is visible, smears are prepared and stained by the Ziehl–Neelsen technique. Growth of *M. bovis* generally occurs after 3–6 weeks' incubation

3- The PCR

5- Enzyme-linked immunosorbent assay

Corynebacterium

Definition: It is Gram-positive, but non-acid-fast rode, arranged in pairs or Chinese letters, non-motile, non-capsulated, non-sporulated, grow aerobically and anaerobic.

Cause: Corynobacterium pyogenes:

Resistance: It is rapidly killed at 570C and very sensitive to disenfectants

Symotoms:

Metritis occure after parturition or retained placenta, large amounts of pus come out from vagina

Diagnosis:

1- Direct smear from pus vaginal discharge and stained by Gram stain would show the diphtheriod in masses and intracellular.

2- Vaginal swabs culture on blood agar at 370C for 24 hour producing Beta-haemolysis while it produced clear zone around the growth on milk agar and produced turbidity with granular deposit on serum broth

3- Biochemical reactions;

It is strongly proteolytic and it liquefies gelatin, egg or solid serum media, ferments a numbers of carbohydrates

Other organisms

Streptococcus, Staphylococcus, E.coli, Pseudomonas aeruginosa, Corynobacterium pyogenes Pasteruella haemolytica, Pasteruella multocida, and Salmonella, these are the most predominant bacteria isolated from cow suffering from retenation of the placenta, endometritis, and pyometre.

Diagnosis:

Isolation and identification of the isolates:

a-Isolation methods:

Culture media:

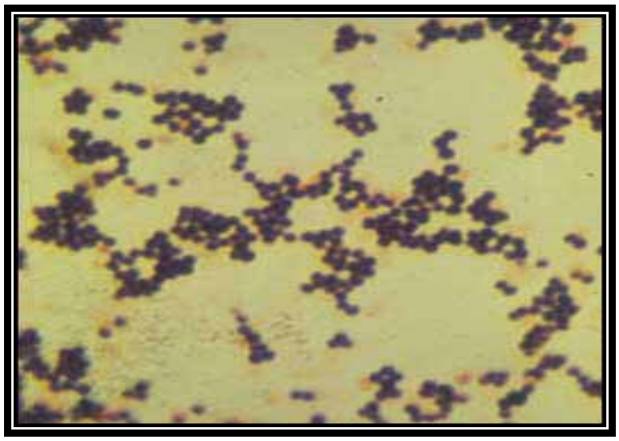
MacConky,s agar, Blood agar, Nutrient agar, Violet Red Glucose Agar, Baried-parker medium.

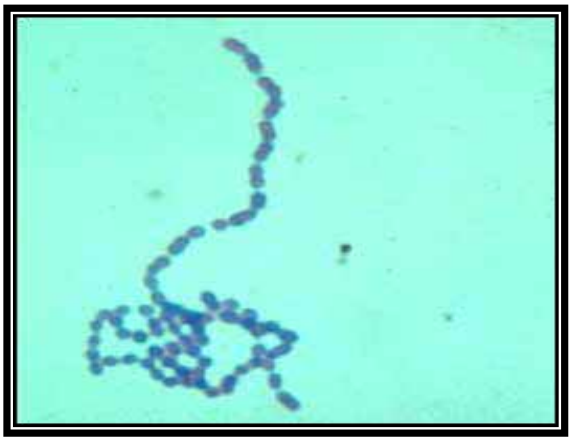
The screw capped bottles containing the samples were incubated at 370C for 24 hours to enhance growth and multiplication of microorganisms. By a platinum loop, a loopful was streaked onto different media and incubated at 370C for 24 hours, after which they examined for bacteria growth. Different colonies were picked up and purified , then kept on nutrient agar sloops

b- Identification of isolates

Smears were prepared from the sloop agar tube and stained by Gram,s stain. The isolates were classified according to the staining affinity into Gram negative rods, Gram,s positive rods and Gram positivity cocci

Staphylococcus organism

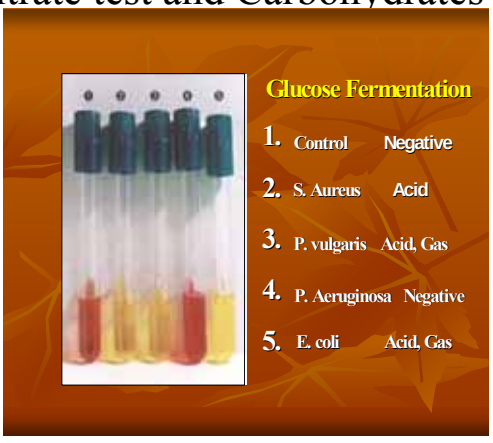




Streptococcus organism

Biochemical rea

‹Voges proskauer test, Indol test, Methylene test, Urease test Citrate test and Carbohydrates fermentation



d- Sensitivity test

The isolates were tested for sensitivity to different chemotherapeutic agents. One ml of 24hr. broth culutures was spread on the surface of blood agar. Antibiotic sensitivity discs were placed on the surface seeded agar. Plates were incubated aerobically or anaerobically at 370C for 24hr. The sensitivity was judged according to the diameter of clearance zone arround the discs

Pregnancy diseases abortion

By
Prof. Dr. M. I. El Sherry

Definition :

*Abortion is the expulsion of a fetus before the time of normal parturition .
*Stillborn is a dead fetus delivered within the period of parturition.

Etiology

1-Viral:
*Equine rhinopneumonitis (ERP).
*Equine viral arteritis (EVA)
*Infectious bovine rhinotracheitis.
*Bovine virus diarrhea.
*Rift valley fever.
*Canine herpes virus.

2-Rickettsial:
* Coxiella burnetii.

3-Bacterial :
* Brucellosis.
* Campylobacteriosis.
* Listeriosis.
* Chlamydia.
* Leptospirosis.

4-Mycotic :
* Aspergillus, Absida , Mucor , Rhizopus and Mortierella wolfii.

5-Protozoal :
* Toxoplasmosis.
Trichomoniasis.
* Neospora.

Viral abortion

Equine rhinopneumonitis (ERP)

Etiology:

*Equine herpes virus 1.

Susceptibility:

*Horse , Donkey , Mule.

Transmission:

*Respiratory.

* Ingestion.

Clinical signs:

* Incubation period from 10 days to 4 month.
* Spontaneous late abortion 8-11 months, but it can be early as 4 months.
* Infected mares show no signs of respiratory illness.
* Placenta passes intact covering the foal.
* Foals aborted before 6 months are autolyzed.
* In late gestation, infected foals are either stillborn or they show weakness, jaundice and difficult in breathing and die within few days of birth.

Lesions:

Grossly:

Fetuses aborted before 6 months:

* Severe autolysis.

Fetuses aborted after 6 months:

* Jaundice.

*Petechiation of mucous membranes.

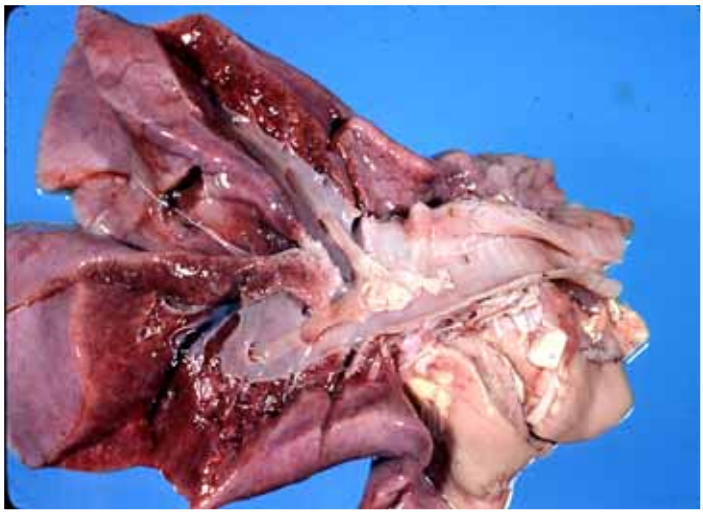
* White to cream colored necrotic foci in liver.

* Accumulation of fluid in the pleural cavity.

Equine rhinopneumonitis fetal lung

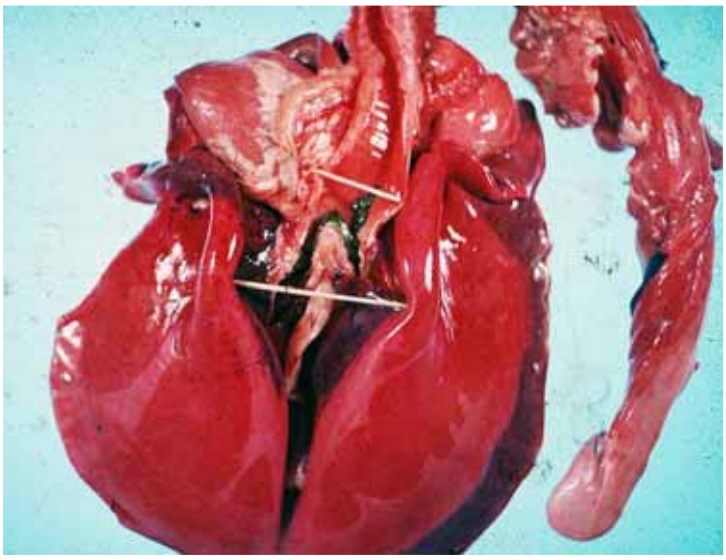
Rhinopneumonitis fetal lung and Equine trachea

Many pale white 2–3 mm foci diffusely scattered in meaty firm lungs

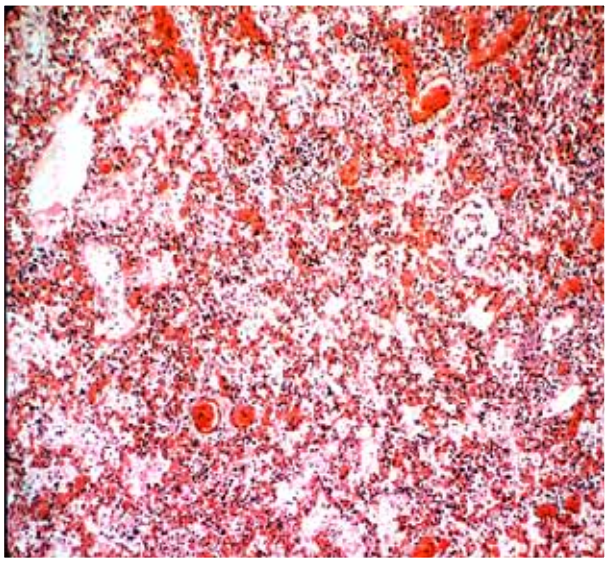


The lung is firm diffusely and pale fibrin clot is lumen present in the tracheal

Equine rhinopneumonitis fetal lung

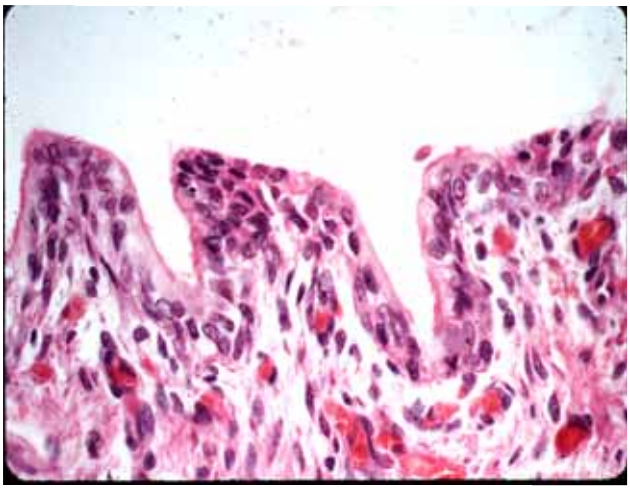


A meconium plug at the tracheal bifurcation



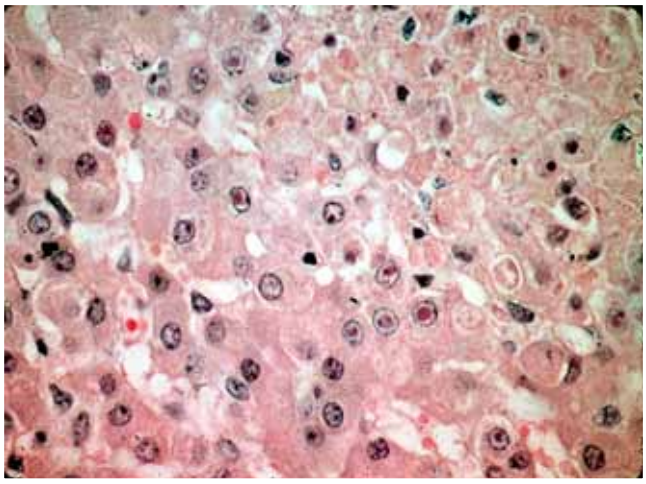
Diffuse pneumonia

Equine rhinopneumonitis bronchial epithelium



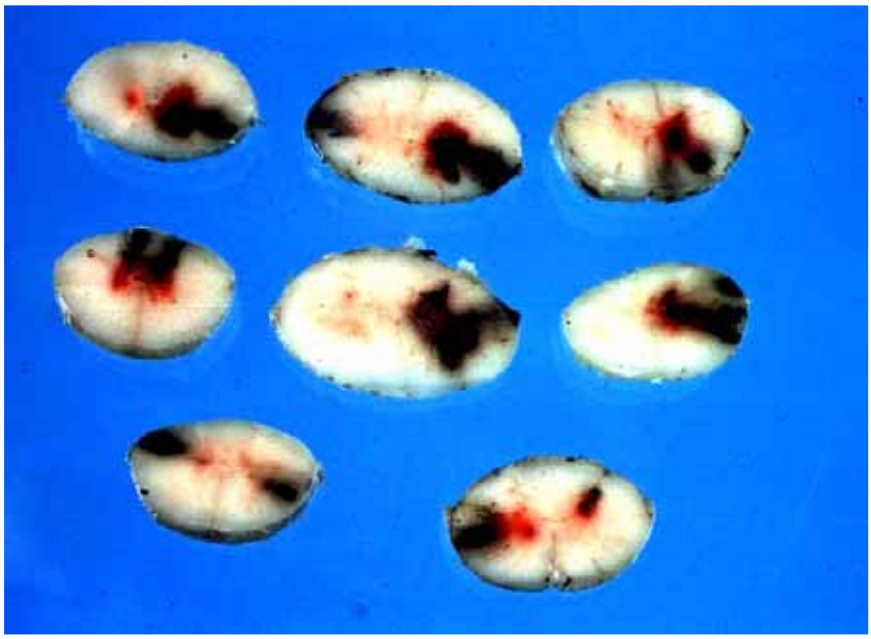
Scattered intranuclear inclusions in epithelium cells

Equine rhinopneumonitis fetal liver



Focal necrosis with intranuclear inclusions in hepatocytes

Equine rhinopneumonitis fetal spinal cord



Multiple , hemorrhagic , irregular soft areas

Placenta :

* Edematous.
* No rapture of cervical star.
* Fetus usually still attached to fetal membranes.
* Premature placental separation.

Microscopically:

*Pulmonary intralobular septa are edematous and infiltrated by mononuclear cells.

*Fibrinous alveolar exudation.
*Liver necrotic foci and acidophilic intranuclear inclusion bodies.

*Serofibrinous placentitis with vasculitis.

*Necrosis of the germinal centers of all lymphatic tissues with herpes inclusions in reticular cells.

Equine viral arteritis (EVA)

Etiology:

***Arteriviridae.**

Susceptibility:

***Equines.**

Transmission:

***Respiratory.**
***Venereal.**

Clinical signs: :

* Mares abort during or shortly after febrile period.

Lesions:

Fetus:

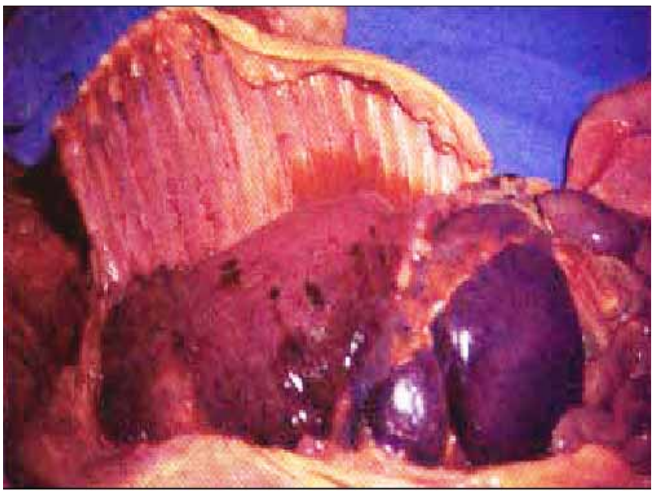
Grossly:

*Serosanguinous fluid in body cavities.
*Vasculitis in fetal organs i.e. liver, kidney ect.

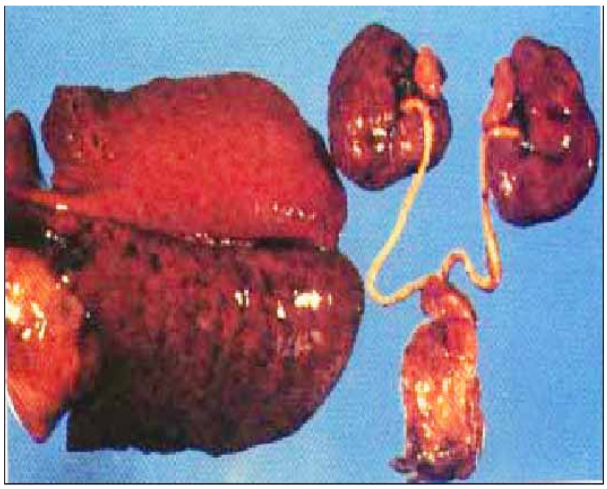
Placenta :

***Vasculitis .**

Equine viral arteritis



Plural and pulmonary hemorrhages



Pulmonary edema and hemorrhages

Infectious bovine rhinotracheitis

Etiology:

*Herpes virus type 1.

Susceptibility:

*Bovine.

Transmission:

*Respiratory.

*Venereal.

Clinical signs:

*Abortion in the second half of pregnancy.

*Fetus autolyzed before delivery.

Lesions:

Fetus:

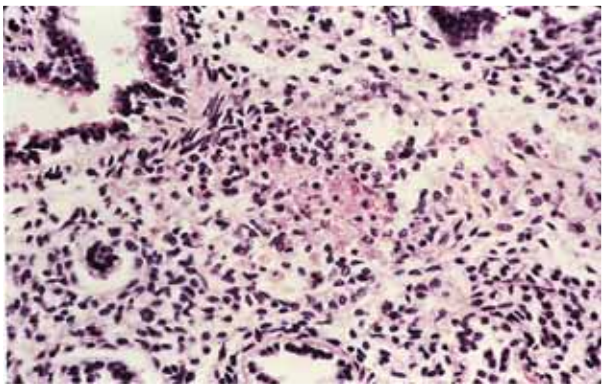
Grossly:

*Autolyzed.

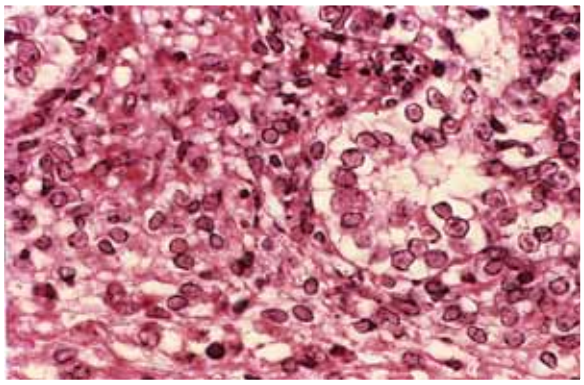
Microscopically:

*Liver and lung show focal necrosis with acidophilic intranuclear inclusion bodies.

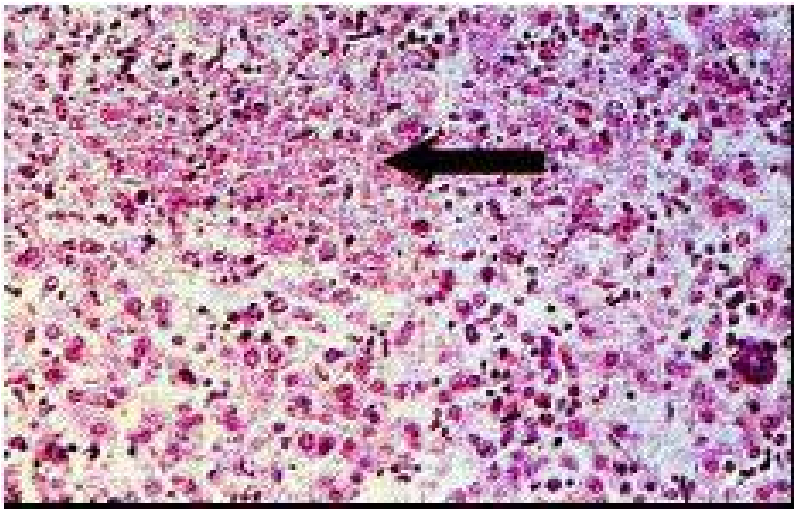
Infectious bovine rhinotracheitis



Pulmonary foci of necrosis

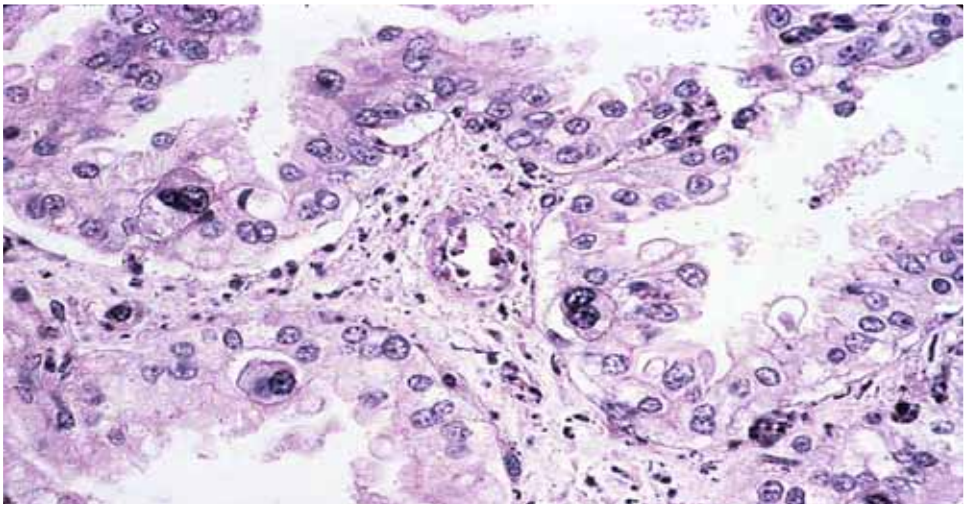


Inclusion bodies in bronchial epithelium

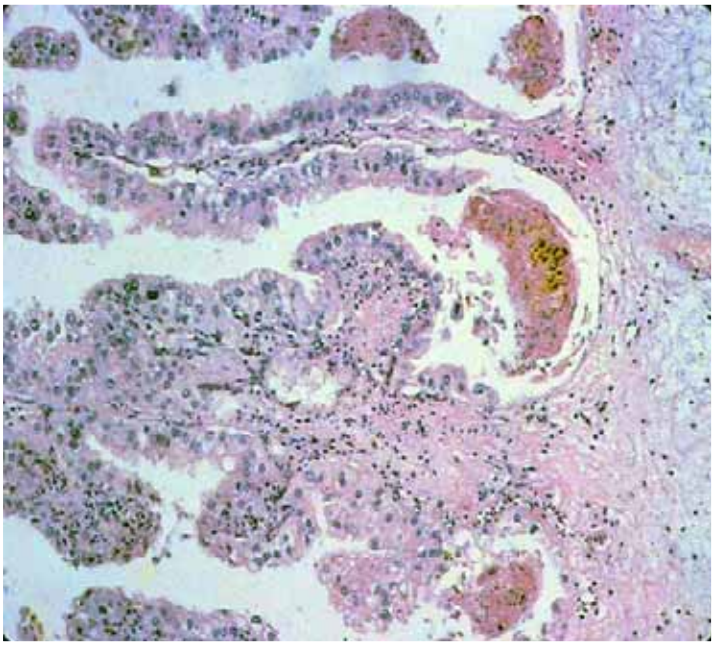


necrosis and inclusion bodies

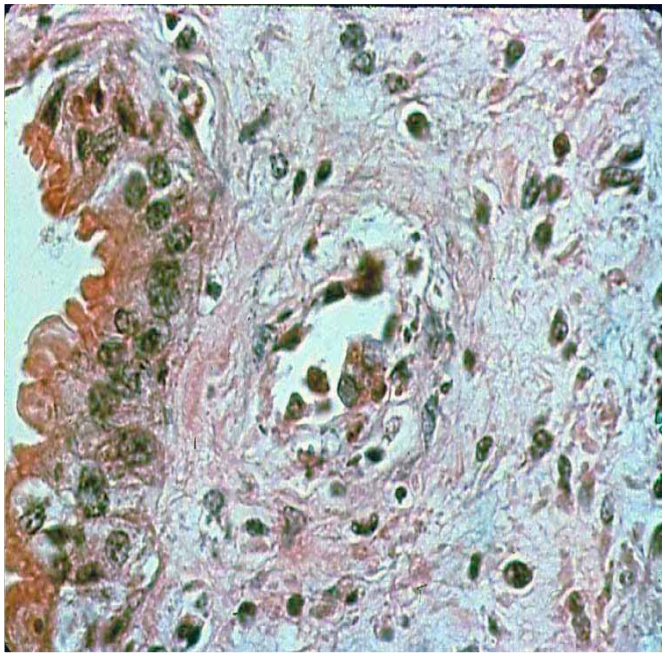
Cow placenta



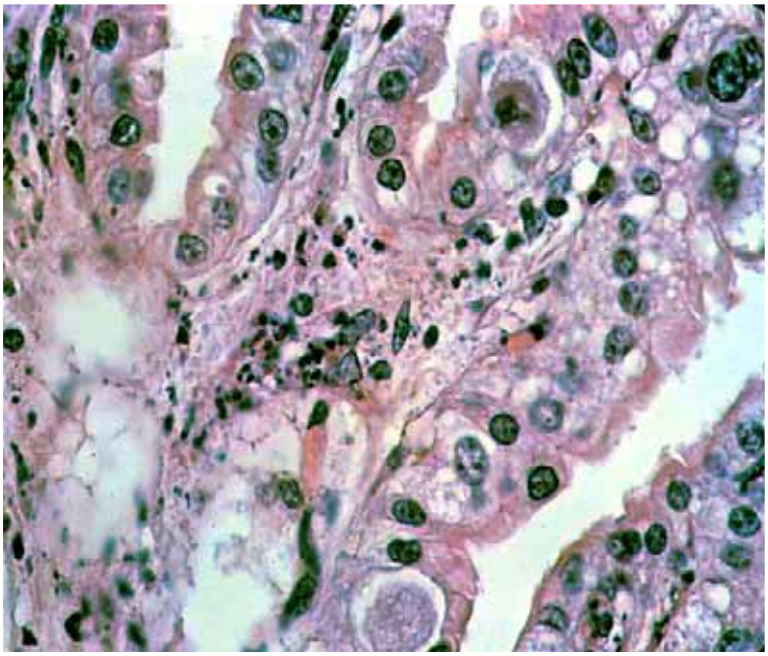
Necrosis of the endothelium of the vessels in the connective tissue of the chorionic villi .The necrosis causes karyorrhexis and pycnosis of the connective tissue cells .The trophoblastic cells are normal



The pycnotic cells in the connective tissue of the chorionic villi is characteristic for IBR infection



IBR placenta with necrosis of endothelial cells .Intranuclear inclusion in endothelial cell at top of vessel



IBR placenta with intranuclear inclusions in two fibroblasts. Basophilic material filling nucleus with very little shrinkage. Pycnotic cells in surrounding tissue. Normal trophoblastic cells.

Chorioallantois from IBR abortion, massive edema

Bovine virus diarrhea

Etiology:

*Pestivirus.

Susceptibility:

*Bovine.

Transmission:

*Ingestion.

Clinical signs:

* Late abortion.
* Newborn with cerebellar hypoplasia.

Lesions :

Fetus :

Grossly :

* Aborted fetuses may be fresh , autolyzed or mummified.
* Calves may be born alive with uncoordinated movements due to cerebellar hypoplasia .

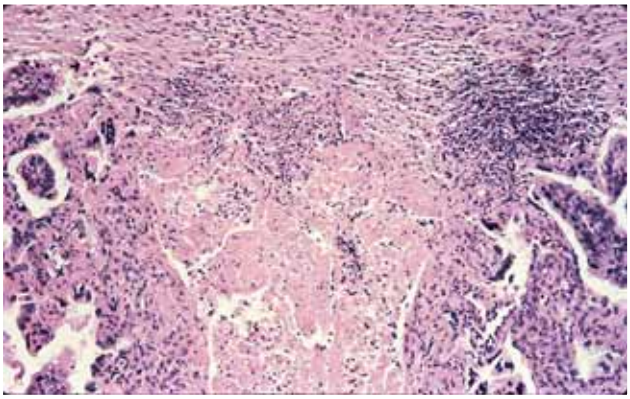
Bovine virus diarrhea aborted calf

cerebellar hypoplasia

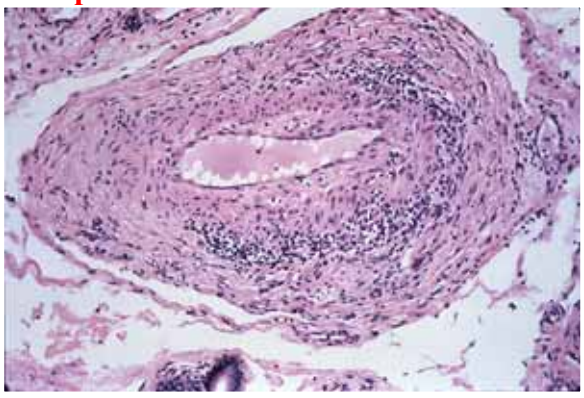
Bovine virus diarrhea

Uncoordinated movements

Bovine virus diarrhea ewe placenta



Focal areas of necrosis of chorioallantois . Lymphocytic infiltration adjacent to area of necrosis.



Necrotic arteritis

Rift valley fever

Etiology:

***Bunya virus.**

Susceptibility:

***Ruminants and human.**

Transmissions:

***Mosquitoes.**

Clinical signs:

***Explosive rate of abortion in sheep.**

Lesions:

Fetus:

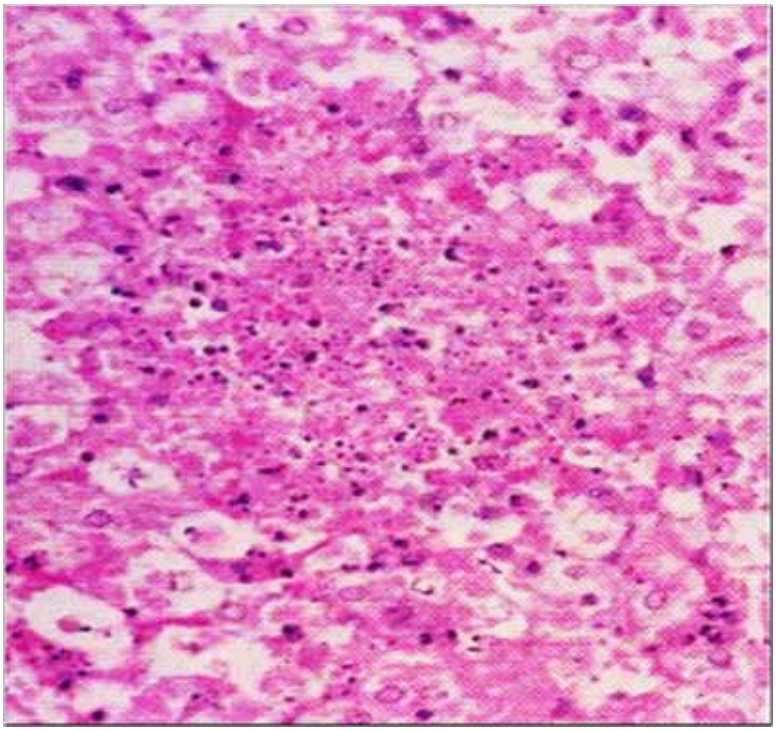
Grossly:

***Focal necrosis in the liver.**

Microscopically:

***Intranuclear cigar shape acidophilic inclusion bodies in hepatocytes at the periphery of coagulative necrotic foci.**

Rift valley fever aborted calf



Focal hepatic necrosis

Canine herpes virus

Etiology:

*Herpes virus.

Susceptibility:

*Canines.

Transmission:

*Respiratory.

Clinical signs:

*High mortality and morbidity rate in new born puppies.
*Abortion, stillbirth and infertility.

Lesions:

Fetus:

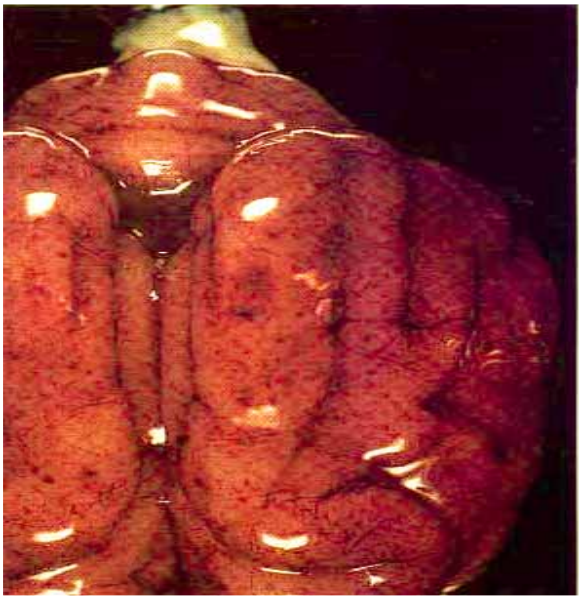
Grossly:

*Edema lung.
*Leptomeningitis.
*Hemorrhagic kidneys.

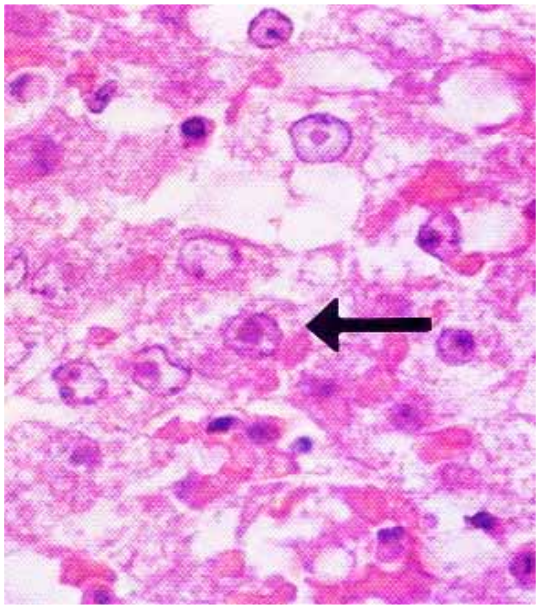
Microscopically:

*Leptomeningitis.
*Intranuclear acidophilic inclusions in liver, kidneys, lungs and adrenal .

Canine herpes virus



Meningeal petechial hemorrhages
Canine herpes virus



Acidophilic intranuclear inclusion bodies

Rickettsial abortion

Coxiella burnetii

Etiology:

***Coxiella burnetii.**

Susceptibility:

***Sheep & goats.**

Transmission:

***Respiratory.**

Clinical signs:

***Endemic abortion in late gestation period.**
***Weak lambs and kids may be born during the outbreak.**

Lesions:

Fetus:

Grossly:

***Generalized subcutaneous edema.**
***Reddish fluid accumulation in the thoracic cavity.**

Microscopically:

***Focal lymphoid accumulations around bronchioles .**
***Few lymphocytes and macrophages in renal medulla and portal triads.**

Placenta:

Grossly:

***Placenta is thickened and leathery.**
***Copious exudate covers intercotyledonary areas.**
***Soft cotyledons.**

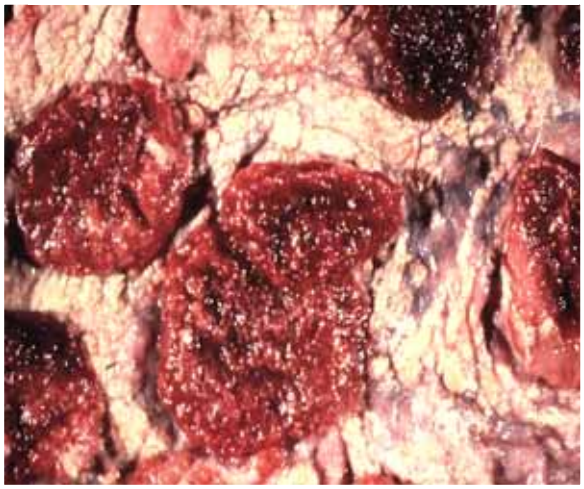
Microscopically:

***Necrotic placentitis.**
***Multifocal necrosis and neutrophilic infiltration in both cotyledonary and intercotyledonary areas.**
***Placental stroma is edematous and hyperemic.**
***Vasculitis.**
***By Gimenez method coxiella organisms appear as intracellular acid fast red short rods . Chlamydia and brucella stain negative blue.**

Coxiella burnetii ewe placenta

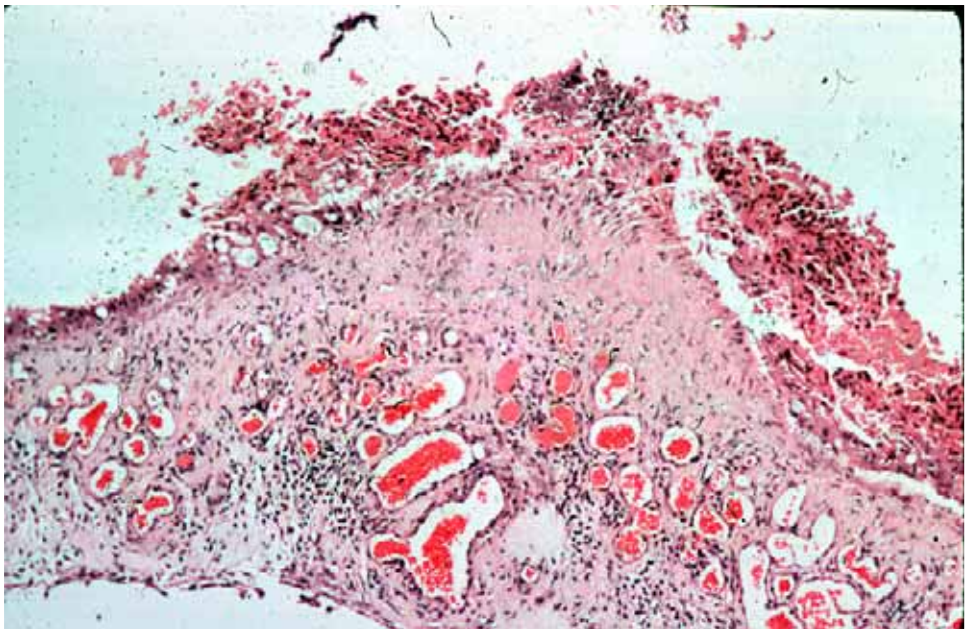
Small areas , 1-2 mm of yellow thickened debris in the intercotyledonary space

Coxiella burnetii ewe uterus



Multiple yellow foci in the intercaruncular space and few in the red caruncles

Coxiella burnetii ewe placenta



Focal necrosis

Bacterial abortion

Brucellosis

Etiology:

*Brucella abortus.

Susceptibility:

*Cattle , Sheep and goats.

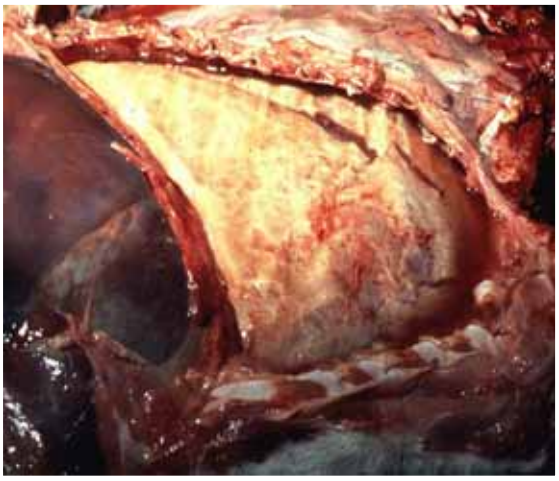
Source of infection:

*Aborted fetus.
*Placenta.
*Uterine discharge.

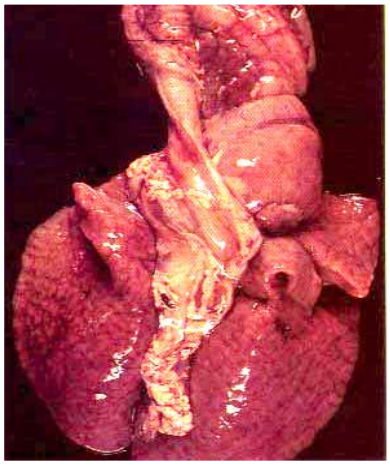
Route of infection:

*Ingestion.
*Coital.
*Conjunctiva.
*Broken or even intact skin.

Brucellosis aborted calf

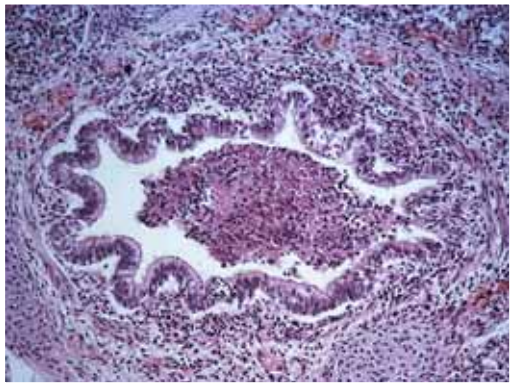


Fibrinous pleuritis



Bronchopneumonia (cobble stone appearance)

Bronchopneumonia (cobble stone appearance)



Catarrhal bronchopneumonia

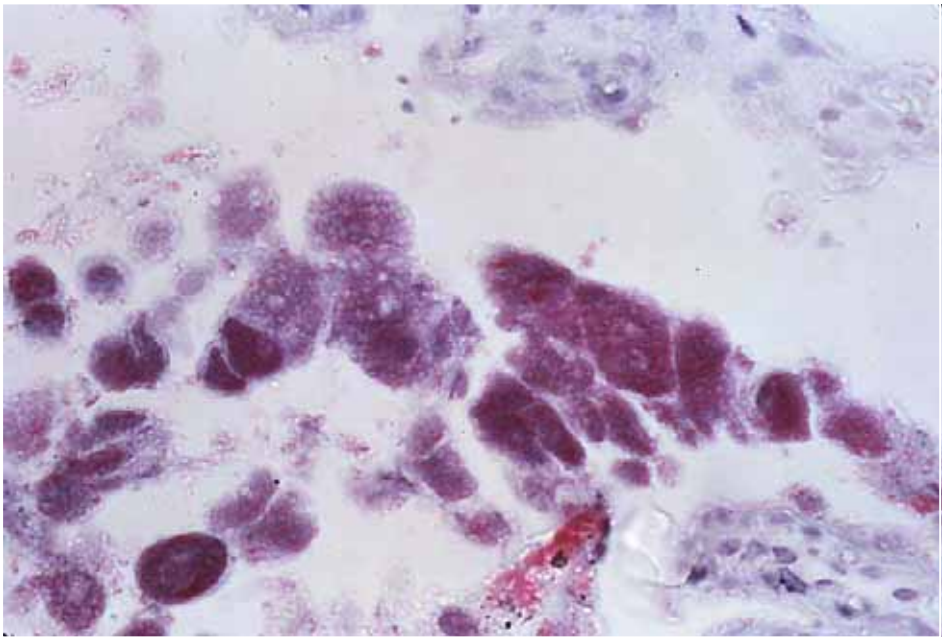
Brucellosis ewe placenta

Necrotic foci are scattered in the cotyledons . Fibrinous inflammation of intercotyledonary areas.

Brucellosis cow placenta

Fibrinonecrotic placentitis

Brucellosis cow placenta



Numerous brucella organisms in trophoblastic cells

Campylobacter fetus (Vibriosis)

Etiology:

***Campylobacter fetus.**

Susceptibility:

***Cattle , Sheep.**

Cattle:

Transmission:

***Coital.**

Source of transmission:

***Bulls carry the organism in preputial cavity.**

***Infected bulls develop balanoposthitis.**

***By time become permanent carriers without lesions.**

Clinical signs:

***Repeat breeder.**

***Abortion at 4 to 6 months.**

***Retained placenta.**

Lesions:

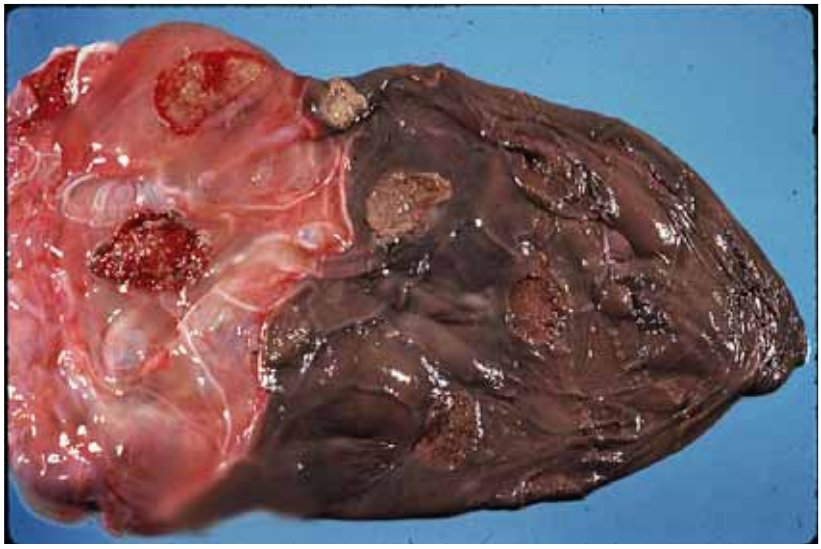
Fetus:

***Edema.**

Placenta:

***Fibrinonecrotic placentitis.**

Vibriosis cow placenta



A definite line of demarcation is present between the infarcted and more normal placenta.

Sheep:

Transmission:

*Ingestion.
*Intestinal carriers.

Clinical signs:

*Late abortion.
*Premature birth.
*Birth of week lambs.

Lesions:

Fetus:

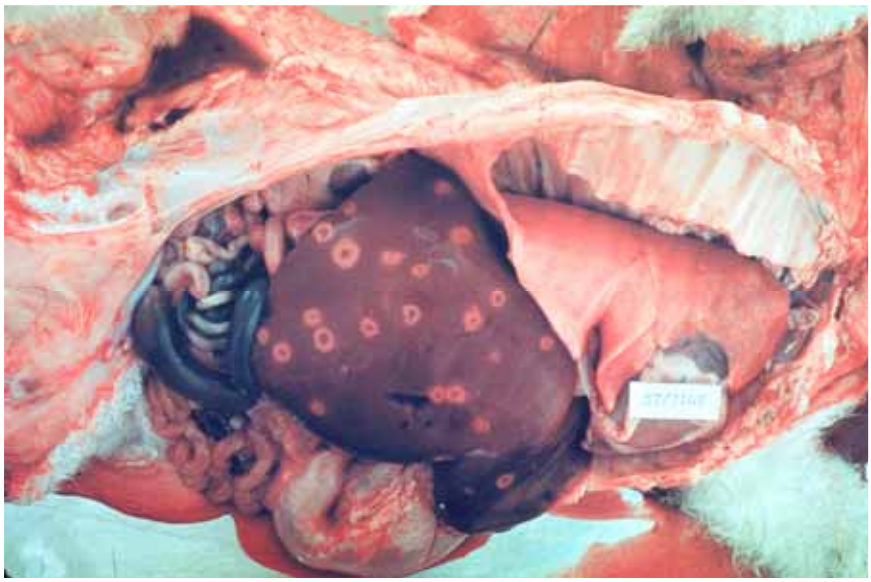
Grossly:

*Focal necrotic hepatitis.
*Light tan areas 1-2 mm up to 1-2 cm in diameter randomly distributed.
* No surrounding reactionary zone.
* Renal cortical hemorrhages.

Microscopically :

* Focal areas of coagulative necrosis.

Campylobacter abortion lamb



Liver necrotic foci

Listeriosis

Etiology:

*Listeria monocytogenes.

Susceptibility :

*Cattle , Sheep.

Transmission :

*Ingestion.

Clinical signs:

*Encephalitis .
*Abortion and stillbirth.
*Abortion at last trimester of pregnancy.
*May occur together or one or other occurs exclusively.

Lesions:

Grossly:

Fetus:

*Small foci of hepatic necrosis.

Placenta:

*Purulent placentitis ; the necrotic tips of villi are covered by purulent exudate.

Microscopically :

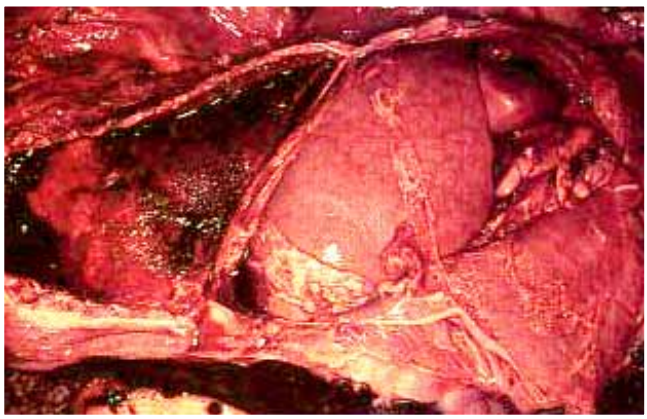
Fetus:

* Microabscesses.

Placenta:

* Purulent placentitis

Listeriosis aborted calf



Pin head necrotic foci in the liver (microabscesses)

Pin head necrotic foci in the liver (microabscesses)

Etiology:

*Leptospira interrogans.
*Pomona.
*Hardjo.

Susceptibility :

*Cattle , Sheep and Horse.

Transmission:

*Ingestion .
*Lacerated skin.

Clinical signs:

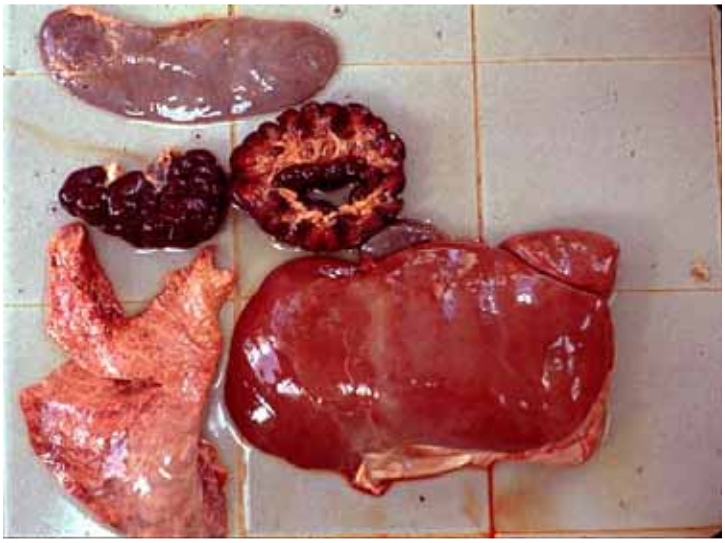
*Abortion in the last third of pregnancy.
*Stillborn.
*Birth of weak calves .

Lesions:

Fetus:

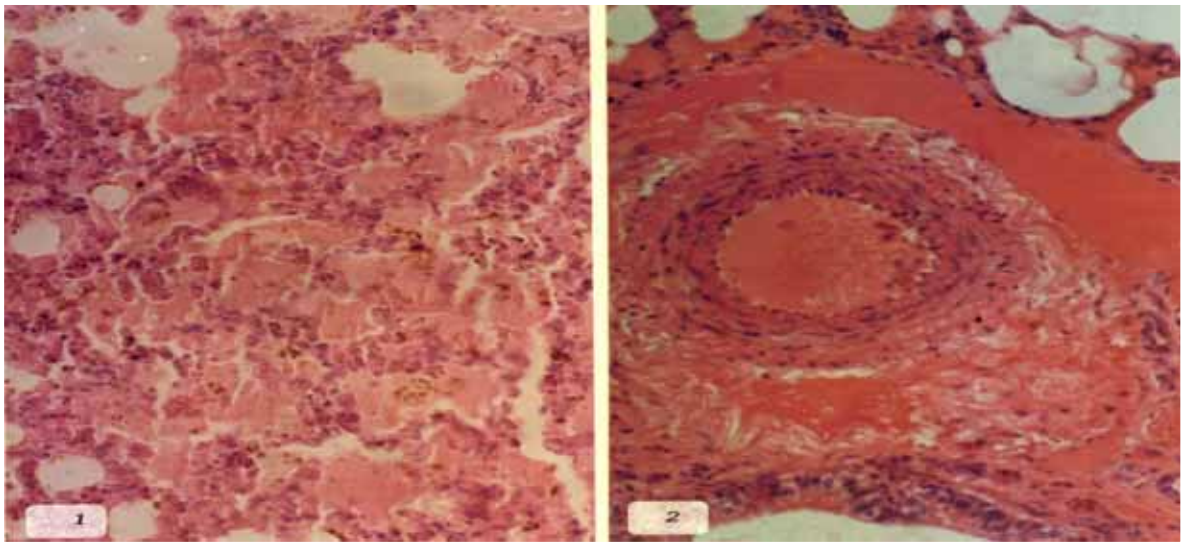
*Focal interstitial nephritis.
*Calves surviving a week or more showed in addition hemoglobinic nephrosis.

Leptospiral aborted calf

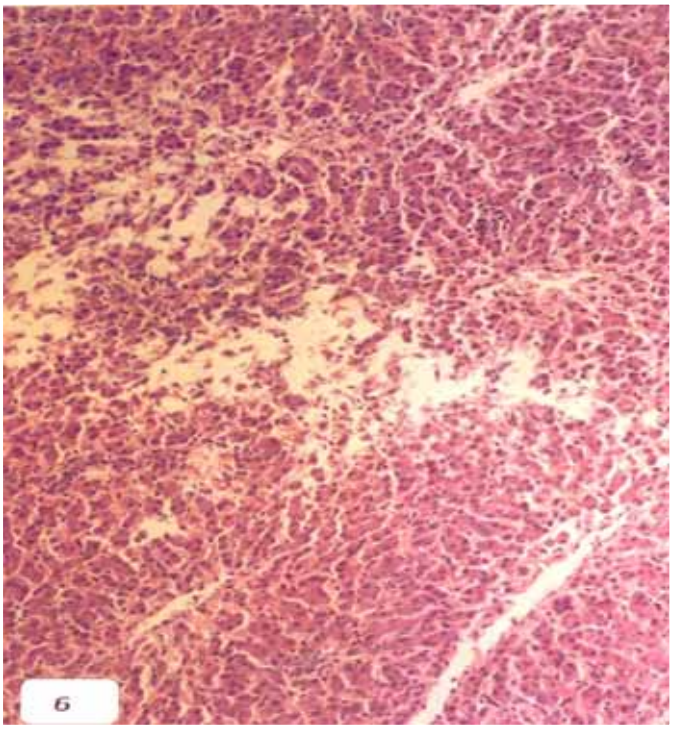


Interstitial nephritis with hemoglobinic nephrosis & lung edema

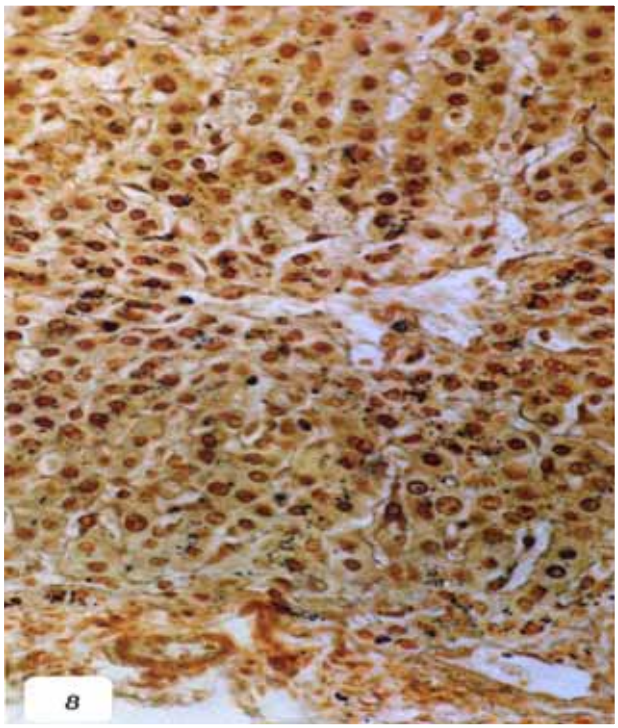
Focal interstitial nephritis with hemoglobinic nephrosis



Pulmonary edema and intravascular haemolysis

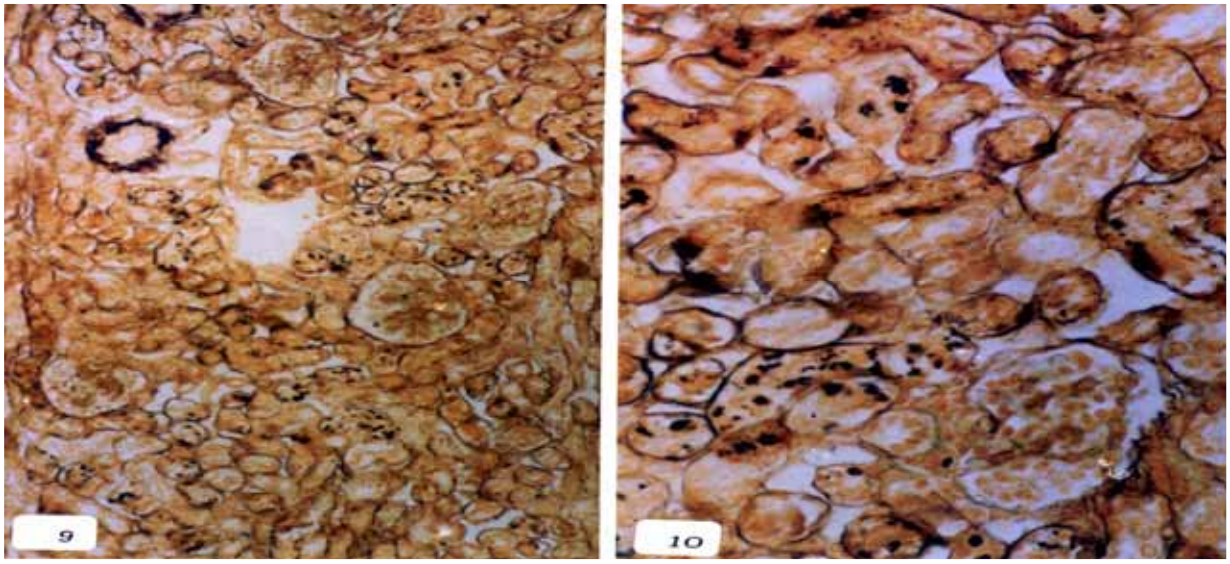


Dissociation of liver cells from cords.



Leptospira organisms in Hepatocytes (silver stain).

Leptospira organisms in kidney



convoluted tubules (silver stain)

Chlamydia abortion

Etiology:

***Chlamydia psittaci.**

Susceptibility:

***Sheep and Goat.**

Clinical signs:

***Late abortion.**
***Premature lambing.**
***Retention of placenta.**

Lesions:

Fetus:

Grossly:

***Body cavities are filled with hemoglobin stained fluid.**

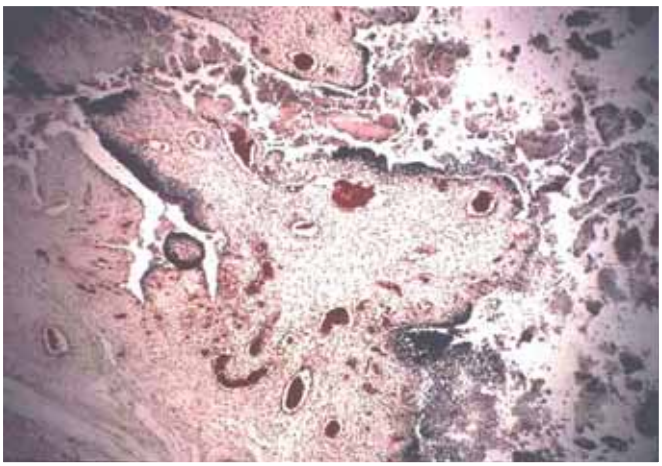
Microscopically:

***Lymphoid hyperplasia.**

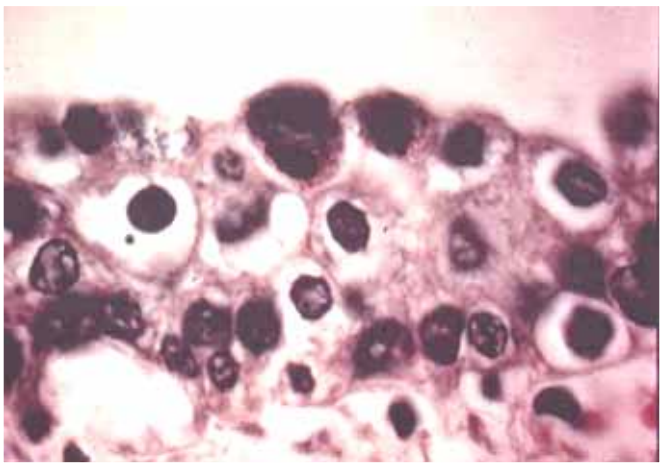
Placenta:

***Fibrinonecrotic placentitis.**
***Vasculitis is microscopic differential feature for chlamydia.**

Chlamydiosis ewe placenta



Inflammation of connective tissue and trophoblastic cell layer



Chlamydial organisms in trophoblastic cells.

Mycotic abortion

Etiology:

*Aspergillus
*Absida.
*Mucor.
*Phizopus.
*Mortierella wolfii.

Susceptibility:

*Cattle and Horse.

Transmission:

*Respiratory.
*Ingestion.
*Haematogenous for pregnant uterus.

Clinical signs:

*late abortion 6-9 months.
*Retained placenta.

Lesions:

Fetus:

Grossly:

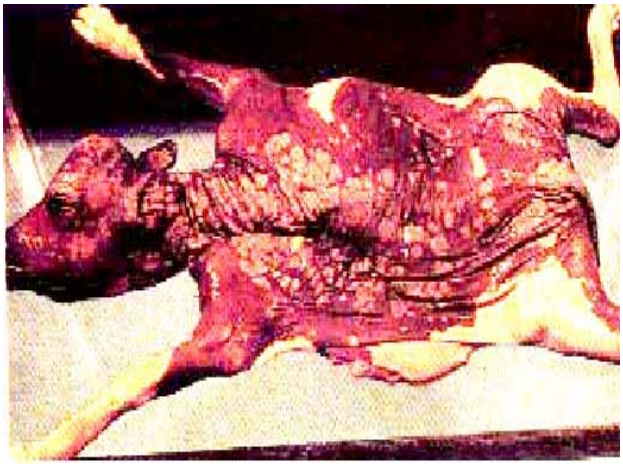
*Cutaneous granulomas inform of irregular plaques.
*The plaques are elevated grayish, irregular in out line and tend to coalesce.
*Located at the periorbital, shoulder , back and sides.

Placenta:

*Granulomatous placentitis.
*Button like lesions .

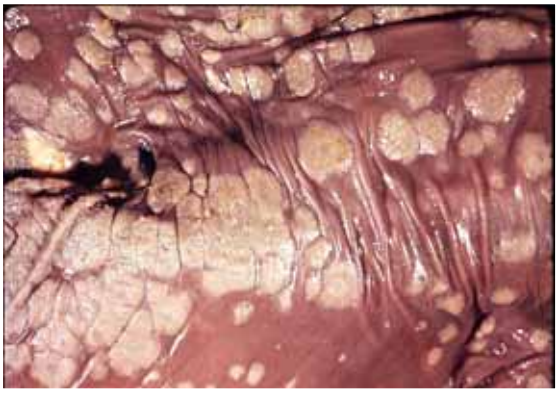
Aborted calf

Mycotic dermatitis



Mycotic dermatitis

Mycotic dermatitis calf



Aspergillosis … thickened pale plagues in the skin

Mycotic placentitis cow

Thickened and leathery with swollen cotyledonary edges and necrotic debris centrally.

Mycotic placentitis cow

Thickening of cotyledonary edges is specific for mycotic abortion

Mycotic placentitis Rhizopus sp

Mycotic placentitis Rhizopus sp

Discriminated only by tissue culture

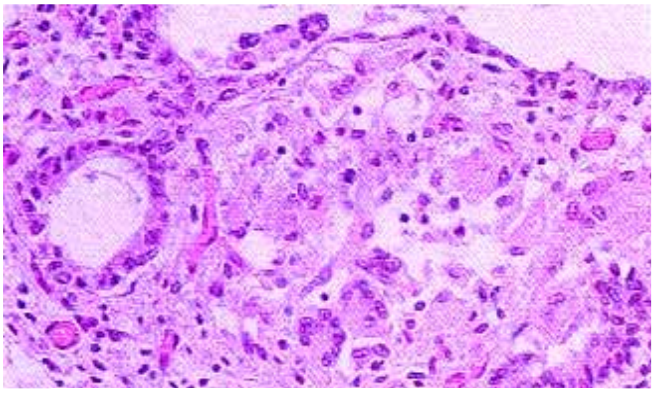
Mycotic placentitis Mortierella wolfii

Discriminated only by culture

Mycotic placentitis mare

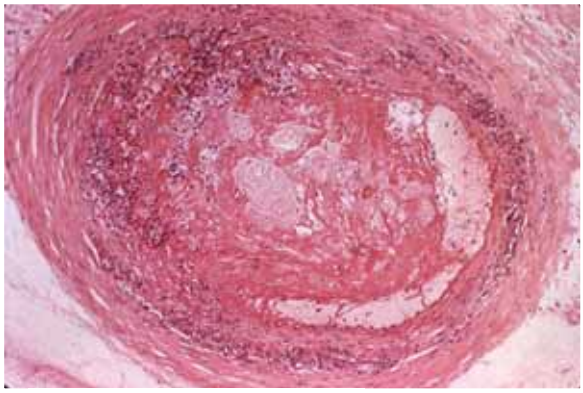
The early lesion is in the placenta adjacent to cervix

Aborted calf



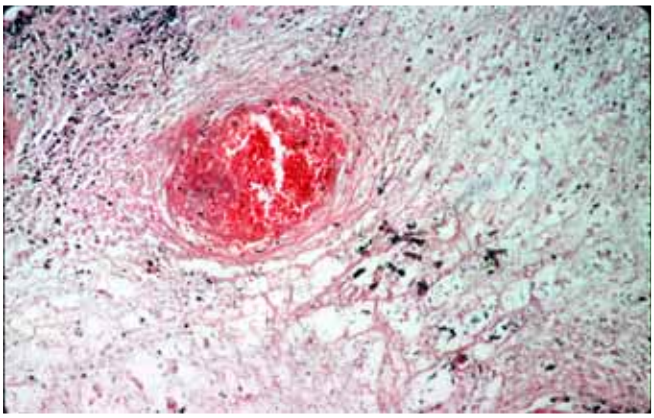
Granulomatous mycotic dermatitis

Artery in cow with mycotic placentitis



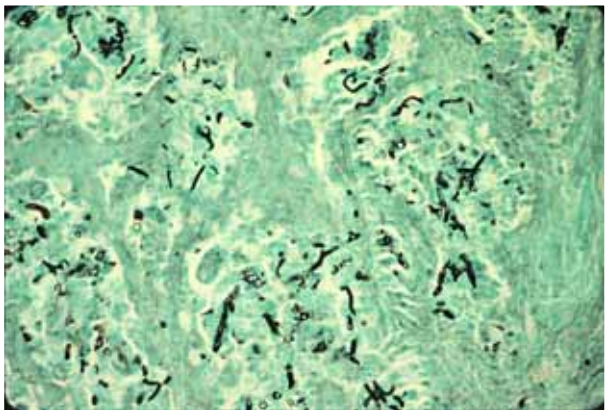
Severe arteritis

Mycotic placentitis cow



Vascular thrombosis , edema and scattered fungal hyphae

Mycotic placentitis cow



Black stained branched septated hyphae (Gomori's methamine silver)

Parasitic abortion

Toxoplasmosis

Etiology:

*Toxoplasma gondii.

Susceptibility:

*Domesticated animals.
*Common in ewes.

Transmission:

*Venereal.
*Transplacental.

Clinical symptoms:

*Late abortion .

Lesion:

Fetus :

Grossly:

*No gross lesions.

Microscopically:

*Demonstration of protozoal cyst in myocardium , Lung and brain.

Placenta:

Grossly:

*Small white foci of necrosis in the cotyledons.
*Edema of intercotyledonary areas.

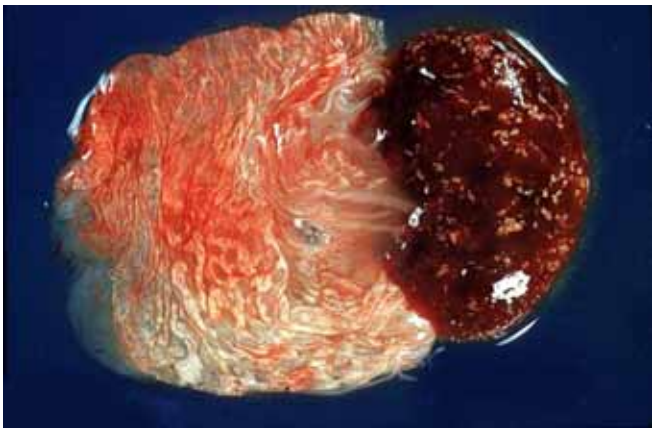
Microscopically:

*Necrosis with protozoal cyst.

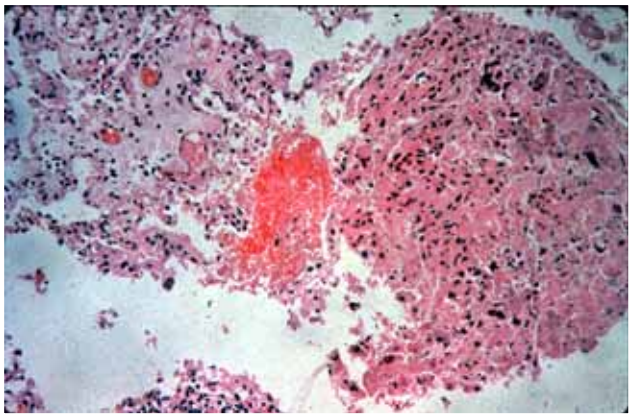
Toxoplasmosis in fetus and placenta ewe

Numerous pin head necrotic foci in cotyledons.The intercotyledonary tissue is normal

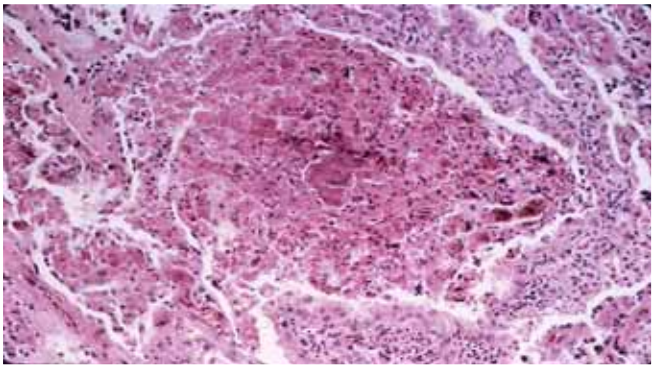
Toxoplasmosis placenta ewe



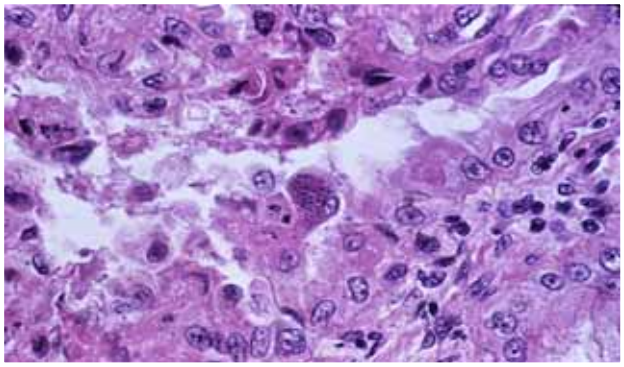
Numerous pin head necrotic foci in cotyledons



Acute necrosis and a few clumps of organism

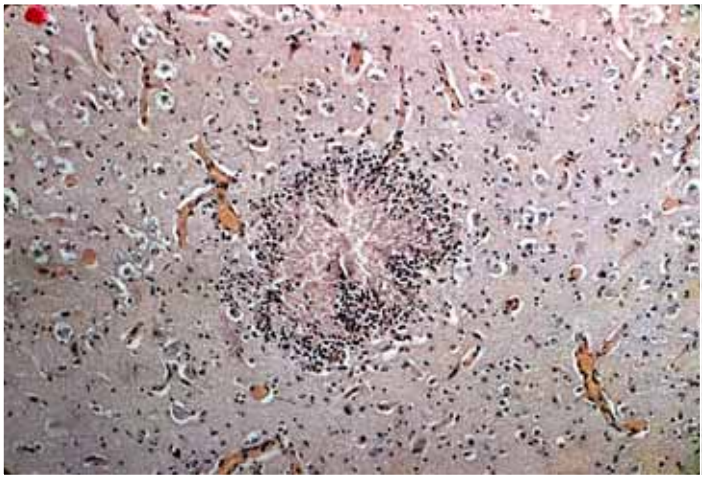


Cotyledon with focal area of necrosis



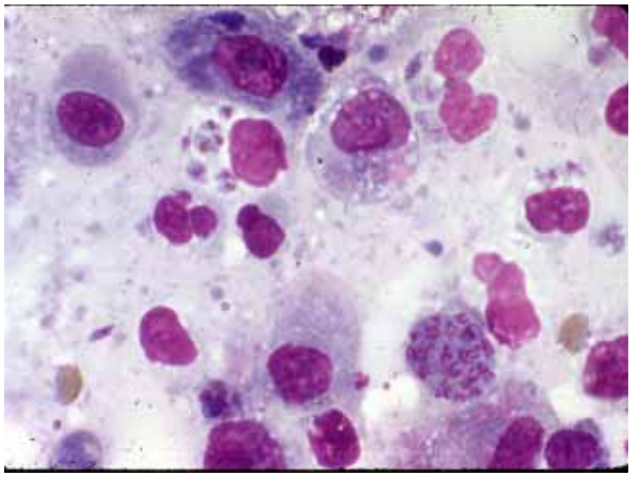
Toxoplasma cyst in trophoblast cell

Toxoplasmosis brain of sheep fetus



Multifocal granulomatous encephalitis

Toxoplasmosis



Toxoplasma sporocyst

Trichomoniasis

Etiology:

*Trichomnas fetus.

Susceptibility:

*Cattle.

Transmission:

*Coitus.

Clinical signs:

Bull:

*Acute purulent balanoposthitis.

*With chronicity, the bull becomes carrier .

Cow:

*Acute catarrhal vaginitis.

*Chronically, the infection localize in uterus and cervix.

*Nonspecific cervicitis and endmetritis.

*Repeat breeding.

*Pyometra.

*Abortion at any time but mainly in the first half of pregnancy.

Lesions:

Fetus:

*Giant cell pneumonitis.

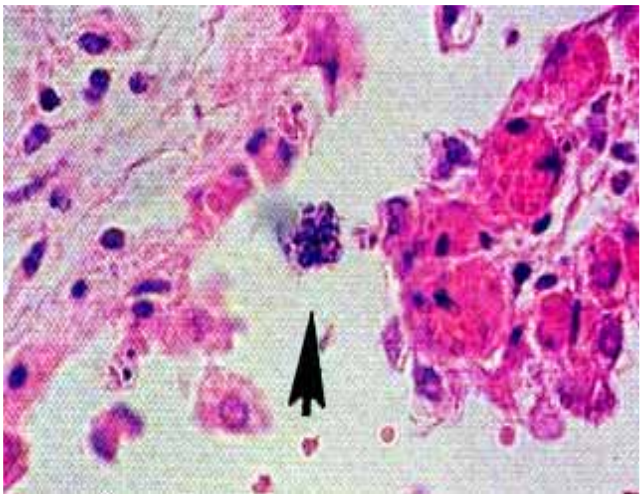
*Demonstration of protozoa by silver stain.

Placenta:

*Fibrinonecrotic placenitis .

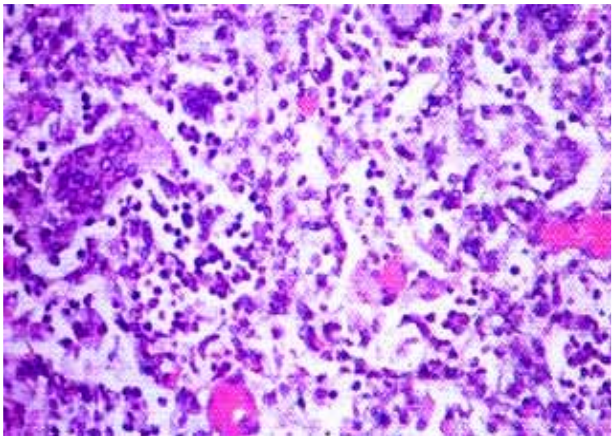
Trichomoniasis

Pyometra



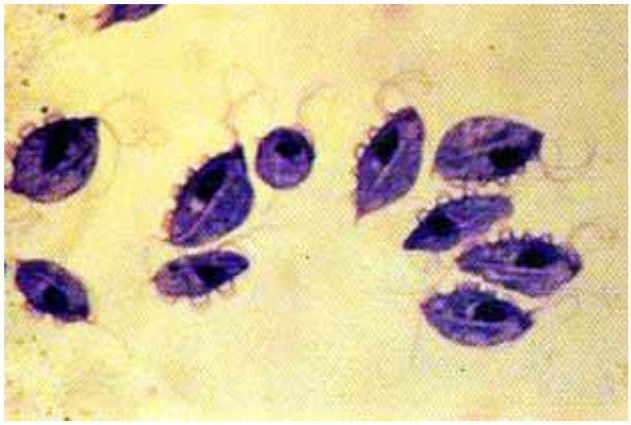
Trichomonad in lung macrophage

Bovine Trichomoniasis



Giant cell pnuemonitis

Trichomoniasis



Trichomonas fetus (flagellated protozoa)

Neospora

Etiology:

*Neospora Caninum.

Susceptibility:

*Cattle , sheep , goat , dog and horse.

Transmission:

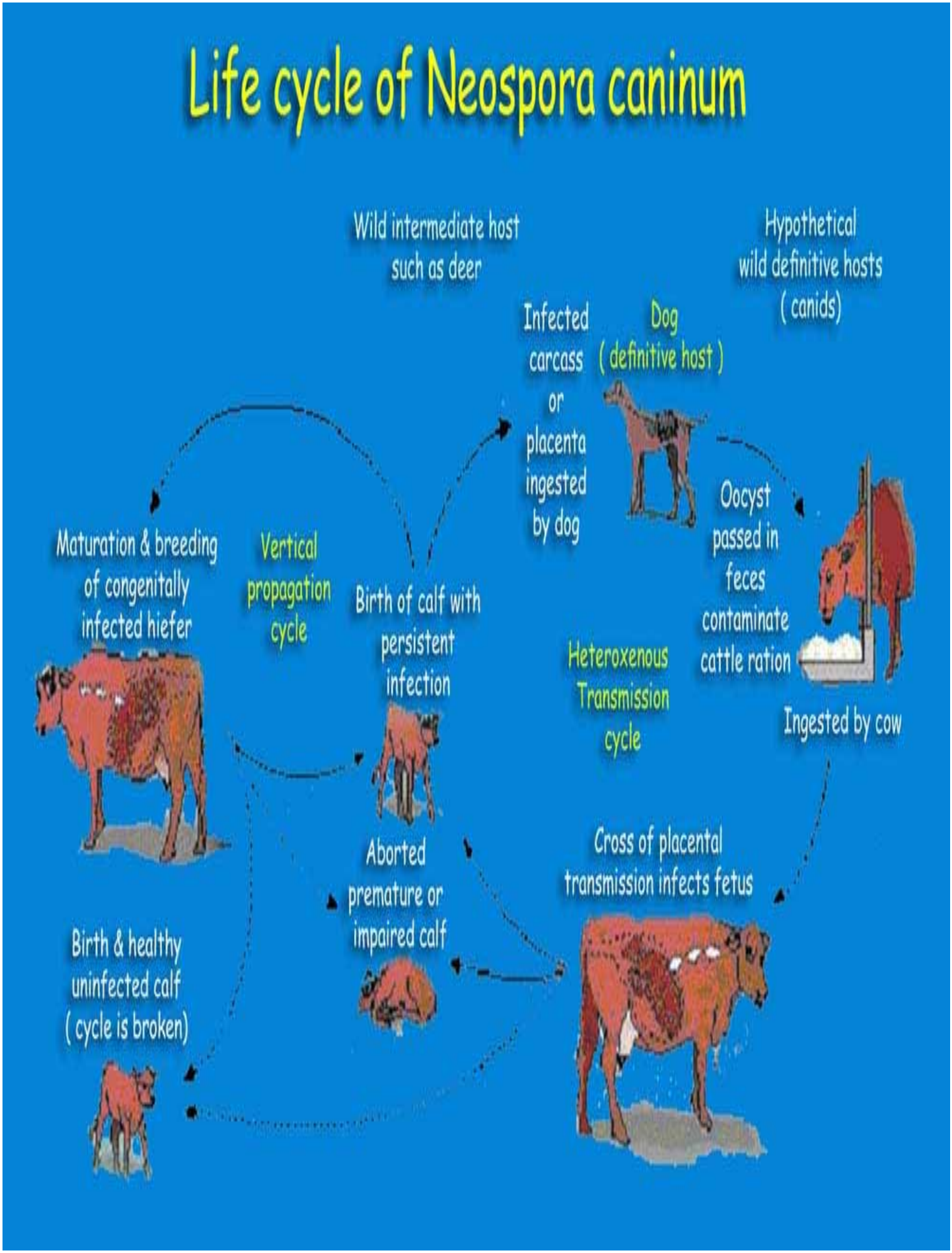
*Ingestion.

Clinical signs :

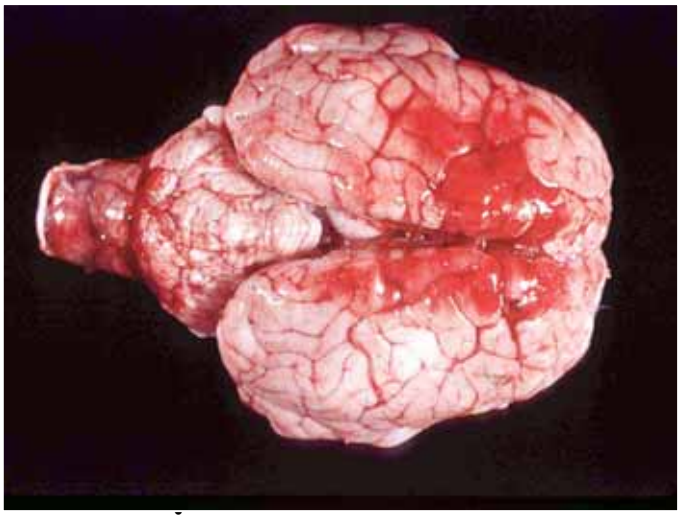
*Abortion between 4 – 6 months .

*Congenital malformations in calves.

Life cycle of Neospora caninum

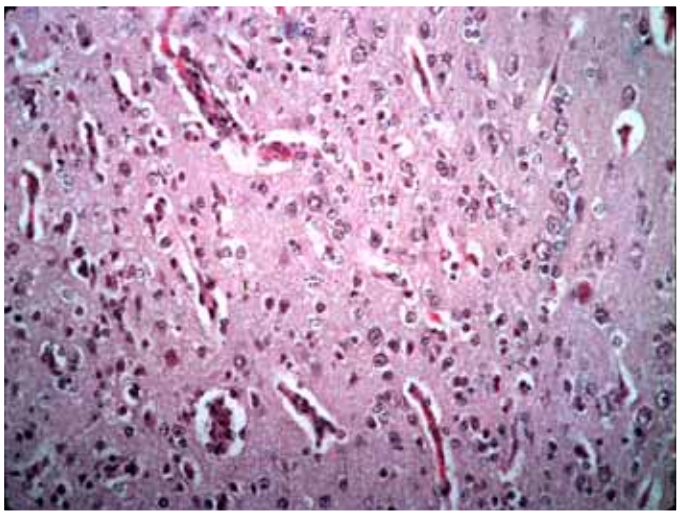


Neospora abortion Brain of aborted bovine fetus



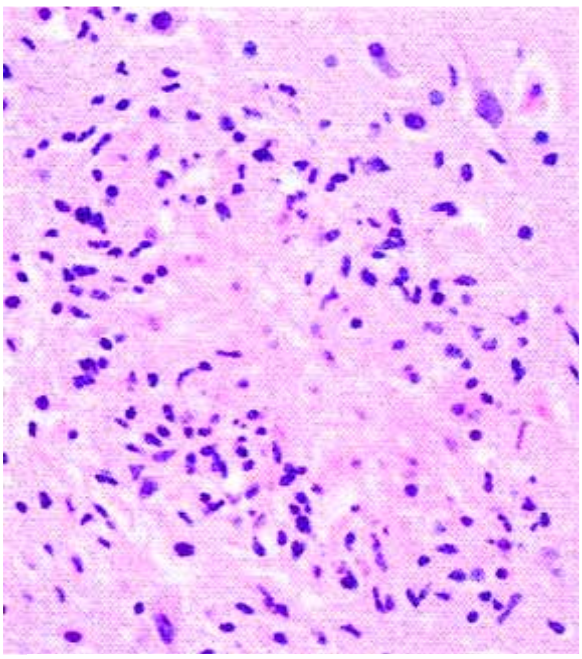
Granulomatous encephalitis and hemorrhage. Massive area of hemorrhage over the cerebral hemispheres and cerebellar nodules

Neospora abortion brain of bovine fetus



Neospora encephalitis glial reaction

Neospora abortion

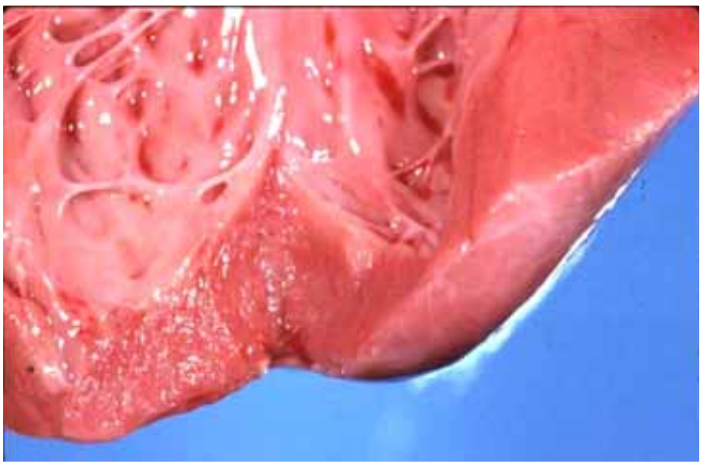


Focal malacia surrounded by gliosis

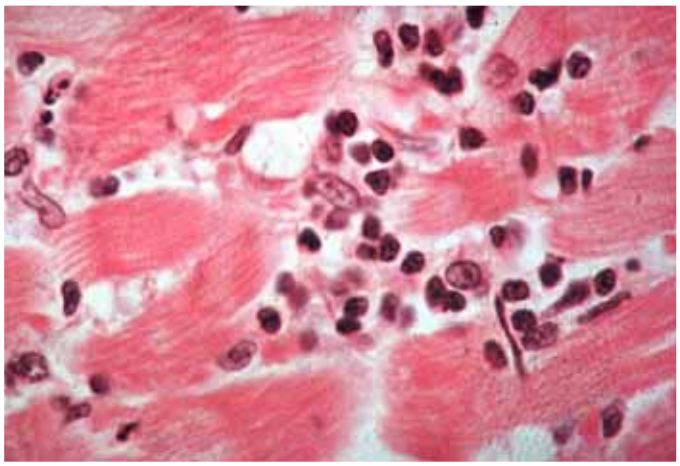
Neospora abortion

Neospora cyst in cerebral neuron

Neospora caninum heart of aborted calf



Multifocal interstitial myocarditis
(scattered pale foci in myocardium)



Focal interstitial myocarditis

Neospora abortion

Arthrogryposis aborted calf

Arthrogryposis newborn calf