Measurements of acute phase proteins in pharyngeal swabs and serum from healthy dairy calves

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Objectives: Early recognition and treatment of respiratory disease in calves can contribute to better animal welfare and possibly, reduce the antibiotic consumption. Detection of acute phase proteins (APP) in pharyngeal fluid could be the first step in making a non-invasive catheter test for early detection of respiratory disease. The objective of this study was therefore to investigate if it was possible to detect the APPs serum amyloid A (SAA), haptoglobin (Hp) and lipopolysaccharide binding protein (Lbp) in pharyngeal swabs from calves and if so, to compare the APP concentration in pharyngeal swabs with the serum APP concentration.

Materials and methods: Eighty-four healthy dairy calves aged 3–30 days housed in nine Danish dairy herds were included. All calves were assessed free from respiratory disease by a clinical examination and thoracic ultrasonography in the herd. After the clinical examination, serum samples were collected from the jugular vein and four long cotton swabs were placed in pharynx and moved around until saturated. The swabs were stored in cytobrush with 1 ml of phosphate buffered saline (PBS) for 24 hours, then removed and the cytobrushes were stored at −80°C until analysis. The swabs and serum were analysed for SAA, Hp and Lbp at the Veterinary Diagnostic Laboratory at University of Copenhagen. The range and mean concentration of SAA, Hp and Lbp in serum and swabs were compared.

Results: The SAA concentration in serum ranged from 32.93–180.94 μg/mL, with a mean of 118.23 μg/mL and a standard deviation (SD) of 40.56 μg/mL. There was a significant association between age and serum SAA, which decreased with age. The Hp concentration in serum ranged from 45.14–788.75 μg/mL, with a mean of 100.00 μg/mL and a SD of 100.74 μg/mL, and the Lbp concentration in serum ranged from 7.25–56.32 ng/mL, with a mean of 20.63 ng/mL and a SD of 30.30 ng/mL. In the pharyngeal swabs, the SAA concentration ranged from 0.00–0.6 μg/mL with a mean of 2.16 μg/mL and a SD of 1.47 μg/mL. The Hp concentration in pharynx swabs ranged from 0.00–69.23 μg/mL with a mean of 26.13 μg/mL and a SD of 13.01 μg/mL. The Lbp concentration in pharynx swabs ranged from 0.00–47.94 ng/mL with a mean of 0.06 ng/mL and a SD of 11.85 ng/mL.

Conclusions: This is the first time that detection of the APPs SAA, Hp and Lbp in pharyngeal swabs from dairy calves has been shown. From these results reference intervals for SAA, Hp and Lbp in pharyngeal swabs from dairy calves housed in commercial farms can be established. This can be used further to compare with SAA, Hp and Lbp in samples from diseased calves to establish the levels of APP in pharyngeal swabs of calves with respiratory disease.

Keywords: Acute phase proteins, calves, pharyngeal swab.

Sepsis and other risk factors for mortality in critically ill calves

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Objective: Critical illness in calves is a problem practitioners are frequently faced with, often resulting in mortality. It can be caused by several etiologies, with sepsis amongst them. Considering the strict antimicrobial legislation in food-producing animals, it is crucial to identify which of the critically ill calves are in need of (critically important) antibiotics. Knowledge on factors contributing to mortality in these calves can aid in better antimicrobial decision making. Therefore, the objective of this study was to identify risk factors for mortality in critically ill calves.

Material & methods: A retrospective cohort study was conducted on 230 calves presented with critical illness in our large animal clinic. Anamnestic information, as well as clinical, ultrasonographic, and laboratory information was assembled. Critical clinical illness in combination with positive hemoculture (BD BACTEC™) were used as a proxy for the presence of sepsis. Multivariable logistic regression analysis as well as classification and regression tree analysis were used to determine parameters significantly associated with mortality.

Results: In total 61.3% (141/230) of the calves died. Enteri adsal (51.7%, n = 119) and pneumonia (45.7%, n = 105) were most frequently detected, followed by sepsis (54.3%, n = 128), bronchitis (50.0%, n = 115) and atelectasis (17.8%, n = 41). Comorbidities (presence of multiple health conditions in the animal) were frequent (54.3%, n = 128), but did not significantly increase the risks of mortality (OR=0.79). The final multivariable regression model showed that abnormal behavior (OR=3.3, 95% CI, 1.1–10.0, P=0.033), male gender (OR=4.3, 95% CI, 1.4–13.2, P=0.01), palsi musculare (OR=10.1, 95% CI, 2.5–42.7, P=0.001). tachycardia (a 126 bpm) (OR=3.4, 95% CI, 1.1–10.8, P=0.04), acidosis (pH ≤7.16) (OR=5.3, 95% CI, 1.3–21.0, P=0.021) and sepsis (OR=6.0, 95% CI, 1.6–26.0, P=0.003) were associated with
Cardiovascular monitoring, laboratory findings and pain score in calves undergoing unilateral rectus sheath block for umbilical hernia repair: a randomized clinical trial

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Objectives: Despite detection and relief of pain are gaining considerable attention in farm animals, only a few clinical studies assess the effect of the analgesia in cattle after abdominal surgery. so far. Cardiovascular findings, serum cortisol level (SCL) and blood gas analysis (BGA) outcomes, as well as the pain score (PS) assessment, are considered some of the most reliable methods of clinical monitoring to evaluated stress, fear, and pain in animals. Based on the previous statements, the current study aims to define the health and welfare of bovine calves undergoing hernioplasty under general field anesthesia using an ultrasound-guided rectus sheath block (RSB) by multiple clinical approaches based on a set of parameters.

Materials and methods: The study has been performed on fourteen calves randomly assigned to receive either bilateral ultrasound guided RSB with 0.3 mL/kg of bupivacaine 0.25% and 0.15 µg/kg of dexametadomina (Treated group, TG) or 3.0 mL/kg of 0.8% NaCl (Control group, CG). All animals were monitored by Holter recording to define the effects on the cardiac dynamics, as well as SCL, BGA, and UNE-SSP. Both car pain scale to assess their health and welfare status. Holter monitoring has been continuously performed from 120 minutes (min) pre-surgery to 120 min post-surgery during the mean results in intervals 1 (1 min)–120 min pre-surgery to the beginning of induction time: Int1: beginning of induction to extubation time (EST1): Int2=EST4 to +120 min post-surgery; Int3=EST1 to +60 min, Int4=EST1 to +30 min, Int5=EST1 to +60 min, Int6=EST1 to +60 min, Int7=EST1 to +120 min. The SCL have been evaluated at -10 min pre-surgery (baseline), at induction time, skin incision and EST1, as well as at +30 min, +45 min, +60 min, +120 min, +360 min after surgery. BGA at -120 min pre-surgery, skin incision and EST1, as well as at +60 min, +120 min. Finally, the PS was carried out at -153 min pre-surgery and at +30 min, +45 min, +60 min, +120 min, +240 min, +300 min post-surgery. Intra- and extra-groups differences have been calculated with appropriate parametric and non-parametric tests. Probabilities < 0.05 were considered statistically significant.

Results: No significant difference was observed regarding the heart rate between the two groups at any time-interval, while regarding the same parameter a significant intra-group difference has been observed for the TG (Int1=0.6±1.0 beat/min ±SD vs. Int2=92.7±22.0; P<0.05); A statistically significant difference was observed regarding the overall time both of respiratory arrhythmia (TG=4.8mm vs. GC=26.8±1.0 mm; P<0.001) and sinus tachycardia (TG=0.3mm vs. GC=1.1±0.7mm; P<0.001). A further significant difference was found regarding the SCL between the two groups at skin incision time (TG=0.4±0.0 vs. GC=0.2±0.0; P<0.01), while none was observed regarding the BGA. Finally, calves receiving RSB exhibited significantly lower median PS (P<0.05) between the two groups at +45 min (TG=1 vs. GC=4), +60 min (TG=1 vs. GC=6), +120 min (TG=0 vs. GC=1) and +240 min (TG=0 vs. GC=1).

Conclusion: The current multiple clinical approaches based on a set of parameters assess the effects on the health and welfare of bovine calves undergoing hemioplasty under general field anesthesia after receiving an ultrasound guided RSB bupivacaine based, for the first time. The clinical procedures seem to reveal beneficial short-term (attained by HR and SCL) and long-term effects after surgery (attested by the PS). Although as compared to the traditional analgesic techniques, the use of this ultrasound guided RSB seems to give greater beneficial effects on the health and welfare of calves affected by umbilical hernia, further studies are necessary to definitively confirm the effects and to enable this innovative analgesic procedure to become a milestone in the bovine field medicine.

Keywords: Holter calves, calves health, calves welfare, rectus sheath block: umbilical hernia.