



JANUARY 2023

# Welfare issues related to metritis in dairy cows

E. MAINAU | P. LLONCH | D. TEMPLE | X. MANTECA

**Metritis is an inflammation of the uterus (uterine cavity and wall). It occurs within 21 days after calving but is most seen in the first 10 days after calving. Metritis is characterised by an abnormally enlarged uterus and a viscous, white purulent or fetid watery red-brown discharge in the worst cases.**

## ● METRITIS CAUSES PRODUCTION AND ECONOMIC LOSSES

The incidence of metritis in dairy cows ranges from 15% to 20%, although it could be higher, affecting up to 40% of cows, depending upon the farm and lactation stage.

Metritis has been associated with reduced milk production, impaired reproductive performance (delayed insemination and reduced conception rates) and increased risk of involuntary culling during lactation. The decision to cull is likely driven by a combination of ill health and low production in the first weeks of lactation.

The average total estimated cost of each case of metritis ranges from 106€ to 490€. The most important variable that contributed to the total variance is milk price, followed by treatment cost, replacement cost, and feeding cost.

## ● CAUSATIVE AGENTS AND METRITIS CLASSIFICATION

After calving, dairy cows experience some degree of bacterial contamination within the uterus, but this is not necessarily associated with clinical disease. The occurrence of metritis depends upon the immune response of the cow, as well as the species and number of bacteria.

Metritis may be associated with or without signs of systemic illness, and that determines the severity of the disease (from Grade 1, or mild, to 3, or severe):

GRADE	ENLARGED UTERUS	UTERINE DISCHARGE	SYSTEMIC SIGNS
1	Yes	Yes	No
2	Yes	Yes	Decreased milk yield Dullness Fever (>39.5°C)
3	Yes	Yes	Signs of toxæmia: Inappetence Cold extremities Depression Collapse

\* Grade 3 sometimes is known as puerperal metritis or toxic metritis.

## ● METRITIS IS A PAINFUL DISEASE

From several surveys carried out with farmers and veterinarians, acute metritis in cows was given from 4 to 6 points out of a 10-point score for pain. Cows with metritis often show both **sickness and pain**, which induce behavioural and physiological changes, but these changes may differ depending on the severity of the disease.

Cows suffering from metritis show several signs of **sickness behaviour** such as reduced feed intake and rumination time, decreased activity and increased time lying down. Sickness behaviour is a well-organised adaptive response of the animal to enhance disease resistance and recovery from disease.

Alteration in activity patterns due to metritis appears to be more pronounced in primiparous cows than in multiparous ones. During the early postpartum period, primiparous cows show an exacer-

bated inflammatory response (increased acute phase proteins, such as haptoglobin), when compared to multiparous cows. This suggests that the immune system of primiparous cows may be more reactive to inflammatory stimuli and may lead to an increase in circulating cytokines. As cytokines play a key role in the sickness behaviour, the increased time lying down, associated with clinical metritis, should be more evident in primiparous than in multiparous cows.

In the early detection of metritis, a smaller proportion of cows with metritis used the brush, as compared with healthy cows. Brush usage is an example of low-resilience activity; this means a behaviour that typically decreases when energy resources are limited or when the cost involved in the activity increases.

## Indicators of sickness behaviour and/or pain caused by metritis in dairy cattle

### Behavioural indicators

#### Increased

Back arching at rectal examination  
Time spent lying down  
Failed lying-down events

#### Decreased

Activity  
Time spent eating  
Competitiveness at the feeding bunk  
Rumination time  
Grooming (brush usage)

### Physiological and production indicators

#### Increased

Heart rate (low-frequency portion)  
Rectal temperature  
Haptoglobin  
Substance P

#### Decreased

Body condition score  
Dry matter intake  
Milk production  
Reproductive performance

In addition to increased time spent lying down (typically associated with sickness behaviour), cows with metritis have more failed lying-down events, possibly resulting in avoidance of lying down or hindering the lying-down movement due to **pain**. More specifically, cows with clinical metritis show physical signs of pain such as back arching at rectal examination (with or without uterine palpation), suggesting that clinical metritis is associated with **visceral pain**. Although not confirmed, it seems that visceral pain due to metritis may lead to **somatic pain** and hyperalgesia (increased pain sensitivity), making skin areas sensitive to touch during lying-down movements and when lying down.

Pain may be classified according to the site of origin:

- **Visceral pain:** results from the activation of nociceptors ("receptors of pain") of the thoracic, pelvic or abdominal viscera. Visceral pain is diffuse, difficult to localise and often referred to a distant, usually superficial, structure.

- **Somatic pain:** results from the activation of nociceptors in the skin or other superficial tissue, and is sharp, well-defined and clearly located.

In terms of **physiological indicators**, concentrations of markers of inflammation, stress and pain (substance P, haptoglobin) are increased in cows with metritis. Those cows have a haptoglobin concentration 20% greater than do healthy cows during the postpartum period.

Finally, it is important to mention that during the peripartum transition period, cows experience some degree of **negative energy balance**, which is a lag in feed intake relative to increased energy demands for gestation, parturition and milk production, especially in high-producing cows. Negative energy balance and metritis are linked: for every 1 Kg decrease in dry matter intake in the week before calving, cows are nearly three times more likely to be diagnosed with metritis. At the same time, negative energy balance impairs the immune function and cows are more susceptible to uterine infections, such as metritis.

## Cows with metritis often show both sickness and pain, which induce behavioural and physiological changes

### • PREVENTION AND HUSBANDRY RECOMMENDATIONS

The most important risk factor identified for metritis is trauma to the genital tract followed by bacterial contamination. Cows should have a clean, comfortable, quiet and spacious environment in which to calve. In case intervention during parturition is necessary, farmers and veterinarians should ensure that they use clean techniques and that they are gentle.

Adequate nutrition and a non-stressful environment are important to optimise feed intake before calving and ensure a proper function of the cows' immune system. The housing and management

of dry cows should minimise social stress by avoiding transport or multiple changes in animal groups, ensuring adequate feeding space (85 cm /cow) and resting space (80% of capacity). Care must be taken to minimise heat stress by ensuring ventilation and providing heat abatement.

### • PAIN TREATMENT

Metritis in dairy cows is commonly treated with intra-uterine infusion or systemic antibiotics. Several studies have reported that cows administered with non-steroidal anti-inflammatory drugs (NSAIDs) after metritis diagnosis, as supportive treatment in addition to antibiotics, improve their reproduction performances by showing increasing pregnancy rates and shortened calving-to-first-oestrus intervals. The effects of NSAIDs on milk yield, uterine involution or recovery from uterine infection are not consistent, as some studies find improvements in favour of analgesic treatment, but others did not. One clinical trial suggested that initial therapy of metritis with an NSAID alone may reduce overall antimicrobial use with similar clinical outcomes for the cow. NSAIDs administered to cows with metritis slightly reduce inflammation and expressions of pain such as an arched back. In addition, the NSAIDs administered as a complementary treatment to antimicrobial therapy to multiparous cows with metritis have been associated with decreased lying-down times during five days after treatment, indicating of reduced sickness behaviour.

### • SUMMARY

Metritis is a disease with both economic and welfare implications. Cows with metritis often show both sickness and pain, which induce behavioural and physiological changes. In cows with metritis, the use of NSAIDs, in addition to antibiotics, is recommended, as it reduces pain and facilitates the return to optimal reproduction performance.

### REFERENCES