

# Therapeutic Efficiency of Antibiotics and Prostaglandin F<sub>2α</sub> in Postpartum Dairy Cows with Clinical Endometritis: An Evidence-Based Evaluation

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## KEYWORDS

- Dairy cows • Clinical endometritis • Antibiotics
- Prostaglandin F<sub>2α</sub>

In the past decade, the decreasing fertility of dairy cows has caught considerable attention in veterinary science.<sup>1</sup> Since reproductive performance is strongly related to the health status of the uterus at the end of the voluntary waiting period,<sup>2</sup> the assessment, the treatment, and the prevention of uterine pathologies in postpartum cows have lately been the focus of research. In cows, lochia (normal postpartum discharge) is usually expelled from the reproductive tract during the first 3 weeks after parturition.<sup>3</sup> In some circumstances, discharges from the genital tract can persist for a variable amount of time depending on the type of organism, the cow's innate immunity, and predisposing factors to uterine diseases.<sup>4</sup> Uterine disease affects about half of dairy cows in the postpartum period<sup>5,6</sup> and causes infertility by disrupting uterine and ovarian functions.<sup>7</sup> Uterine inflammation is normal during the early physiologic stage of uterine involution. However, defining rigorous criteria for the diagnosis, the treatment, and the prevention of endometritis post partum remains a challenge.

Studies have used nonvalidated diagnostic criteria for endometritis, which may have jeopardized the researchers' ability to discern a true treatment effect. A new

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definition for clinical endometritis reflecting more accurately the clinical situation was proposed by Sheldon and coworkers.<sup>2</sup> Clinical endometritis was defined as the inflammation of the endometrium in a normal-sized uterus associated with vaginal purulent discharge after 21 DIM (days in milk) in the absence of systemic clinical disease. Purulent vaginal discharge is generally associated with *A. pyogenes* infection in the uterus beyond 21 days postpartum,<sup>7</sup> and clinical endometritis was clearly related to a prevalence of *A. pyogenes* in a different report.<sup>9</sup> Even though vaginal discharge is an indirect method to diagnose inflammation and infection of the uterus, the presence of purulent discharge in the anterior vagina or cervix has been consistently associated with reduced fertility in dairy cows.<sup>10–14</sup> The negative impact of clinical endometritis on reproductive performance is reflected by the increase of the number of services per conception, the calving-to-first service and calving-to-conception intervals,<sup>15,16</sup> and the reduced risk of pregnancy<sup>17</sup> and conception.<sup>18</sup> The reproductive inefficiency associated with clinical endometritis<sup>19</sup> translates into a significant economic loss for the dairy industry.<sup>16,20</sup> The financial impact is caused by excessive culling, milk loss, infertility treatment costs, and the genetic losses due to fewer replacement heifers.

Currently, 2 major therapeutic options are used for the treatment and prevention of clinical endometritis: the use of antibiotics (intrauterine or systemic) or prostaglandins (PGF<sub>2 $\alpha$</sub> , systemically). Antibiotics reduce the load of bacteria in the uterus and the inflammation of the endometrium.<sup>21</sup> The injection of PGF<sub>2 $\alpha$</sub>  causes luteolysis of the corpus luteum and induces estrus with increased uterine contractility and subsequent clearance of the uterine cavity. During the estrous period, local immunity prepares a better uterine environment to support embryo development and the establishment of a pregnancy. Although many reports on the subject can be found in the literature, treatment protocols for clinical endometritis are quite variable among veterinarians. The lack of negative controls, a small number of animals per treatment, different case definitions, and the use of outcome parameters based on clinical cure instead of reproductive performance make it difficult to assess the best therapeutic approach based on the available literature. By identifying, evaluating, and summarizing the best available data based on superior scientific methods, the evidence-based analysis reflects the best strategy by which to make a valid clinical decision.

## OBJECTIVE

The objective of this systematic review was to analyze and summarize the results of studies with the best available evidence concerning the efficiency of different antibiotics and PGF<sub>2 $\alpha$</sub>  for the treatment of clinical endometritis in postpartum dairy cows. Evidence was based on subsequent reproductive performance parameters (see Types of Outcomes).

## MATERIAL AND METHODS

### *Types of Studies*

Studies using meta-analysis and controlled clinical trials were analyzed in which postpartum dairy cows were randomly allocated to different treatments of antibiotics and/or PGF<sub>2 $\alpha$</sub> .

### *Types of Interventions*

Only trials comparing different antibiotics and/or PGF<sub>2 $\alpha$</sub>  regimens including but not limited to different drugs/different route of administration (systemically and intrauterine infusion)/duration of therapy/time of administration after calving), hormonal profile,

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