

Brief Communication

**AN ATTEMPT TO INDUCE LAMINITIS IN COWS BY
INTRARUMINAL INFUSION OF LACTIC ACID***

The aetiology of laminitis in cattle and other species is unclear. The onset of clinical symptoms in experimental equine laminitis has been shown to be well correlated to increased concentrations of lactate in plasma (*Garner et al.* 1977). *Telle & Preston* (1971) and *Morrow et al.* (1973) induced laminitis in sheep by intraruminal infusion of lactic acid. In the present investigation the effect of intraruminal lactic acid infusion was studied in cows.

Four Swedish Red and White cows weighing about 550 kg were given intraruminally 5 l of 24 % racemic lactic acid at once (cows A and B) or 10 l of 20 % racemic lactic acid continuously during 3 h (cows C and D). Venous blood and rumen fluid were sampled before and at intervals during 6 h and 24 h, respectively, after the start of the experiment. Lactate in blood was estimated with kits (Boehringer Mannheim). pH in the rumen fluid was measured with a pH-meter. The concentration of lactate in the rumen fluid was estimated by oxidating the lactic acid to acetic aldehyde, which was measured colorimetrically at 570 nm after adding of hydroquinone.

During about 3 h to 12 h after the lactic acid infusion, cows A and B showed increased heart and respiratory rates, dullness and inappetence. The peripheral parts of the body felt cold. Cows C and D did not show any significant symptoms, except a slightly increased heart rate in cow C. No symptom of disease was observed from the locomotor system of any cow. The parameters measured in rumen fluid and blood are shown in Figs. 1 and 2. The lactate concentration in rumen fluid increased and pH decreased heavily in cows A and B and moderately in cows C and D. There was a heavy increase of blood lactate in cows A and B and a slight increase in cow D.

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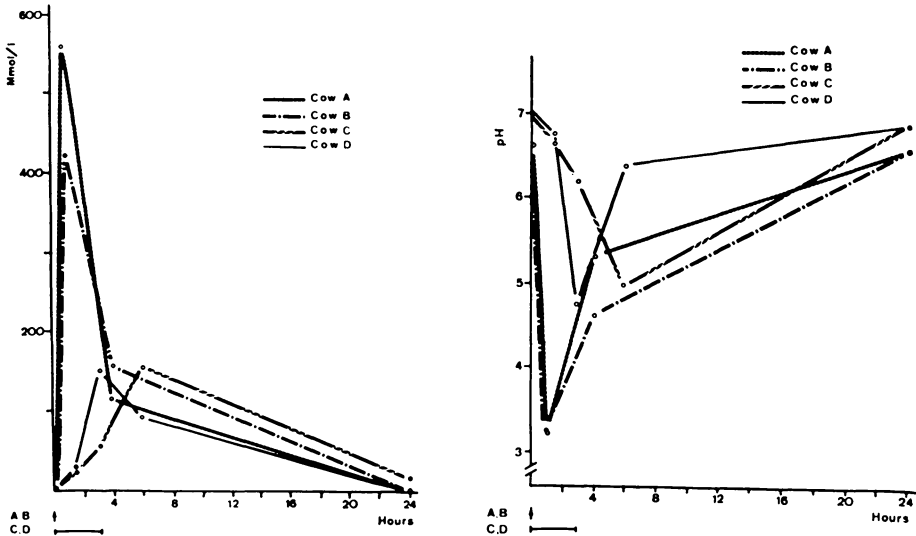


Figure 1. Lactate and pH in rumen fluid after infusion of lactic acid. Cows A and B were given 1200 g at start, cows C and D 2000 g during 3 h.

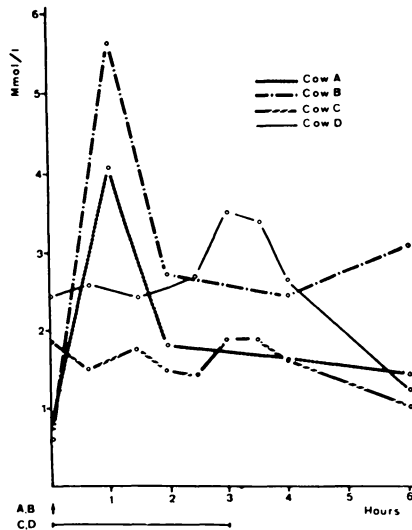


Figure 2. Blood lactate after infusion of lactic acid. Cows A and B were given 1200 g at start, cows C and D 2000 g during 3 h.

Hylgaard-Jensen & Simesen (1966) observed laminitis in experimentally grain-overloaded cows. The concentration of lactate in rumen fluid was elevated during 30 h with peaks at about 340 mmol/l. Laminitis in sheep has been induced by intrarumi-

nal infusion of lactic acid at a dose level of 0.23 % of the body weight (*Telle & Preston, Morrow et al.*). In the experiment by *Telle & Preston* a peak concentration of lactate in rumen fluid of 180 mmol/l was estimated. In the present experiment dose levels at 0.2—0.3 % of the body weight gave peak concentrations of lactate in rumen fluid between 150 and 570 mmol/l. Compared to the results of *Hyldgaard-Jensen & Simesen*, cows A and B showed higher peak concentrations of lactate in the rumen fluid. The shorter duration could by itself explain why laminitis did not occur in the present experiment. On the other hand, the lactate concentration in rumen fluid in all 4 cows were higher than or as high as in the sheep experiments made by *Telle & Preston*. Parts of the intraruminally infused lactic acid were absorbed, and in cows A and B blood lactate concentrations were of the same level as after intravenous lactic acid infusions made in cows by *Svendsen* (1979). Despite high blood lactate concentrations no laminitic symptoms were observed either in the present investigation or in that made by *Svendsen*.

In conclusion, these results, though based on few animals, do not support the theory that lactic acid is a fundamental aetiological factor in bovine laminitis.

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