

**STUDY OF THE ROLE AND ORIGIN OF ENDOTOXEMIA IN THE PATHOGENESIS OF RESPIRATORY DISTRESS SYNDROME IN THE NEWBORN CALF**

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In Belgium, respiratory distress syndrome (RDS) in mature hypermuscled Belgian Blue (BB) calves is frequently observed. It concerns 65% of BB farms whose 36% lose one or more calves each year. Septicemia and enteritis lesions found respectively in 30% and 42% of RDS necropsied calves made us to consider the hypothesis that an endotoxemia of digestive origin is associated with RDS. The aims of the study were to test this hypothesis by dosage of blood endotoxin in RDS and in healthy comparable calves and to investigate the origin of this endotoxemia by bacteriological culture and dosage of endotoxins in colostrum of their respective dams, and by complete necropsy of dead calves.

We examined 14 eleven-hours to six-days old BB presenting RDS as well as 9 healthy calves. Calves physical examination was supported by arterial and venous blood gases and pH analysis, as well as blood endotoxin dosage by the Limulus Amebocyte Lysate test (LAL). The colostrum endotoxin content was also tested by LAL.

In 10 out of these 14 RDS calves, mental status and appetite were severely depressed. This led us to distinguish two groups: RDS undepressed (4) and RDS depressed calves (10) which presented, beside tachypnea and hypoxemia, acidosis, hypercapnea and cyanotic mucous membranes. The endotoxemia of depressed calves was significantly higher ( $0,14 \pm 0,17$  Endotoxin Unit (EU)/ml, mean  $\pm$  SEM) comparatively to healthy ( $0,01 \pm 0,01$  EU/ml) and undepressed calves (endotoxin level under limits of detection).

Bacterial examinations on 4 necropsied calves revealed pathogenic *E. coli* in the intestines of 3 calves. Only 1 calf showed simultaneous presence of *E. coli* in both intestine and heart's blood. Concerning the bacteriological culture and endotoxin dosage in colostrum, no difference was found between the three groups of dams.

This study suggests that the colostrum is not the origin of endotoxemia. The presence of endotoxemia only in depressed RDS and not in undepressed RDS calves pleads for a secondary consequence rather than primary cause of RDS. Such endotoxemia can suppress the synthesis of surfactant by pneumocytes II and, combined with higher lung vascular permeability, induces hyaline membranes formation. However, other factors like trace elements are known to influence pulmonary maturation and thus to play a role in the pathogenesis of RDS, especially iodine and selenium deficiencies. Further study is needed to clarify the pathogenesis of RDS in calves.