Epidemiology of gastric ulcers in sows

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Abstract

This paper describes a study investigating the role of sow gestation diet with special emphasis on fibre content for development of gastric lesions (GLs). Furthermore, the association between serum pepsinogen A (SP-A) level and gastric lesions in sows was investigated. The study included 400 sows from two large sow herds with high prevalence of gastric lesions. In each herd two different sow gestation diets were applied. One was a traditional ration based on wheat and barley (diet 1) while the other was supplemented with additional fibre (diet 2) in the form of beetroot pulpits in herd 1 and oats in herd 2. Gastric lesions occurred in 95-98% of the sows in the two herds. Half of the lesions were categorized as severe with ulcers or stricture of the oesophagus. The overall prevalence of GLs in the two herds was not influenced by the diet. However, in herd 1 the prevalence of severe gastric lesions was reduced when sows were fed the high fibre diet compared to the traditional diet. No clear association was observed between SP-A level and GL occurrence per se. The association between GL severity and SP-A level should be further investigated.

Introduction

Lesions in the gastric mucosa pars oesophagea of intensively housed sows may occur at within-herd prevalence above 70%. Reduced feed uptake, loss of body condition, increased culling rates and mortality are some of the clinical problems associated with GL. The diagnosis of GL in sows is most commonly placed post mortem in connection with high herd mortality. The diagnosis of GL ante mortem is difficult as the clinical signs such as paleness, hypothermia and weakness may be difficult to observe. In vivo diagnosis of GL would be of great value as the early diagnosis could improve the longevity of sows due to an early onset of preventive measures.

In fattening pigs, several studies have linked the pathogenesis of gastric ulcers to the feeding strategy such as the particle size in feed, but very little is known about the risk factors and diagnosis in sows. Intensively housed sows are often fed a high concentration diet of low volume and low particle size once every 24 hours.

In humans, serum pepsinogen A (SP-A) concentration has been associated with gastric ulcer severity and high SP-A level is used as a non-invasive diagnostic marker (Germana B. et al., 2005). A similar association between SP-A level and gastric ulceration of the pars oesophagea has been suggested in swine (Banga-MBoko H. et al., 2003a).

Objective

The objective of the study was to investigate whether high-fibre gestation diets would reduce the prevalence and/or severity of gastric lesions in sows. A secondary objective was to investigate if the serum pepsinogen A level could be used as a marker for gastric ulceration in swine.

Methods

In each herd two gestation diets were used. Diet 1 was a traditional sow gestation diet based on wheat and barley. Diet 2 was a diet with increased fiber content. In herd 1 diet 2 had high content of beetroot pulpits (10%) and in herd 2 diet 2 had high content of oats (23.5%). In each herd, half the participating sows were fed diet 1 during gestation while half of the sows were fed diet 2. Sows selected for slaughter were subjected to a clinical investigation and blood sampling 1-3 days before slaughter. The SP-A concentration was measured by Radio Immuno Assay as described by Banga-

MBoko et al. (2003b). After slaughter, the gastric mucosa was scored according to Table 1 and slaughter weight was recorded. Gastric mucosal scores were then compared with SP-A level and diet.

Table 0. Scoring of gastric lesions in pars oesophagea ventriculi

GL index	Pathology	GL severity
0	No lesions	
1	Hyperkeratosis	1 mm epithelial thickening
2		2 mm epithelial thickening
3		3 mm epithelial thickening
4	Erosions	< 1% of the white area
5		1-10% of the white area
6	Ulcer	< 1% of the white area
7		1-10% of the white area
8		>10% of the white area
9	Esophageal	3 mm < diameter of oesophagus • 10 mm
10	stricture	• 3 mm diameter of oesophagus
11	Scarring	< 1% of the white area
12		1-10% of the white area
13		>10% of the white area

Results

The severity of the gastric lesions diagnosed post mortem ranged from hyperkeratosis to severe acute ulceration and chronic changes (Figure 1).

a.   b.   c.

Figure 1. Gastric lesions of sows. a.: hyperkeratosis of pars oesophagea, b.: acute ulceration, c. scarring of the pars oesophagea. Photo by L. Carstensen.

Gastric lesions (GL indexes 1-13) occurred in 98% and 95% of the sows in herd 1 and 2. Clinical signs 1-3 days before slaughter were not associated with GL lesions. In herd 1, 46%, and in herd 2, 45% of the sows had severe lesions, scored as GL indexes 6-10. After feeding a gestation diet with increased fibre content the prevalence of severe GLs was reduced in herd 1 and tended to be reduced in herd 2 (Figure 2). In herd 1, severe GLs occurred in 52% of sows fed diet 1 and 37% sows fed diet 2 (p=0.008). In herd 2, 48% sows fed diet 1 and 31% of sows fed diet 2 had severe lesions (p=0.09).
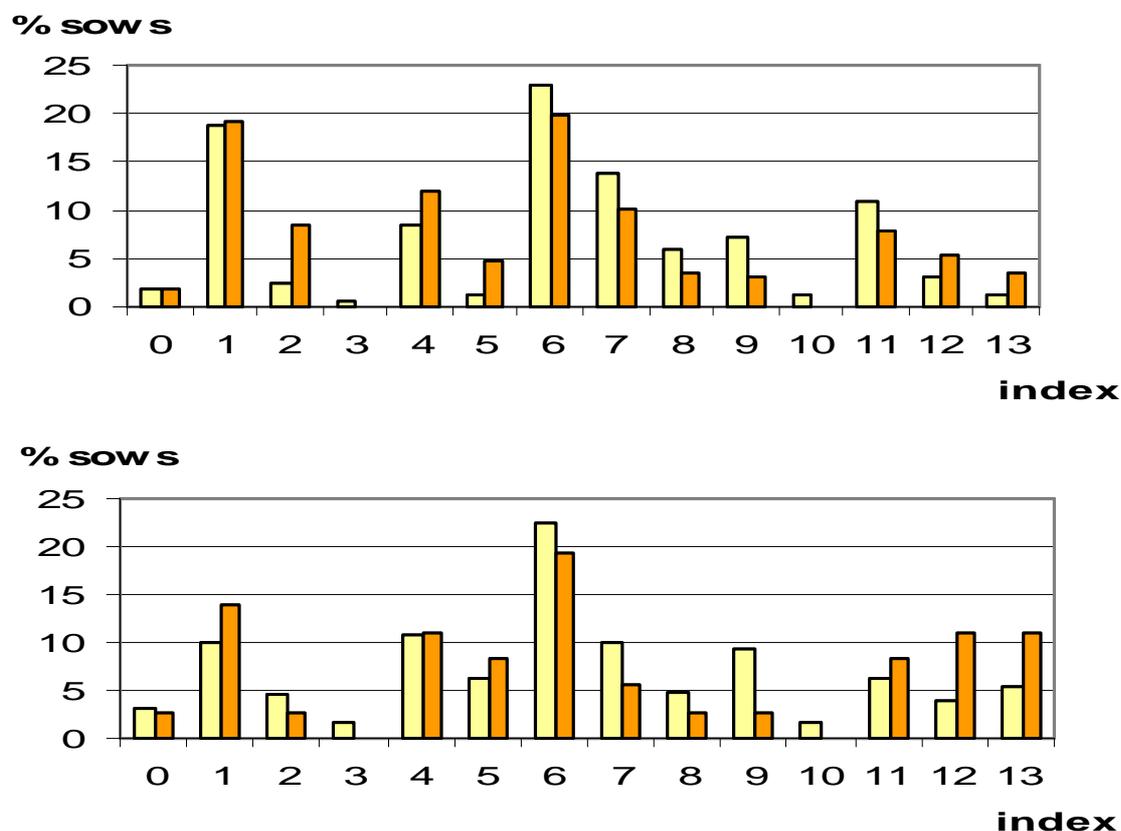
Figure 2 Gastric lesion prevalences in herd 1 (upper figure) and 2 (lower figure), in relation to the original conventional diet in each herd (Yellow bars) and after changing to the test diets with high fibre content (Orange bars). Reduction in lesion prevalence was most pronounced among severe lesions (indexes 6-10)

Sows diagnosed with chronic lesions and stricture of the oesophagus (GL indexes 9-10) had significantly lower slaughter weights compared to sows with GL indexes 0-8 and 11-13 (p=0.002 and p=0.006 in herd 1 and 2).

No association was observed between SP-A concentration and GLs overall (GL indexes 1-13) or between SP-A concentration and severe GLs (GL indexes 6-10). There was a tendency to increase in SP-A concentration among sows with severe GLs. However, this association was not statistically significant.

Discussion

The present study showed an effect of diet type on the prevalence of certain gastric lesions in sows. Although the overall prevalence of gastric lesions was not reduced in the two herds, the prevalence of severe lesions was significantly reduced in one of the participating herds after inclusion of additional beetroot pulpits in the diet.

Gastric ulceration may be an important health and productivity problem per se. Oesophageal stricture is a common chronic pathological sequela following gastric ulceration. In the present study a significant reduction in slaughter weights of sows was diagnosed in sows with oesophageal stricture (GL's indexes 9-10). Mortality due to gastric ulcers in intensive sow husbandry was found to be the third most common cause of mortality in dead-found sows in a study by Vestergaard, K. and Christensen, G. (2004).

Although 45-46% of the sows in the present study had severe GLs with acute ulceration or oesophageal stricture, these lesions were not associated with clinical signs observed 1-3 days before slaughter. This emphasizes the difficulty in diagnosing gastric ulceration in live animals.

No clear association between SP-A concentration and GLs was shown in the present study,. Therefore, SP-A may not be applicable as a diagnostic marker for gastric ulceration in sows. The results indicated, however, a slight increase in SP-A concentration in sows with severe GLs, and the association between SP-A and GL severity should be further investigated

References

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