

Evaluating field efficacy of MetriVet (intra-uterine cephalosporin) for the treatment of endometritis in New Zealand dairy cows

Background

Endometritis is inflammation of the uterine lining caused by bacterial infection after calving. Diagnosis and subsequent treatment of cows with endometritis can improve in-calf rates.

McDougall (2001) showed treatment of 'at-risk' cows with intra-uterine cephalosporin improved 28 day and 56 day in-calf rates compared to untreated controls for particular at-risk categories of cows.

	Retained Foetal Membranes		Vulval Discharge (14+ days post-partum)		Dead Calf at/ within 24hrs of calving	
	4	8	4	8	4	8
In-calf rate (weeks)	4	8	4	8	4	8
Cephalosporin treated %	57.4	86.7	52.1	83.3	59.7	89.1
Untreated control %	45.5	78.4	35.4	65.9	41.9	78.1
Difference	11.9	8.3	16.7	17.4	17.8	11.0
p-value	0.05	0.09	0.10	0.06	0.02	0.08

Table 1: In-calf rates at 4 weeks and 8 weeks for dairy cows classified 'at-risk' of endometritis from retained foetal membranes (RFM), vulval discharge or the presence of a dead calf, and then either treated with cephalosporin or left as untreated controls

The development of the MetriCheck device has enabled diagnosis of those cows that have pus present in the vagina. McDougall et al (2007) showed that dairy cows which were diagnosed as MetriCheck-positive 35 days prior to the start of the mating season were associated with poorer subsequent reproductive performance. These cows were at higher risk of not being detected in oestrus prior to the start of the mating season, were first mated later in the mating program and had a lower first service conception rate, 56 day pregnancy rate and final pregnancy rate.

Runciman et al (2009) evaluated the MetriCheck device in Australian dairy cows and showed similar reduced reproductive performance in cows that were diagnosed MetriCheck-positive between 7 and 28 days after calving. This study also showed that cows diagnosed as MetriCheck-positive and subsequently treated with intrauterine cephalosporin had improved first service conception rates, 21 day in-calf rates and 42 day in-calf rates compared to untreated controls.

Study objectives

The objective of this study was to demonstrate that a single administration of intrauterine cephalosporin, MetriVet (A10955 RVM, AgriHealth), is not inferior to Metricure (A7394 RVM, MSD Animal Health) when used to treat NZ dairy cows diagnosed as MetriCheck-positive at 30 days prior to the planned start of mating.

Study design

The study included 34 dairy herds in the Waikato and Otago regions. Herd sizes ranged from 250 to 2,000 lactating cows. Each dairy herd was 'Metrichecked' approximately 30 days prior to the planned start of mating.

731 cows diagnosed as MetriCheck-positive (see Table 2) that met selection criteria were eligible to be enrolled.

Selection criteria were

- no clinical signs of disease,
- calved at least 14 days,
- not treated with systemic antibiotics or anti-inflammatory drugs for 90 days prior to enrolment,
- free from gross abnormalities of the reproductive tract.

Random allocation achieved very similar group composition with no statistical difference between the groups in mean calving date, breed composition, age, BCS or days calved prior to enrolment.

Mucus was scored on the commonly accepted scoring methodology modified from Sheldon and Hobson (2004).

Category	Score	Definition
Negative	0	No mucus or clear mucus only present
	1	A few flecks of pus present in otherwise clear mucus
Positive	2	Mucopurulent (< 50% pus)
	3	Mucopurulent (> 50% pus)

Table 2: MetriCheck score and definition

Each MetriCheck-positive cow enrolled was body condition scored (BCS) at the time of enrolment. Cows were alternatively allocated to receive a single dose of either MetriVet (n=370), or Metricure (n=361) within 24 hrs of diagnosis. This allowed cows to be drafted following diagnosis, then treated the following day in larger herds.

Treatments were administered intra-uterine as per label instructions. Each enrolled cow underwent a subsequent MetriCheck examination 21 days after treatment, and was scored on the same scale. Pregnancy testing was undertaken on each cow to determine the date of conception.

Treatment efficacy was determined by:

- presence or absence of pus in vagina 21 days after treatment ('apparent cure')
- change in group mean MetriCheck score by 21 days post treatment
- measurement of reproductive outcomes (3 week submission rate, 6 week in-calf rate, 10 week in-calf rate, first service conception rate and cumulative pregnancy rate).

Results

Metricheck score

There was no difference in the group mean Metricheck score between each treatment ($p=0.734$) as shown in Table 3. There was no difference in the proportion of cows 'cured' (as assessed by repeat Metricheck) between MetriVet and Metricure treated cows (85.1% and 85.2%, respectively).

	MetriVet	Metricure
Day 0	1.80	1.79
Day 21	0.26	0.24

Table 3: Group mean Metricheck score for cows Metricheck-positive at 3 weeks prior to mating start date and treated with one of two intrauterine preparations of cephalixin

Reproductive performance

There were no differences in the 3 week submission rate, first-service conception rate, 6 week or 10 week in-calf rate between the treatments as shown in Table 4.

	MetriVet	Metricure	<i>p value</i>
Total Cows	356	347	
Cows submitted	254	255	
3 Week submission rate	71.3	73.5	0.53
First-service conception rate	39.2%	39.5%	0.94
6 week in-calf rate	61.5%	59.9%	0.67
10 week in-calf rate	73.9%	72.9%	0.77

Table 4: Reproductive performance for cows Metricheck-positive at 3 weeks prior to mating start date and treated with one of two intrauterine preparations of cephalixin.

Mean survival to conception was 39.5 days (95%CI 36.3 to 42.7) and 40.2 days (95%CI 36.9 to 43.4) for MetriVet treatment and Metricure groups respectively. There was no difference in cumulative pregnancy rates between treatments.

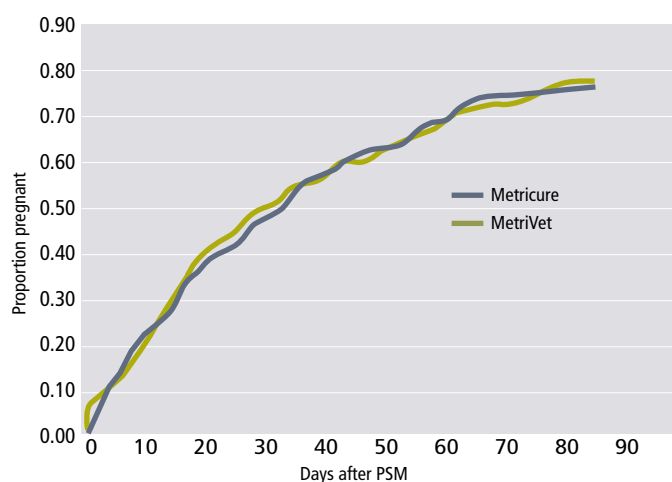


Figure 1. Cumulative pregnancy rate for cows Metricheck-positive at 3 weeks prior to mating start date and treated with one of two intrauterine preparations of cephalixin.

Discussion

Endometritis cure rates in this study are similar to those reported elsewhere in the literature. The two cephalixin products showed no difference in reduction of mean Metricheck score, proportion of cows 'cured', 3 week submission rate, first service conception rate, 6 week in-calf rate, 10 week in-calf rate and survival to conception between treatment groups.

Six week in-calf rates in this study were very similar to those reported by Howard (2014) for dairy cows diagnosed with endometritis by the Metricheck device and treated with a single intra-uterine treatment of cephalixin 19 or 29 days prior to the mating start date.

First service conception rates were within expectations and similar to those achieved when NZ dairy cows are treated with non-cycling programmes. This result in cows diagnosed with endometritis and treated with cephalixin aligns with the reports of McDougall et al (2007) and Runciman (2009), showing an improvement in first service interval, conception and in-calf rates.

The study veterinarians noted that MetriVet syringes affixed securely to the pipettes and this feature, along with optimal product viscosity enabled easy administration to the treated cows.

Conclusions

MetriVet and Metricure products had equivalent efficacy in the treatment of dairy cows diagnosed with endometritis using the Metricheck device one month prior to mating start date.

MetriVet is a reliable treatment choice for endometritis in dairy cows under New Zealand farming conditions.

References

- Howard, P (2014). Reproductive outcomes for "At Risk" cows treated on routine visits in New Zealand. Dairy Cattle Vets Newsletter Vol 32:1, September 2014, pp14-17.
- McDougall, S (2001). Effect of intrauterine antibiotic treatment on reproductive performance of dairy cows following periparturient disease. New Zealand Veterinary Journal, 49:4, 150-158.
- McDougall, S, McAuley, R, Compton, C (2007). Association between endometritis diagnosis using a novel intravaginal device and reproductive performance in dairy cattle. Animal Reproduction Science, 99(1), 9-23.
- Runciman, D, Anderson, G, Malmo, J (2009). Comparison of two methods of detecting purulent vaginal discharge in postpartum dairy cows and effect of intrauterine cephalixin on reproductive performance. Australian Veterinary Journal, 87(9), 369-378.
- Sheldon, I, and Dobson, H (2004). Postpartum uterine health in cattle. Animal Reproduction Science, 82(1): 295-306.
- MetriVet is a NZ restricted veterinary medicine, A10955, which is registered to AgriHealth NZ Ltd.
- Metricure is a NZ restricted veterinary medicine, A07394, which is registered to Schering-Plough Animal Health, NZ.