Popular Article

THE SCIENCE WORLD
A Monthly e Magazine

ISSN:2583-2212
January, 2023; 3(01), 94-96

Effect of Mastitis on Fertility

***Satish Martha[1], M. Rajashri[2], E. Sunil Anand[3]**
Department of Veterinary Gynaecology and Obstetrics,
College of Veterinary Science, Mamnoor, P.V. Narsimha Rao Telangana Veterinary University,
Rajendranagar, Hyderabad-30.
https://doi.org/10.5281/zenodo.7579283

Mastitis is an infection of the mammary gland, which is usually correlated with physical, chemical, and bacteriological changes in the milk. The first evidence of a relationship between mastitis and decreased fertility was reported 20 yrs ago (Moore et al., 1991). Affected cows had long interestrus intervals, even if these first data were contradictory, describing opposite results in the 2 herds under examination. Further studies confirmed that clinical mastitis had a negative effect on fertility when it occurred either before or after the first AI postpartum (Barker et al., 1998; Santos et al., 2004).

Very high milk yield is not an essential prerequisite for mastitis to decrease reproductive performances, as mastitic cows had more days to first service and days to conception than non-mastitic cows in a dual-purpose breed (Nava-Trujillo et al., 2010).

Mechanism

Negative interactions between mastitis and reproductive efficiency can be mediated by several mechanisms. The hypothalamic-pituitary-ovarian axis is a potential target.

The way through which mastitis impairs fertility could be a specific and common to any inflammatory process. Elevated body temperature, a classical symptom of acute mastitis, is a most likely candidate. It is known that a temperature increase around fertilization and early embryonic development significantly decreases oocyte competence and embryonic survival. Decreased feed intake, another common symptom in animals experiencing clinical infection, may alter energy metabolism and cause further disruption of reproductive function. Connections between mastitis and fertility are complex and multifaceted.

Several studies were conducted to find relation between Mastitis and infertility

1. Experimental intramammary inoculation of pathogens in healthy cows during early lactation indicated that mastitis alters the uterine sensitivity to PGF2α and its sensitivity to oxytocin that may decrease embryonic development and quality independently from luteolysis and decrease of progesterone concentrations during pregnancy (Hockett et al., 2000).
2. Experimental acute udder infection can decrease LH pulsatility with a consequent decrease of estradiol17β production, leading to a lack of estrous expression (Hockett et al., 2005).
3. The effect of an acute administration of Escherichia coli endotoxin (LPS), either i.v. or directly into the mammary gland, during estrus has been studied (Lavon et al., 2008), showing that ovulation is delayed, plasma estradiol concentration is low, and the preovulatory LH surge is low or delayed
4. Studies on naturally occurring subclinical mastitis confirmed that the same endocrine disruptions were observed in about 30% of affected animals (Lavon et al., 2010).
5. A more detailed examination of the effects of chronic mastitis on ovarian follicles revealed that an abnormal follicular steroidogenesis was present in the same percentage of infected animals (Lavon et al., 2011a).

An alteration of the ovarian structure takes place in cows affected by chronic mastitis, which involves a reduction of the vascular bed and an increase of the fibrotic tissue, together with a direct effect on oocyte specific factors like GDF-9. Mastitis in its clinical or subclinical forms disrupts functions of the pre-ovulatory follicle on the day of estrus, resulting in low conception rates in buffaloes. A major cause of this disruption could be the delayed ovulation which associated with low follicular estradiol production.

References

Moore, D. A., J. S. Cullor, R. H. Bondurant, and W. M. Sischo. 1991. Preliminary field evidence for the association of clinical mastitis with altered interestrus intervals in dairy cattle. Theriogenology 36:257–265.

Barker, A. R., F. N. Schrick, M. J. Lewis, H. H. Dowlen, and S. P. Oliver. 1998. Influence of clinical mastitis during early lactation on reproductive performance of Jersey cows. J. Dairy Sci. 81:1285–1290

Santos, J. E. P., R. L. A. Cerri, M. A. Ballou, G. E. Higginbotham, and J. H. Kirk. 2004. Effect of timing of first clinical mastitis occurrence on lactational and reproductive performance of Holstein dairy cows. Anim. Reprod. Sci. 80:31–45.

Nava-Trujillo, H., E. Soto-Belloso, and A. E. Hoet. 2010. Effects of clinical mastitis from calving to first service on reproductive performance in dual-purpose cows. Anim. Reprod. Sci. 121:12–16.

Hockett, M. E., F. M. Hopkins, M. J. Lewis, A. M. Saxton, H. H. Dowlen, S. P. Oliver, and F. N. Schrick. 2000. Endocrine profiles of dairy cows following experimentally induced clinical mastitis during early lactation. Anim. Reprod. Sci. 58:241–251

Hockett, M. E., R. A. Almeida, N. R. Rohrbach, S. P. Oliver, H. H. Dowlen, and F. N. Schrick. 2005. Effects of induced clinical mastitis during preovulation on endocrine and follicular function. J. Dairy Sci. 88:2422–2431.

Lavon, Y., G. Leitner, T. Goshen, R. Braw-Tal, S. Jacoby, and D. Wolfenson. 2008. Exposure to endotoxin during estrus alters the timing of ovulation and hormonal concentrations in cows. Theriogenology 70:956–967.

Lavon, Y., G. Leitner, H. Voet, and D. Wolfenson. 2010. Naturally occurring mastitis effects on timing of ovulation, steroid and gonadotrophic hormone concentrations, and follicular and luteal growth in cows. J. Dairy Sci. 93:911–921.

Lavon, Y., G. Leitner, E. Klipper, U. Moallem, R. Meidan, and D. Wolfenson. 2011a. Subclinical, chronic intramammary infection lowers steroid concentrations and gene expression in bovine preovulatory follicles. Domest. Anim. Endocrinol. 40:98–109.