

To test your knowledge and understanding of the control of this condition, try our instantly marked self assessments, by clicking here

Health Quiz

PWMS and Circovirus Disease

Mark White BVSc DPM MRCVS

Introduction

Post weaning Multisystemic Wasting Disease (PMWS) and Porcine Dermatitis Nephropathy Syndrome (PDNS) appeared in the United Kingdom in the late 1990s and is now ubiquitous. Very few countries in the pig keeping world claim to be free of the disease and even Sweden has reported disease in the last 12 months.

As with any disease entering a naïve population, over a period of time the clinical picture evolves and the enzootic picture presented can look very different to that seen in the original epizootic situation.

Furthermore recent advances have been made in control of the disease, particularly with vaccination against PCV2 becoming available. A preliminary assessment of the efficacy of vaccination can be made.

Causation

In the early days of PMWS/PDNS scientists and clinicians divided into 2 schools of thought as to the cause of the disease.

On the one hand researchers maintained that Porcine Circovirus Type 2 (PCV2) was the primary and principal cause of the disease and possibly exacerbated by the presence of other enzootic viral infections such as Porcine Parvovirus (PPV) and Porcine Reproduction and Respiratory Syndrome (PRRS).

However, clinicians dealing with the disease in the field have maintained that there was more to the pathogenesis than PCV2 virus.

It is now known that different genotypes of PCV2 exist (designated type a, b & c) and this opens the possibility that the appearance of the disease was associated with a change of genotype acting as a 'new' agent negating the need for an additional unknown agent.

Clinical Presentation

In the early stages of the disease breakdown in breeding establishments, many practitioners argued that the disease had adverse effects on the reproductive capacity of the sow. It is now known that PCV2 virus is capable of infecting and damaging embryos in early pregnancy leading to



Fig 1: Classic PMWS



Fig 2: Typical PDNS (skin haemorrhage)

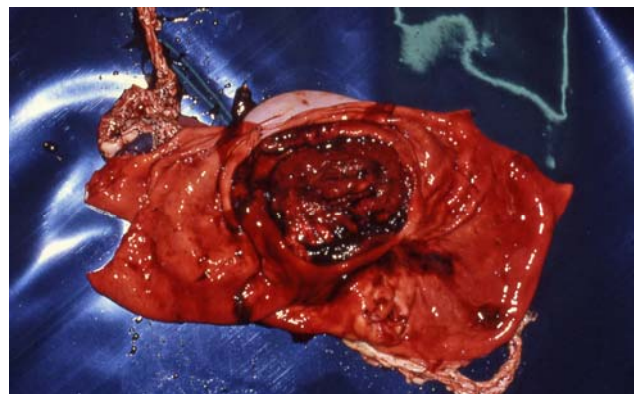


Fig 3: Gastric ulceration is a common secondary in PCV2 infection

pregnancy failure or depression in litter size and also can damage developing foetus in later gestation leading to abortion, mummification and stillbirths. Whilst there is limited field diagnosis of such specific problems the potential for reproductive damage must be considered. If PCV2 is a relevant cause of reproductive loss, use of sow vaccination would seem highly appropriate.

Research work has also shown that it is very difficult to actively infect a piglet over 10 weeks of age with PCV2. The fact that many farms have seen the disease creep into older growing pigs may suggest

that although initial infection with PCV2 still occurs in the young pig in some cases it does not multiply to the point of causing pathological damage until later, possibly due to partial immunity derived originally from colostrum.

Thus the current picture can involve pigs from 5 to 25 weeks of age, can produce anything from sudden death to wasting pigs and commonly involves either enteric disease (watery scour is common) or respiratory signs. Circovirus associated disease is thus now often non-specific and strongly influenced by the overall health status and standard of the herd.

Diagnosis

PMWS/PDNS is a clinical syndrome that is diagnosed first and foremost by clinical signs – loss of condition, prominent lymph nodes, pallor in PMWS and classical skin lesions and limb oedema in PDNS. Diagnosis is confirmed by *post mortem* examination revealing swollen, pale amorphous lymph nodes. Demonstration of PCV2 within tissues by immunohistochemistry (or alternative techniques) will confirm the diagnosis. Serology is of little value diagnostically.

In the later onset, less specific cases massive pulmonary oedema may occur but a wide range of other pathology also becomes evident as secondary disease takes hold. Thoracic lesions are common (pleurisy and pneumonia) as are gastric ulcers and enteritis.

As with the classic disease, demonstration of PCV2 in tissues by histopathological techniques looking for microscopic lesions and viral prevalence will support the diagnosis of Porcine Circovirus Disease (PCD).

Initial Control Techniques

Historically, control programmes have tended to revolve around active control of complicating diseases by medication and/or vaccination coupled with rigid application of sound management practices which have been established over many years. The Madec 20 point plan was no more than re-stating of the rules of good husbandry that had been long established:

- improvements in hygiene standards
- minimising mixing of pigs especially by age

- provision of clean feed, clean water and clean air
- minimising the 'stress' on pigs through overstocking etc

There were suggestions that younger sow herds produced piglets less vulnerable to disease and that extending weaning age improved disease control, although these features remain equivocal.

It is only in the last 18 months or so since PCV2 vaccines became available that real hopes of full control of PCD have come.

Costs

Obviously the costs of the disease will depend on the severity. If pigs die in the older grower stage they can cost the farm £50 or more. Thus a 500-sow unit with a 5% rise in mortality will have costs of £28,000 in deaths alone. A loss of 40gm/day would

add 7 days to slaughter with additional feed costs of £1.50-£2 per pig, giving total costs of £50,000 per year plus medication. Vaccination, at worst, in such a farm, would cost 25% of this.

Vaccination

A number of killed PCV2 vaccines have become available in the UK over the last year or so but at the time of writing have variable legal status. (Table 1) (This is expected to change over the course of 2009).

In April 2008 BPEX introduced a research programme into PCV2 vaccination which in part involved subsidisation of the cost of vaccine for pig producers. This finished at the end of January 2009 and a total of 483 farms applied to be part of the scheme, providing vaccination either for sows or

their progeny representing over 300,000 sows on pig keeping farms – more than 75% of the national herd.

This has been a tremendous opportunity for the industry – with financial assistance – to try these new vaccines and to rapidly assess their efficacy in the field – the first time in living memory that such a protocol has been permitted and enacted.

It is still very early days and but initial herd data has been analysed.

The full report of this study is available (click below):

[BPEX studies on PCV2 vaccines](#)

In a survey of veterinary clinicians presented at the November 2008 Pig Veterinary Society Conference, the following general benefits/effects were reported following introduction of PCV2 vaccination on farm.

- 1) Improved growth (7 – 10 days faster to slaughter)
- 2) Nursery mortality reduced by 1-5 percentage points
- 3) Finisher mortality reduced by 1-6 percentage points

- 4) Improvements in numbers weaned/litter by up to 0.5 pigs (sow vaccine).
(In Germany analysis of reproductive results across many farms using sow vaccine has shown a measurable improvement in both fertility and litter size)
- 5) More even growth within groups of pigs
- 6) Increase in P2 measurements (presumed to result in faster growth and improved appetite).

These early impressions have largely been born out in the results presented in the BPEX study (qv).

Vaccine	Manufacturer	Target	Dose	Legal Status/Comments
Circovac	Merial Animal Health Ltd	Sows Piglets	2ml 0.5ml single dose (at 3-4 weeks)	Fully UK licensed – see data sheet for programme. (POM- V) Off licence, use of fully licensed product.
Circoflex	Boehringer Ingelheim Limited	Piglets	1ml single dose at 2 weeks +	Pan-European licence granted and product available in UK under POM-V categorisation
Suvaxyn PCV2	Fort Dodge Animal Health	Piglets	2ml single dose from 4 weeks old	Unlicensed in UK. Import from US under Special Treatment Certificate.
Porcilis PCV	Intervet Schering Plough Animal Health	Piglets	2 x 2ml doses 3 weeks apart	Recently licensed in UK. (POM-V)

Table 1 PCV2 Vaccines available in the UK

However, underlying these general comments are more specific experiences that can be detailed:

Sow Vaccination

Circovac (Merial Animal Health) sow vaccine first became available in limited quantities (under an STC licence) in late 2006 and thus has had the longest period of evaluation.

The advantages of vaccinating the sow rather than the piglet are:-

- 1) Lower cost
- 2) Lower work load and reduced stress on piglets
- 3) Prevention of *in utero* or very early post natal infection

- 4) Control of reproductive losses associated with PCV2 where relevant

The results from the BPEX study clearly shows a benefit in breeding herd output, as an average, on farms using sow vaccine, measured on a before and after basis.

In some farms sow vaccination has worked well, particularly but not only where disease in the growing pigs has tended to occur in the younger animals (up to 10 weeks of age).

However, on some farms where disease occurs above 10 weeks, sow vaccination does not appear

to be as effective. It can be postulated that colostral protection does not prevent primary infection with PCV2 in some pigs and once colostral immunity has faded, virus replication occurs.. (Vaccines themselves generally do not prevent infection of an animal; they reduce or eliminate damage due to infection, via an active immune response; antibodies transferred in colostrum to the young pig may prevent colonisation if levels are high enough.)

The use of sow vaccine to control disease in growers is dependent upon colostral transfer and it would seem that if colostrum intake falls below a threshold level, infection and subsequent disease can result. Where colostrum intake cannot be ensured, sow vaccine results may be disappointing.

Occasional reactions in sows have been seen post vaccination (hyperpnoea and recumbency) but these are transient and rare. There does not appear to be a problem using the vaccine in pregnant sows (as per data sheet).

Due to shortages of supply of dedicated piglet vaccine, some farms, under veterinary advice, have used the sow vaccine off licence in piglets at 25% dose rate (0.5ml/piglet) as a single dose at weaning. Results from one large herd show a reduction in mortality from 7.5% to 4.2% from weaning to slaughter accompanied by withdrawal of in feed medication. (Occasional transient collapse of piglets post-vaccination has been seen with no long-term consequences).

Piglet Vaccines

Porcilis PCV (Intervet Schering Plough/ Animal Health) is a newcomer to the UK and little experience is available with the vaccine to date, although it has been widely and successfully used in Europe.

Both Circoflex (Boehringer Ingelheim) and Suvaxyn PCV2 (Forte Dodge Animal Health) have been widely used through 2008 and the general picture seen on many farms is that mortality levels reduce by up to 50% and growth from weaning to slaughter improves by 50gm/day with most of the increase occurring in the finishing stage. Greater evenness within groups is frequently observed. More experience is available in the USA but the differences between US and UK pig industries makes cross comparison an unreliable exercise.

There are, however, some downside issues to consider:

1) Current recommendations for the 2 vaccines are for them to be given at no less than 2 weeks (Circoflex) or 4 weeks (Suvaxyn PCV2). In practice this tends to mean they are given at weaning which, at a stressful time for the piglet, may not be the best option. Varying the timing will increase workload, as an additional handling is needed.

2) In common with most vaccines, these products are not recommended to be used simultaneously with other vaccines – a recommendation commonly ignored by stockmen. Weaning is also a convenient time to apply SEP or PRRS vaccines and some difficulties have arisen when either of these vaccines is given in conjunction with piglet PCV2 vaccine. A 2-week gap between PCV2 vaccines and other biologicals would appear prudent. On a precautionary basis live PRRS vaccine should be given after PCV2 vaccine, not before.

3) Some adverse reactions to Suvaxyn PCV2 have been reported post-vaccination both in North America and in the UK. This can include hyperaemia, hyperpnoea, vomiting, collapse and occasional death, possibly associated with hypersensitivity (allergic reaction). It may be a particular problem in specific herds. The vaccine has recently been amended to attempt to minimise this problem.

4) Routine injection given to the slaughter generation exposes the pig to the risk of future carcass damage if injection technique is unhygienic. To reduce the potential cost of such problems, it is preferable to inject piglets in the neck rather than the ham. (This issue is not unique to PCV2 vaccines).

Conclusion

The arrival of widespread application of PCV2 vaccines over the last 12 months has been a useful weapon in the fight against what has become a widespread, damaging disease that is constantly evolving. As with all novel products an extended period of evaluation of up to 2 years widespread use is needed to be able to understand the best application of vaccine for any given circumstances. However, early impressions are that the vaccines

can be highly cost effective at controlling both mortality and inhibited growth, and lead to substantial improvements in health. As with any disease reliance on vaccines alone for control and prevention is unwise and management changes should also be considered to improve effectiveness of disease control and production efficiency.

Copyright © NADIS 2009 www.nadis.org.uk

Comments made in this paper are based on the practical clinical experiences of the author working in the field and opinions expressed are derived from those experiences; others may have different experiences.

To test your knowledge and understanding of the control of this condition, try our instantly marked self assessments, by clicking here

Health Quiz

NADIS Health Bulletins are designed to improve farm income, animal health and welfare by promoting disease control and prevention.

Discuss how health planning can improve the profitability of your farm with your veterinary surgeon.

NADIS is supported by BPEX, EBLEX, HCC, QMS, Merial Animal Health and Pfizer Animal Health.

