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Swine Diarrhoea: Important bacterial causes

Dr Alex Westerink, CS Vet

Gastrointestinal diseases are among the most important economic diseases in pig production due to their harmful effects on productivity and profitability.

Diarrhoea in pigs is a clinical sign that is present on most farms, and various aetiological agents can cause the expression of disease. Bacteria are mainly responsible for most cases of diarrhoea in pig units in South Africa. Diarrhoea types vary throughout the different productive stages and can include neonatal diarrhoea, post-weaning diarrhoea and fattening diarrhoea.

Colibacillosis

Colibacillosis is a common enteric disease in swine, most often seen in the neonatal and post-weaning phases of production. It is caused by colonization of the small intestine with enterotoxigenic strains of *Escherichia coli* (ETEC). Neonatal colibacillosis often occurs within the first week of life; piglets from gilts may be more severely affected than piglets nursing from sows.

Post-weaning colibacillosis often gets triggered by stress related to the weaning process, hygiene or following abrupt changes in environment or nutrition.

Clinical signs often include watery diarrhoea commonly accompanied by dehydration and loss of condition. Piglets in the neonatal phase may have higher mortality rates compared to the weaner phase. In the post-weaning phase, there are generally low to zero mortalities; however, a marked reduction in the daily weight gain may occur.

Lesions can be mild and are typically seen in the small intestine. The small intestine may contain excess watery fluid or be distended and gas-filled. Diagnosis is based on herd history, clinical signs, and post-mortem findings. Bacterial culture is required for the isolation of the pathogen.



Figure 1: Post-weaning diarrhoea

Treatment and Control: Vaccination of pregnant gilts and sows should be performed to induce colostral immunity. Due to drug-resistant bacteria, antibiotic treatment strategies should be based on antibiogram results. Good hygiene and pig flow in the farrowing and weaner sections significantly reduce bacterial load.

Salmonellosis

In swine, only a few pathogenic serotypes can cause clinical disease. The two most important serotypes in pigs are *Salmonella chloleraesuis* and *Salmonella typhimurium*. Salmonella causes inflammation and necrosis of the small and large intestine resulting in diarrhoea and, in some cases, septicaemia. *S. choleraesuis* often presents as acute septicaemia and can result in death without forewarning.

The disease is most often observed in pigs from weaning up to five months of age. Sources of infection are primarily carrier pigs (bacteria shed in the faeces), rodents, contaminated feed and fomites.

Clinical signs may include foul-smelling diarrhoea, often containing necrotic debris and mucous. A decreased growth rate may be observed in chronically affected pigs. Pneumonia and blue discolouration of extremities (ears, tail, nose) can be seen in septicaemic cases. Lesions typically include severely inflamed and necrotic small and large intestines. Necrotic hepatitis may also be apparent.

Diagnosis is initially based on herd history, clinical signs, and post-mortem findings. Bacterial culture and serotyping should be performed to determine the strain. Histopathology of affected tissues can assist with the diagnosis.

Antibiotic treatment should always be based on antibiogram results for an effective treatment strategy. Good hygiene practices and all-in-all-out pig flow assists with the control of the disease.



Figure 2: Fibrinonecrotic typhlocolitis

Porcine Proliferative Enteropathy

Porcine proliferative enteropathy, also known as Ileitis, is a common cause of diarrhoea in growing/finishing pigs and young breeding pigs. *Lawsonia intracellularis,* the aetiologic agent of Ileitis, is an intracellular gram-negative rod-shaped bacterium.

The disease is characterized by the thickening of the intestine's mucosa due to hyperplasia of the crypt enterocytes. The disease includes acute and chronic manifestations.

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The acute form generally manifests as a haemorrhagic diarrhoea with sudden deaths often close to marketing age; the chronic form is milder diarrhoea known as porcine intestinal adenomatosis (PIA), which can result in reduced growth rate in growing pigs.

Lesions are generally located near the ileal-caecal junction, but lesions can also be observed in the jejunum, caecum and colon. Chronically affected pigs have lesions with thickened ileal mucosa and deep folds. In the acute haemorrhagic form, reddish black faeces may be present in the colon, and clotted blood can be observed in the ileal lumen.

Increased abattoir condemnations due to anaemia from the haemorrhagic form may be apparent.

Diagnosis is generally based on herd history, clinical signs and post-mortem findings. Culturing *L. intracellularis* is difficult; alternatively, PCR of faeces or affected organs can be performed. Immunohistochemistry can demonstrate the intracellular bacterium.

Treatment and control: Commercially available vaccines can be helpful in herds with severe disease. Antibiotics such as Oxytetracyclines, Doxycycline and Tylosin are generally effective against *L. intracellularis* and can be used strategically in feed, water or parenterally in the grower phase.



Figure 3: Acute haemorrhagic form

Swine Dysentery

Swine dysentery is a severe infectious disease characterized by mucohaemorrhagic diarrhoea and marked inflammation limited to the large intestine. *Brachyspira hyodysenteriae,* a spirochete, is the leading aetiologic agent. Swine dysentery can survive in faecal-contaminated environments or surfaces for long periods.

The disease occurs more frequently during the growing/finishing periods and seldomly occurs in piglets less than three weeks old.



Figure 4: Chronic Form



Figure 5: Mucohaemorrhagic diarrhoea

Swine dysentery is relatively uncommon on commercial pig farms in South Africa; however, it may be more prevalent on smaller-scale farms where hygiene and all-in-all-out practices are challenging.

Clinical signs include mucohaemorrhagic diarrhoea; protracted disease leads to dehydration, weight loss and variable mortality rates. Diarrhoea can have variations in colour (grey, yellow, red), consistency and composition (mucous or blood). Focusing on faecal appearance may lead to a misdiagnosis as salmonellosis, Ileitis and Swine dysentery can all appear similar at various stages. The morbidity rate can be high depending on the management system used on the farm.

Lesions are confined to the large intestine; affected mucosa is swollen and congested. Intestinal content is usually foul-smelling and often contains blood-streaked mucous and necrotic material.

Diagnosis is made based on herd history, clinical signs and post-mortem findings. Findings should not be confused with lesions caused by other bacterial agents. PCR of faeces or intestinal content can be performed to confirm the diagnosis.

Treatment and control: Continuous flow pig farms require a high level of hygiene and effective treatment strategies. Antibiotic treatment with Tiamulin tends to be most effective, but treatment with Lincomycin and Tylosin can also be attempted. Swine dysentery can be eradicated through carefully planned depopulation strategies.

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QUESTION 1

What disease typically causes piglet diarrhoea in the neonatal and post-weaning phase of production?

A. Salmonellosis
B. Colibacillosis
C. Proliferative enteropathy
D. Coccidiosis
E. Swine dysentery

QUESTION 2

What disease agent causes a characteristic mucohaemorrhagic diarrhoea seen mainly during the growing and finishing period?

A. *Lawsonia intracellularis*
B. *Salmonella*
C. *Brachyspira hyodysenteriae*
D. *E. coli*
E. *Coccidia*

QUESTION 3

In a pig that has died from *Salmonella typhimurium*, what lesions can be expected in the caecum and colon?

A. Haemorrhagic colitis
B. Necro-haemorrhagic enteritis
C. Ulcerative typhlocolitis
D. Fibrinonecrotic typhlocolitis
E. None of the above

QUESTION 4

What management practices can assist with reducing the incidence of diarrhoea in a piggery?

A. Good Hygiene practices
B. Mixing pigs of different age groups together
C. All-in-all-out pig flow
D. Continuous pig flow
E. Both A & C

QUESTION 5

Near which anatomical site can lesions for Proliferative enteropathy most commonly be seen?

A. Jejunum
B. Colon and caecum
C. Ileal-caecal junction
D. Duodenum
E. Rectum

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QUESTION 6

Which of the following laboratory tests can be performed on faeces or affected organs to detect Lawsonia intracellularis?

A. Bacterial culture
B. PCR and Immunohistochemistry
C. ELISA serology
D. Histology
E. None of the above

QUESTION 7

What *E.coli* vaccination protocol is advised to help reduce piglet Colibacillosis?

A. Vaccination of pregnant gilts and sows
B. Vaccination of piglets
C. Vaccination of pregnant sows and piglets
D. Vaccination of sows soon after farrowing
E. No vaccination strategy required

QUESTION 8

Which one of the following statements are false?

A. Proliferative enteropathy generally occurs in grower pigs
B. Clinical signs of Swine Dysentery can be confused with those of Proliferative Enteropathy
C. Carrier pigs are an important source of infection for Salmonellosis
D. Post- weaning Colibacillosis generally results in high mortality rates
E. Dehydration and loss of condition can be seen in piglets with Colibacillosis

QUESTION 9

Which one of the following statements are true for post-weaning Colibacillosis?

A. Most antibiotics are effective against enteropathogenic *E. coli* due to the lack of drug resistance.
B. Vaccination of gilts and sows fully protects piglets against Colibacillosis
C. Due to drug resistance, antibiotic treatment strategies are based on bacterial culture and antibiogram results.
D. Good hygiene does not help control Colibacillosis
E. All of the above

QUESTION 10

What is the main reason for carcass condemnations at abattoirs due to the acute clinical effects of Proliferative enteropathy?

A. Septic peritonitis
B. Anaemia
C. Enteritis
D. Fever
E. Septicaemia

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