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Mastitis, Metritis, Agalactia Syndrome

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Mastitis, metritis and agalactia (MMA) is a complex syndrome which is seen in post-partum gilts or lactating sow, also known as postpartum dysgalactia syndrome. It usually occurs within 12 to 48 hours of farrowing. The predisposing factors include stress, mismanagement, poor hygiene, infectious agents, lack of exercise, imbalanced nutrition and other environmental factors. The main clinical signs are fever, anorexia, hardened udder, reduced milk production, metritis and hungry piglets/loss of condition in litter. Prevention and treatment of MMA involves a multifaceted approach that includes good management practices, hygienic condition and appropriate antibiotic therapy. Prophylactic treatment can be administered before parturition to reduce the risk of MMA.

Causes

MMA is a complex and multifactorial disease. It can be caused by a variety of factors including infectious agents, poor management practices, environmental stressors, hormonal imbalances and immune system dysfunction. Some of the factors involved are:

- **Infectious agents**: MMA is often caused by bacterial infection. The most common bacteria associated with mastitis are E. coli, Staphylococcus aureus and Streptococcus spp. Metritis is often caused bybacterial infection such as Arcanobacterium pyogenes and E. coli. These bacteria can enter the mammary gland or reproductive tract during or after farrowing and can cause inflammation and infection in the mammary gland or reproductive tract leading to mastitis and metritis.
- **Managemental factors:** Poor management practices like inadequate hygiene, overcrowding, insufficient space, lack of exercise, poor ventilation pre-dispose the animals to infection and stress.
- **Environmental stressors**: High temperature, humidity, draft can also contribute to the development of MMA.

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- **Stress** caused by various factorleads to increased cortisol release which depresses the sow's immune system and the animal becomes more susceptible to infections.
- **Hormonal causes**: Decreased oxytocin (oxytocin levels are often half as compared to unaffected sows) and prostaglandin secretion resulting in reduction of prolactin levels leading to agalactia. The inhibition of $PGF_2\alpha$ production in the uterus and the endotoxins produced by bacteria may reduce the prolactin levels dramatically.
- **Improper nutrition**: Inadequate intake of energy or protein can weaken the sow's immune system making it more susceptible to infection.
- **Genetics**: Some genetic factors may also contribute to the development of MMA. Certain breeds may be more prone to the syndrome and some genetic traits may predispose sows to stress or immune system dysfunction. Selecting for resistance to these conditions may be beneficial in reducing the incidence.

Transmission

It can be transmitted from sow to sow through direct contact, such as during fighting or through close physical contact. Infected piglets can also spread infection to other sows. Moreover,the infection can also spread through contaminated equipment such as sharing feeding and watering equipment along with poor hygienic conditions.

Clinical manifestation

MMA leads to an inflammatory state and accounts for 40-50% morbidity rate. The clinical symptoms of MMA can vary depending on the severity of the condition and the individual pig's immune response. The first sign observed in affected sow includes anorexia and feverfollowed by weakness, depression, lethargy, dullness,constipation. It results in swollen, hot, painful udder which causes restlessness during suckling leading to hungry piglets. There may be pus or clots in the milk. It even leads to death of piglets due to starvationbecause of reduced milk production or cessation of milk flow altogether.The sow may have a prolonged farrowing duration, with piglets being born at irregular interval along with decreased maternal behavior and may show less interest in her piglets leading to reduced piglet survival and growth. It also leads to foul smelling vaginal discharge and reduced fertility. In severe cases, the sow may become unable to stand and walk.

Diagnosis

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The diagnosis of MMA is based on clinical signs, thorough physical examination and diagnostic testing.

- **Physical examination**: It involves palpation of mammary gland and reproductive tract to check for swelling, pain and discharge.
- **Milk analysis**: Milk samples can be collected for analysis to check for the presence of bacteria, somatic cells and other abnormalities. California mastitis test (CMT) or somatic cell count can be done to diagnose mastitis.
- **Blood test:** Blood samples can be collected to check for signs of infection, such as elevated white blood cell counts or C-reactive protein levels.
- **Culture and sensitivity testing**: It is done to identify the specific bacteria and determine the most effective antibiotic treatment.
- **Ultrasonography:** It can be used to identify the abnormalities in the reproductive tract such as retained fetal membranes or uterine inflammation.
- The examination of litter or piglets should also be done.

Treatment and management

Treatment usually involves a multifaceted approach, which includes supportive care,antibiotics, anti-inflammatory drugs, as well as management strategies to optimize piglet care and nutrition.

- **Antibiotic therapy**: It is crucial in the treatment of MMA syndrome. The choice of antibiotics will depend on the severity of condition and the causative agent. Common antibiotics used to treat MMA include penicillins, cephalosporins and aminoglycosides.
- **Anti-inflammatory drugs**: NSAIDs can help reduce inflammation and pain in affected sow. Examples include flunixin meglumine and ketoprofen.
- **Fluid Therapy:**Intravenous fluid therapy can be used to treat dehydration and restore electrolyte balance in affected sows. This can help to improve overall health and reduce the risk of complications.
- **Nutritional support**: MMA causes a reduction in milk production which can lead to inadequate nutrition or even death of the piglets due to starvation. Once the affected piglets are identified, they should be given sow colostrum through a stomach tube or

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by sucking another unaffected sow. The pig's diet should be supplemented with electrolytes and glucose, may be necessary in severe cases.

- **Hormonal therapy:** In some cases, hormonal therapy may be necessary to address hormonal imbalances that contribute to MMA. Oxytocin and prostaglandins may be used to stimulate milk production and reduce uterine inflammation.

Prevention

- Maintaining good hygienic conditions in the farrowing pen. The sows should be cleaned and dried before shifting them in the farrowing crates along with disinfecting equipments and providing adequate space and ventilation.
- Any kind of noise should be avoided to avoid stress.,
- The teeth of the piglets should be clipped to avoid damage to the sow's teat.
- Exercising the sows prior to farrowing and during early lactation.
- Avoid over feeding: The feed intake should be reduced to 1kg/day from 100 days of gestation along with provision of feeding vegetable protein.
- Prophylactic measures: Supplementation of feed with sulphonamide and trimethoprim or tetracyclines at 15 mg/kg bwt from day 112 of gestation to day 1 post-partum reduces the incidence of disease.
- Availability of adequate water at all times.

Conclusion

Mastitis metritis agalactia is a common syndrome in lactating sows that can cause significant economic losses to the pig industry. It leads to increased piglet mortality and reduced weaning weight.To prevent MMA, pig farmers should ensure that the sows are in good health condition before parturition and should minimize the stress during the parturition. Proper management practices, hygiene and antibiotic therapy can help reduce the incidence and severity of MMA. Early detection and prompt treatment of MMA are crucial to prevent the spread of infectious agents and improve the health and welfare of both sows and piglets.