

# Evaluation of intrauterine antibiotic treatment of clinical metritis and retained fetal membranes in dairy cows

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## Abstract

Retained fetal membranes (RFM) and clinical metritis (CM) are frequently diagnosed disease conditions in dairy cows and considered of major economic impact due to negative effect on reproduction and milk production. The objective of this study was to evaluate the efficacy of i.u. tetracycline for the treatment of RFM and CM in dairy cows. Affected cows were randomly assigned to two groups; treatment group animals received i.u. 5 g chlortetracycline twice weekly for 2 wks, and no treatment group.

A total of 1416 cows and 804 heifers in 5 herds calved during the study period. CM was diagnosed in 18.6% (inter farm range; 15.2–23.5%) and 30% (19.4–42.3%) of cows and heifers, respectively. RFM was diagnosed in 13.1% (9.4–18.1%) and 9.2% (3.6–13.8%) of cows and heifers, respectively. Conception rates after first insemination were 38.3%, 42.5% and 18% in normal, treated and non-treated CM cows, respectively. Numbers of days open were 140.5, 136.2 and 165.5 in normal, treated and non-treated CM cows, respectively. Based on 305-d corrected milk yield, cows and heifers affected by RFM and CM produced 300–500 kg less milk compared with their normal herd mates. Cows treated for CM produced 654 kg more milk per 305-d corrected lactation compared to non-treated control cows. Treatment of RFM had no effect on reproductive performance or milk production. In conclusion, i.u. chlortetracycline treatment was proven to prevent the detrimental effect of CM on reproductive performance in heifers and cows and on milk production in cows only.

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## 1. Introduction

Retained fetal membranes (RFM) and metritis are frequently diagnosed disease conditions in dairy cows and considered of major economic impact due to negative effect on reproduction, milk production, increased culling rates and costs of treatments [1–3]. It is generally accepted that most cows with RFM will develop metritis to which most of the negative impact of

RFM is attributed [4–7]. The diagnosis of RFM in dairy cows is simple and accurate although there are discrepancies between studies regarding time of onset postpartum [2,3]. Contrarily, diagnosis of primary metritis or endometritis in the early (<14 d) postpartum dairy cow is controversial and many researchers and practitioners refute this diagnosis [8,9]. It has been recommended to monitor the early postpartum cow for systemic signs of sepsis such as elevated rectal temperature, a condition referred to as toxic puerperal metritis (TPM) [10,11]. By this approach it was not recommended to examine or treat the early postpartum cow unless suffering from TPM and the appearance of fetid, watery vaginal discharge was considered as

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non-specific contamination with low predictive value for economical measures. Consequently it was recommended to routinely examine dairy cows only 3–4 wks after calving and to treat animals with abnormal vaginal discharge [9].

It was recently suggested to differentiate between puerperal metritis (PM) and clinical metritis (CM) both occurring within 21 d postpartum. While PM is synonymous with TPM, the diagnosis of CM was based on the presence of purulent vaginal discharge and enlarged uterus without systemic illness [12]. These authors also suggested defining cases with purulent vaginal discharge detected later than 21 d as clinical endometritis.

In the present study differentiation between PM and CM was not made and animals were diagnosed as having either RFM or CM as defined later. Metritis is a frequent diagnosis in Israeli dairy cows based on routine vaginal and rectal examination performed 5–14 d after calving [13,14]. Since similar routine examination of dairy cows in the first 2 wks after calving is not commonly practiced in Europe or North America, most recent studies enrolled either cases of PM or clinical endometritis diagnosed within and later than 3 wks postpartum, respectively.

Treatment protocols for CM or RFM are highly controversial and although intrauterine antimicrobials, especially tetracyclines, are used extensively their efficacy was questioned [15,10,16,6]. Outcome variables for treatment efficacy trials should be measures of economic significance, such as milk production and reproductive performance, rather than clinical or bacteriological cure.

The objectives of this study were to analyze the impact of RFM and early CM on milk production and reproductive performance in dairy cows. Concurrently, the efficacy of the commonly used i.u. tetracycline treatment for RFM and CM was evaluated in a randomized, negatively controlled, multi-herd field trial analyzed as a prospective cohort study with milk production and reproductive parameters as outcome variables. Evaluation of treatment efficacy for RFM and CM will be based on elimination or reduction of the expected negative effect of these conditions on milk production and reproductive performance.

## 2. Material and methods

### 2.1. Animals and herds

The study was conducted on cows calved between April 2000 and December 2001 in five commercial

Israeli dairy herds consisting of 250–350 Israeli Holstein dairy cows. Cows were housed in loose housing systems in large, completely covered open sheds and fed total mixed ration (TMR). In all herds, cows were milked three times daily in computer controlled milking parlors and the mean annual milk production was 10,000–12,000 kg per cow. All cows were identified by ear tags and freeze marking. The herds were within the practice area of the Ambulatory Clinic of The Koret School of Veterinary Medicine, which provided a complete herd-health service and all herds were visited at least twice weekly during the trial period. Clinical, reproduction, production and management data were computer recorded by the herd manager and the attending veterinarians. Once a month each cow was sampled and analyzed for milk, fat, protein, and lactose production and somatic cell count by the Central Laboratory for Milk Recording. Reproductive management was solely based on AI performed by highly trained technicians employed by the Artificial Insemination Service of the Israel Cattle Breeders Association (ICBA). In all herds, cows were bred on observed estrus or computerized pedometry system and no timed breeding protocols were used. Pregnancy diagnosis was performed by rectal palpation of the uterus and its contents 40–50 d post insemination.

### 2.2. Clinical examination

All heifers and cows were examined between 5 and 14 d after calving by trained veterinarians who also diagnosed, treated and recorded all the periparturient disease conditions. At examination all animals were body scored and comprehensively examined by intravaginal and transrectal palpation after thoroughly cleaning and disinfection of the perineal area. Cases of retained fetal membranes (RFM) were defined as the presence of placental tissues 24 h or more after calving as observed by trained farm employee or the attending veterinarian. Animals with observed or suspected RFM were submitted for veterinary examination on the next routine biweekly visit (1–4 d postpartum). In animals without a history or diagnosis of RFM, the diagnosis of clinical metritis (CM) was based on the combined characteristics of vaginal discharge, obtained by manual examination of the vagina, and of cervical and uterine examination by palpation per rectum as previously described [17]. Affected cows had a flaccid, nonretractable uterus that was located in the abdomen, a cervical diameter >75 mm, and a watery or purulent, fetid vaginal discharge.

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