Metritis and Pyometra

Methods of diagnosis and treatment

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THE value of dairy and beef cows depends upon their ability to reproduce healthy, viable calves at regular intervals. Since pregnancy is the greatest burden of reproduction, a healthy genital system is essential to realizing this value. The anatomical location of the bovine external genitalia plus the frequent insanitary husbandry in many dairies subjects this important system to infection.

Invading pathogens find conditions well suited to rapid growth. If pregnancy is not terminated by this infection it is quite likely that parturition and labor will so weaken the uterus that the existing infection will appear in a more virulent form. According to Williams,[1] parturition and the puerperium supply the greatest mortality of any period in the breeding female's life.

Sterility

In cases of metritis not ending fatally the result is sterility. This may be either temporary or permanent. Metritis is an inflammation of the uterus. Often qualifying prefixes are used to indicate the exact seat of infection such as pyometra, an accumulation of pus in the uterus; endometritis, an inflammation of the endometrium; and perimetritis, an inflammation of the peritoneal coat of the uterus. Nielson[2] describes pyometritis as an endometritis of the third degree. There is no specific etiological agent responsible for metritis and pyometra. *Brucella abortus* is recognized as a major cause of metritis, abortion, and sterility, but since brucellosis is a subject in itself it will not be discussed here. Suffice it to say that it should not be overlooked when examining cattle with histories of breeding trouble. Other agents include the Protozoa, *Trichomonas fetus* and *Vibrio fetus*, the Staphylococci, Streptococci, mycotic organisms, Corynebacterium, Necrophorus bacillus, and other bacteria. Except for trichomoniasis, Vibrio infection and brucellosis, metritis and pyometra may be considered as relatively noncontagious. Most other uterine infections are introduced by attendants at parturition or as mentioned above through improper husbandry practices. Trichomoniasis is chiefly transmitted from infected bulls to noninfected cows and heifers, but may also be transmitted mechanically. From these, other bulls become infected and the cycle is continued.

Metritis and cervicitis are closely related and the former is seldom present without the latter also being present in some degree. When the uterus is the site of the infection the disease progresses caudally and usually involves all of the cervix. Metritis may develop into a rapidly fatal septicemia or into a chronic form ending in sterility. Since the former usually ends in the death of the animal before veterinary assistance is sought, the chronic type is most frequently encountered.

Diagnosis

The accurate diagnosis of chronic metritis depends largely upon an accurate history and a careful clinical examination of the reproductive system, including rectal palpation and examination with the speculum. Accurate histories are difficult to obtain, especially if the owner has resorted to home treatment at the last par-

turition. If there was a history of retained placenta at the last parturition there may have been much damage to the uterine mucosa and caruncles. If the damage was extensive pregnancy is impossible or prematurely terminated due to insufficient nutrition to the developing embryo. In such cases clinical examination is unsatisfactory without a complete history.

Examination

Upon examination of the genital tract the symptoms may be marked or very slight. A purulent discharge, when present in the vagina, usually comes from the uterus or the cervical canal. The vaginal speculum is useful to determine the origin of the discharge. The cervix frequently shows much inflammation and induration. In some cases the cervix may be enlarged to the size of the fist or larger, exposing the first or second cervical folds. For closer inspection or digital examination the cervix may be retracted with two pairs of uterine forceps. The forceps are placed on either side of the os uteri externum. Steady traction will present the cervix in the vulva except in animals accustomed to constant pasturing in which the tubular organs are more firmly attached. Once the cervix is retracted as far as possible the vulva can be spread by applying lateral pressure on the forceps handles. With the cervix fixed in such a position it should be examined for stenosis, induration, character of discharge and the extent of the inflammatory process.

According to Albrechtsen[3] there is nearly always a discharge from the cervix in metritis. Where the cervical canal alone is involved, a whitish, viscous, greasy secretion covers the external orifice. When the secretion is more purulent it usually comes from the uterus. Since the cervix is usually open, Williams[1] advocates exploratory catheterization. Patience is required to introduce the catheter through the tortuous canal as any great pressure may injure the mucosa or pierce the wall of the cervix or uterus. In some instances, best results are obtained by removing the forceps and grasping the cervix per rectum with one hand and manipulating the catheter with the other, palpating the instrument at all times. Should this method fail the procedure should be repeated during estrum. Gould *et al.*[4] use epidural anesthesia to facilitate this manipulation. Since complete anesthesia causes ballooning of the rectum and difficult manipulation, do not carry anesthesia too far. Rarely does atresia play a part in preventing passage of the catheter.

Once a catheter is passed, warm physiological saline is used to douche the uterus and the character of the return flow is noted. When little pus is in the return flow it may have come from the cervical canal, but when the amount of pus is extensive it indicates much damage to the endomtrium. The future breeding value of such cows is questionable.

Rectal Palpation

Rectal palpation should always be practiced when examining for metritis. Enlargements of the cervix and sclerosis of the corpora uterinum and cornua are easily recognized. The detection of adhesions of the uterus to other organs indicates a prior severe metritis and peritonitis. Also the presence of a mummified fetus and pyometra is diagnosed rectally. Pyometra may be confused with pregnancy. Rowson and Spriggs[2] suggest these differential points.

1. In pyometra there is no fremitus in the middle uterine artery.
2. The uterine wall is thickened in pyometra contrasted to the thin pliable wall of the pregnant uterus.
3. A bilateral enlargement of the uterus is seldom seen in pregnancy with a single corpus luteum.
4. In pregnancy the fetal membranes can be palpated. When the uterine wall is rolled between the fingers the membranes can be felt as they slip away.

The presence of a partly digested fetus may cause some confusion. If there is any doubt as to the uterine contents another examination should be made at a later date and the cotyledons noted. The condition of the ovaries and the tone of the uterus should also be noted at the time

of the rectal examination. In all cases of metritis and pyometra bacterial cultures should be made as the prognosis and treatment depends upon the causative agent. The technique for obtaining samples is described below.

At this time it is well to consider trichomoniasis as a cause of metritis and pyometra. Early investigations of this disease were conducted by Emmerson,[5] and McNutt, Walsh and Murray.[6] Classification of trichomoniasis as a venereal disease has been established without doubt.

According to the British Ministry of Agriculture[7] trichomoniasis may be suspected when:

a. Several cows and heifers are returned to service. Estrum may recur in three weeks, but usually the interval is six, nine or twelve weeks.
b. Abortions occur early in pregnancy, commonly between the sixth and sixteenth week. In trichomoniasis abortion rarely occurs in the second half of pregnancy.
c. Endometritis and pyometra are associated with anestrus.
d. Vaginitis or cervicitis are noted.

Abortions may not be observed or suspected and the only symptom is failure to conceive. In other cases the cow is believed to be pregnant from two to four months when a clear discharge is seen coming from the vulva.

Generally a few days after the infection there may be some discharge at the vulva, but this is often overlooked by the caretaker or is passed off as something of no importance. White streaked pus is characteristic of trichomoniasis, however, secondary infection frequently alters this until it is not diagnostic. "Rasp" vaginitis, when present, is suggestive, but not diagnostic of *T. fetus* infection.

Laboratory Diagnosis

If the above clinical symptoms fail to be diagnostic, microscopic and cultural methods may be resorted to. To obtain samples for this purpose the following technique is suggested. Clean the external genitalia with soap and water, then insert a sterile vaginal speculum. With a sterile pipette equipped with a rubber bulb material can be aspirated from the os uteri externum. If the quantity of secretion is not sufficient, a small amount of sterile saline may be used to wash the cervical orifice and the resulting admixture aspirated for diagnostic purposes. A cotton swab may be used instead of the pipette if preferred. If the material is to be examined immediately no preservative is necessary, but if the material is to be sent to a laboratory it should be preserved by refrigeration during transit. Because of the periodic appearance of *T. fetus* several days prior to estrus, Hammond and Bartlett[8] recommend examination at that time. They also recommend the examination of recently bred virgin heifers in herds where *T. fetus* is suspected. The best time to examine such heifers is twelve to nineteen days after breeding or if estrum returns the examination should be a few days prior to the next anticipated estrum.

Material For Diagnosis

The material from aborted feti best suited for examination is obtained from the fetal stomach, membranes, and mucus around the tongue. Other material suited to examination can be obtained from the vaginal discharge following abortion. Emmerson[9] reports the fluid under the skin of the aborted fetus as providing suitable material for examination.

To examine the material, a hanging drop or wet slide is prepared. Some workers add one drop of a 1% eosin solution to the preparation to better outline the protozoa. The slide is first examined under low power. Once the trichomonads are found the high dry objective is used to definitely identify them as *T. fetus*. Wenrich and Emmerson[10] describe *T. fetus* as a spindle shaped or pyriform protozoan 10 to 25 microns in length and one-third to two-fifths as wide as it is long, bearing three anterior flagella as long or somewhat longer than the body, and a posterior flagellum which constitutes the marginal filament of the undulating membrane. The posterior flagellum is about as long as the anterior flagella. Within the undulating membrane a secondary filament parallels the marginal filament. The

dorsal undulating membrane usually has four or five undulations. In the live specimen the movements of the anterior flagella are seen as rapid forward extensions and energetic backward thrusts. The movement of the undulating membrane with the flagellar movements causes a counter-clockwise rotation and an intermittent locomotion. For more details of morphology reference should be made to the work of the above authors.

Cultural Methods

Cultural methods are seldom practiced although some cases have been diagnosed by this means when other methods failed. Serological diagnosis is of limted value since a negative test is not always indicative of freedom from infection. The serological test is useful to indicate herd infection and not infection in individuals. It must be remembered that positive diagnosis of trichomoniasis depends upon finding the organism. All else is only suggestive as similar symptoms may be due to other infections.

The prognosis in most cases of metritis and pyometra with regard to the life of the animal is good. However, if bacteriological findings show the causative organism to be the necrophorus bacillus, corynebacteruim or mycotic organisms, or if acute septic metritis develops the prognosis is guarded. Chivers[11] reports one case of necrotic metritis in which five or six inches of the gravid horn had necrosed. This case ended fatally five or six days after parturition.

Chronic metritis, pyometra, and trichomoniasis often respond to treatment to the extent that subsequent pregnancies are carried to term. The economy of keeping mediocre cows which fail to reproduce regularly has not been demonstrated. It would seem that, except for those cows of outstanding pedigree, treatment beyond preparing for slaughter is not advisable.

Treatment

The treatment of cervicitis and metritis has changed but little since Albrechtsen's time. A catheter is introduced as described above and the uterus douched with 12 ounces of 2 or 3 percent Lugol's solution. This treatment is repeated 2-3 times a week until the discharge stops. If a corpus luteum is present it should be expressed. In some instances bismuth subnitrate 2 parts and iodoform 1 part in 12 ounces of mineral oil can be substituted for the above treatment. Lindquist points out that the flavor of iodoform is often detected for as long as two weeks in the milk of cows so treated, therefore, judgment is needed in the use of this drug around dairies. Sulfonamides are useful in acute metritis due to streptococcic or staphylococcic infections. For the former sulfanilamide is recommended, and for the latter sulfathiazole is the drug of choice. The dose of either is 1-1½ gr. per pound of body weight divided into three daily doses and continued for two to five days. When the discharge has ceased and the estrus cycle has become normal, it is generally thought to be safe to breed these treated animals.

Pyometra

In treating pyometra, regardless of the cause, the aims are first, to induce the regression of the corpus luteum, second, to dilate the os uteri and third, to produce prolonged contraction of the uterus and expel the pus. Rowson suggests three possible ways to accomplish these aims:

1. By use of the two way catheter and douche plus massage of the uterus through the rectal wall.
2. By expression of the corpus luteum.
3. By hormone therapy.

The advantages of the first method are few and the disadvantages many. Passing a uterine catheter in the cow is always a tedious job. This method presents the danger of puncturing the rectum or peritoneal cavity. In such cases fatal infections are the rule. Most antiseptics introduced in this manner are ineffective in the presence of the purulent exudate in the uterus. The flaccid uterus is not easily emptied of its contents by siphoning and any additional material introduced may cause rupture of the weakened organ. Introduction of instruments into the

uterus is always done at the risk of introducing more infection.

Method two presents no real advantages. In some extreme cases of pyometra the ovary can not be palpated. Other disadvantages include danger of rupturing the rectal wall and danger of severe or fatal hemorrhage when the deeply embedded corpus luteum is expressed. If the corpus is not enucleated the desired results are not obtained for several days. Since the object is to get the animal back into breeding condition any of these injuries defeat the purpose.

Hormone Therapy

Hormone therapy presents several distinct advantages over the other two methods. Stilbestrol is the drug generally used. It is easily administered and can be repeated as necessary. There is no danger of infection or hemorrhage and if used with proper judgment there is no danger of damage to the ovaries. Hormone therapy approaches the aims as set out above. The natural hormone functions include increased cellular activity of the tubular genitalia, sensitization of the uterus to the oxytocic principle of the posterior pituitary causing contractions of the uterine musculature, dilation of the os uteri and regression of the corpus luteum. It is not always desirable to conclude treatment with one or more injections of a hormone substance. After the cervix is dilated and the purulent material is evacuated rectal massage of the uterus may be useful in restoring the tonus of that organ. Rowson and Spriggs administer 20-25 mg. of Stilbestrol intramuscularly and one week later irrigate the uterus with a 1:500 aqueous iodine solution. Their results show that pus appears within 24 hours after injection and continues until the uterus is empty, however, in very large pyometras a second injection may be necessary. Pyometra due to trichomoniasis is treated in Great Britain with aqueous iodine solution 1:2000 plus 30 minims of lactic acid to each 12 ounces of solution. The uterus is irrigated weekly until estrus occurs spontaneously and the discharge stops. This generally requires two or three treatments. A week after estrus returns the uterus is again irrigated, but the lactic acid is left out of the iodine solution. Treated animals are considered safe to breed when the discharge has stopped and two normal estrus cycles have elapsed. Chances for conception in such animals are considered fair if the pathological changes to the endometrium have not been too great.

Metritis, due to retained placenta, is being treated at Iowa State College by a combination of sulfanilamide and stilbestrol. 60 to 90 gms. of sulfanilamide are placed into the uterus and the capsules opened to aid in distribution. 25 to 35 mg. of Stilbestrol are given intramuscularly simultaneously and again in 48 hours.

Trichomoniasis

Trichomoniasis in the adult female is frequently self-limiting. Cows which have aborted or failed to conceive seem to produce a local immunity to *T. fetus* and if given two to three estrus periods of sexual rest successfully resist further invasion. If such animals are then bred to a disease free bull they often calve normally. Garlick, Bartlett and Hammond attempted to produce passive immunity with negative results. Attempts to demonstrate an active immunity failed. Hammond and Bartlett suggest a local tissue immunity in the vagina. If this is true of that tissue it may be assumed that a like reaction occurs in the uterus.

Prevention

Metritis and pyometra are best prevented by applying the principles of livestock sanitation. Williams says that this must begin by raising healthy calves. This can be done only in a healthy uterus. Cows should be provided clean quarters at parturition. When conditions are such that cows can be observed at all times no better place can be provided than the pasture. In dystocia the veterinarian must always use sterile instruments and wash the arms and hands thoroughly before attempting delivery. Attendants should be advised of the danger of infection in attempting home remedies. When the pla-

centa is retained a return trip 24-48 hours later may be necessary. If at that time the placenta is not easily detached the use of sulfanilamide and stilbestrol may be resorted to.

Sanitation

Pyometra due to trichomoniasis can be prevented by a strict program of sanitation and a careful breeding program. Virgin heifers should be mated only to young bulls which have not previously been exposed to trichomoniasis. Older cows showing signs of infection should be removed from the breeding herd and given a rest of two to six months. Each cow in an infected herd should be given a thorough physical examination before breeding. The bull used for older cows should be free from infection and not used on young females. Infected bulls should be removed from the herd. By following these simple rules breeding efficiency can be improved in most infected herds.

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USDA Farm Science Notes dated April 10, 1944, warns flock-owners of the danger to sheep from dogs infected with Taenia ovis by pointing to a recent incident in which 164 sheep out of 429 were condemned by federal meat inspectors on account of the presence of tapeworm cysts in their flesh and various organs, acquired from ingesting worm eggs scattered about the pasture by dogs. Proof of the source of the cysts was furnished by investigations of Parasitologist Benjamin Schwartz of the BAI. Anthelmintic treatment of the suspected dog removed a complete tapeworm. The incident has importance to veterinarians by warning that the presence of dogs on ground inhabited by sheep is not a matter to be overlooked.

E. R. Quortrup, D.V.M., of Fish and Wildlife Service, USDI, described two outbreaks of botulism in mink on fur ranches. The one was due to mixing the meat of a calf that had died from pneumonia with wholesome meat as mink feed, and the other outbreak from feeding frozen blocks of horse meat shipped from Idaho to Utah which obviously was toxic when frozen. The losses were 200 mink out of 5,000 in the second instance and 461 mink out of an approximate 500 in the first outbreak.

A raw material essential to the manufacture of insulin, used in the treatment of diabetes, has been given dollar-and-cent ceiling prices by the OPA recently.

The OPA said that "insufficient quantities of these glands were moving to the pharmaceutical trade because some packing and slaughtering houses had low 'freeze' prices and found it unprofitable to perform the separate function of removing the gland from tankage material."

The prices for the glands, trimmed and free of fat and other tissue, individually frozen and packed, f.o.b. at the packing plant are:

Hog pancreas glands.....12c per lb.
Calf pancreas glands .....28c per lb.
Beef pancreas glands .....16c per lb.