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The use of xylazine hydrochloride (Rompun®) in the analgesic protocol for claw treatment in lateral recumbency on a surgical tipping table in lame dairy cows

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INTRODUCTION
Lameness in dairy cows is commonly due to claw lesions (Van Amstel and Shearer 2006). For treatment of claw disorders commonly surgical intervention with proper analgesia and restraining is important in order to ensure adequate and safe surgical conditions (VanMetre et al. 2000 and Starke et al. 2007). For orthopaedic surgery frequently cows are laid down on a surgical tipping table. Restraining is perceived as stress by cows (Tagawa et al. 1994 and Pesenhofer et al. 2006). Although animal welfare is a growing subject of concern in farm animals, adequate analgesic protocols in general and in particular in orthopaedic surgery are still neglected by field veterinarians and farmers (Hudson et al. 2008). This appears under animal welfare aspects no longer acceptable (Galindo and Broom 2002).

Results of a previous study showed the alleviation of stress by pre-emptive application of xylazine (Rompun®) when cows are turned into lateral recumbency (LR) for painless claw trimming with some additional effect on respiratory depression of LR in dairy cows. The aim of this study was to investigate the effect of pre-emptive xylazine treatment in the analgesic protocol for claw treatment in LR in lame dairy cows on the stress and pain response.

MATERIALS AND METHODS
In a prospective, blinded, placebo-controlled clinical case study, 24 lame, German Holstein Frisian cows (not more than four months pregnant), weighing 531±85.5 kg and aged 4.4±1.5 (mean ± SD) years old were used. All cows suffered from lameness due to a claw lesion. An indwelling venous catheter was introduced into the right jugular vein for repeated blood sampling. Cows were randomly allocated into two groups of 12 cows each and either treated with Xylazine (Rompun®; 0.05 mg kg-1 BW, IM) or an equal volume of sterile saline (controls) 15 minutes before LR for claw treatment. After initial claw examination in each cow a retrograde intravenous local anaesthesia (LA) with 20 ml of 2% procaine was performed. At regular preset time intervals over an observation period of 6 hours (30 min before drug application to 6 hours post-operative) heart rate (HR), respiratory rate (RR), plasma levels of cortisol, glucose, lactate and non-esterified fatty acids (NEFA) were determined and signs of behaviour monitored (via video recording and pedometer).

Xylazine or placebo treatments were performed in the stable. Fifteen minutes after drug application cows were moved to the surgery theatre and turned into LR for initial claw examination, then (20 min after start of LR) the regional anaesthesia was applied and thereafter the surgical claw treatment performed according to the type of the claw affection. After turning into standing position cows were moved back to the stable. Statistical evaluation of results (SAS package 9.1) was performed by means of a two factorial analysis of variance for repeated measurements. Behaviour signs were tested for group differences either by Fisher’s exact or by Wilcoxon rank-sum test.

RESULTS
All cows treated with xylazine showed mild signs of sedation for about one to two hours, and were able to walk and to stand at all times. No significant (P < 0.05) difference was found for rumen motility in both groups. In both groups rumen motility ceased during the surgical intervention in LR. Cows of both groups showed mild signs of ruminal free gas bloat after LR. In the evaluation of behavioural signs xylazine demonstrated significantly (P < 0.05) additional analgesic effects to LA by reduced pain response on the insertion of the needle for LA, reduced ear flicking during claw treatment and reduced lameness score. In xylazine treated cows the evaluation of the pedometer recordings revealed in the first hour after claw treatment in LR a significantly (P < 0.05) higher percentage of standing than in controls. The average period of activity (standing and active) was not significantly different between both groups and generally with about 2 – 3% per hour low. Also the mean number of steps per min during active periods was not significantly different.
Coming back from claw treatment in LR to the free stall, xylazine treated cows started to consume offered feed mostly immediately, while controls preferred to lie down. In average the time period in % of one hour cows spent feeding was longer in xylazine treated cows than in controls.

Mean HR and RR as well as plasma levels of lactate and NEFA were significantly (P < 0.05) reduced after xylazine treatment compared to baseline and controls. After xylazine treatment mean plasma glucose was significantly (P < 0.05) higher after xylazine treatment compared to controls. In placebo treated control cows plasma glucose increased significantly (P < 0.05) compared to baseline during LR. Mean plasma level of cortisol was significantly (P < 0.05) lower in xylazine treated cows after being turned into LR but raised to levels in controls during the surgical treatment. No difference between groups was seen in plasma cortisol post-operatively. In each of both groups one cow exhibited with 2 ng ml-1 plasma cortisol concentrations which were close to the detection limit. In both cows plasma cortisol concentrations stayed at this low level, even during the entire period of LR.

CONCLUSION
The pre-emptive xylazine treatment in a low dose (0.05 mg kg-1 BW) can reduce hormonal and metabolic stress response and has short term additional mild analgesic effects to LA in lame cows receiving claw treatment in LR. Thus, xylazine appears to be an appropriate sedative for stress alleviation in cows turned into LR and can be used as an analgesic in a multimodal analgesic protocol for short term pain management during claw surgeries. Since xylazine has as LR depressive effects on cardio-respiratory function the desired effects of sedation and analgesia have to be balanced against the possibility of reduced tissue oxygenation before the use of xylazine in cows turned in LR, at least we discourage to use higher doses of xylazine under field conditions.

REFERENCES