Fecal calprotectin as a candidate non-invasive biomarker for infectious colitis in swine

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Background

Grower-finisher infectious diarrhea affects swine operations across the globe, leading to decreased profits associated with poor animal performance. Antimicrobials are generally employed to mitigate diarrheal diseases. A non-invasive intestinal inflammation biomarker to monitor enteric infectious diseases will aid on the judicious use of antimicrobials. This study aimed to evaluate the usefulness of fecal calprotectin as a biomarker of enteritis or colitis in pigs.

Materials and Methods

Colitis fecal samples (n=18) were collected from 9-to-10-weeks old pigs experimentally infected with *Brachyspira hyodysenteriae* G44 or sham-infected controls. Enteritis fecal samples (n=14) were collected from 8-weeks old pigs experimentally infected with *Salmonella enterica* serovar Typhimurium or non-infected controls. Fecal samples from both trials were collected by digital stimulation and scored as: 0= normal; 1= soft, wet cement; 2= watery feces; 3= mucoid diarrhea; and 4= bloody diarrhea. Fecal calprotectin was extracted and measured using a sandwich ELISA commercial kit (BÜHLMANN, Laboratories AG, Switzerland). Kruskal-Wallis one-way analysis of variance followed by Dunn's *post-hoc* was used to investigate differences in fecal calprotectin levels between fecal scores and anatomical groups. Fecal calprotectin levels are expressed as means (µg/g of feces) and standard deviation (SD).

Results and discussion

Fecal calprotectin levels were significantly higher in colitis fecal samples that scored as 3 (mucoid; 25.25 □g/g ± 0.23) and 4 (blood-tinged; 28.07 □g/g ±2.12) than scores 0 (24.97□g/g ±0.46) and 1 (24.95□g/g ±0.28). These findings suggest that fecal calprotectin can be associated with colonic lesions and may be a non-invasive biomarker correlated with colitis in pigs. In contrast, no differences in fecal calprotectin levels were found between enteritis samples, regardless of fecal scores (0 = 25.47 □g/g ± 0.49; 1 = 26.46□g/g ± 0.55; 2 = 26.75□g/g ± 1.17). This lack of correlation is likely due to the proximal location of lesions, leading to the disappearance of calprotectin through luminal proteases activity. This provides further evidence that fecal calprotectin levels are related to the location and degree of intestinal inflammation.

Conclusions

Fecal calprotectin level is suggested as a potential marker of infectious colitis in pigs, but it was not correlated to enteritis. Further studies are needed to validate the field application of this tool.

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