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LONG SPOKEN PRESENTATION

ANIMAL WELFARE SCIENCE, ETHICS AND LAW

RESEARCH

A multiparametric approach to discriminate the impacts of different degrees of invasiveness of surgical procedures in sheep

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No conflict of interest

Traumatic situations in animals induce responses including pain, expressed through behavioural and physiological pathways such as inflammation, oxidative stress, hypothalamic-pituitary-adrenal axis (HPA), and autonomic-nervous-system (ANS). As some of these systems can also be activated during excitement and situations with a positive valence, their use as a means to assess pain response is difficult. We explored i) how these five aforementioned pathways change in sheep exposed to various degrees of invasiveness of surgical procedures despite a therapeutic regimen and ii) whether a multiparametric analysis that combines information from these five pathways enhances the discrimination between these situations, and estimates the relative importance of these pathways in the response.

We used 24 adult sheep split into four treatments: Control (C, no fasting, no anaesthesia, no surgery), Sham (S, fasting, anaesthesia, no surgery), Rumen Canulation (R, fasting, anaesthesia, rumen cannulation), and Rumen-Duodenal-Ileum cannulation (RDI, fasting, anaesthesia, cannulation of the rumen, duodenum and ileum). Sheep' responses were measured for five days after surgery.

When considering each behavioural or physiological pathway independently, discrimination between treatments was acceptable, its sensitivity (Se) ranging from 0 to 100%, and its specificity (Sp) ranging from 62 to 100%. The multiparametric analysis gathering information from the five pathways enhanced the effectiveness of discrimination between treatments (Se, 50-100%; Sp, 82-100%), and gave additional information on the relative contribution of each pathway to the global sheep response. Sheep global response was higher when exposed to a surgery, and increased with the surgery invasiveness. This response relied mostly on Inflammation (absolute correlation for haptoglobin, 0.89), HPA (cortisol, 0.85), and behaviour (Antalgic postures, 0.85).

The multiparametric approach seems to be a promising tool to discriminate between different degrees of invasiveness of surgical procedures.