Preliminary Outbreak Assessment

Senecavirus A in the Americas

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Disease Report

Since November 2014 there has been rapid spread through Brazilian pig herds of two linked unusual disease presentations in pigs; Porcine Idiopathic Vesicular Disease (PIVD) and Epidemic Transient Neonatal Losses (ETNL). Detection of Senecavirus A (SVA, also known as Seneca Valley Virus), in the virus family Picornaviridae, has been a consistent, and in some the only, finding in these (Vanucci and others, 2015). To date, 70% of the national Brazilian pig herd has been affected (National Hog Farmer, 2015). There have also been multiple commercial pig herds affected in the USA, between July and September 2015, involving just under 100 pig herds, of which 38 were breeding farms and 30 were farms with growing pigs (other unknown). There have been no recent updates. Wide variation is reported in the level of morbidity of the vesicular disease presentation on individual affected farms in the USA.

SVA has been detected previously in two incidents of PIVD in pigs in North America (Pasma and others, 2008 and Singh and others, 2012) but not all pigs in past incidents of PIVD have had SVA isolated from them. Although other PIVD outbreaks have been reported from different countries over past decades, the involvement of SVA was not investigated in these.

Clinical signs in PIVD-affected herds include vesicles, coalescing erosions, crusting lesions on snouts, coronary bands, foot sole; transient and mild loss of appetite and lameness; low fever (40°C– 40.5°C) in some pigs. Outbreaks are self-limiting, lasting 1-2 weeks. For ETNL, clinical signs are: acute loss of neonatal piglets (5-70%) in the first four days of age; sometimes concurrent lethargy, neurological signs and/or diarrhoea in neonatal piglets; sows in affected herds may show vesicular disease but
surviving piglets in herds affected with piglet mortality rarely do. Outbreaks resolve rapidly over 1-2 weeks.

It is important to note that while experimental infection studies in pigs with SVA have not reproduced clinical disease in the past, recently vesicular disease was successfully reproduced by experimental infection of growing pigs in a study conducted by Dr Kelly Lager’s group (USDA, Ames, IA - USA) using a contemporary 2015 US SVA field isolate from Dr KJ Yoon (Iowa State University, Ames, IA - USA). The findings were shared at the Swine Disease for Practitioners Conference at Iowa State University in November, 2015. The field isolate was from a case which had been investigated by animal health officials and notifiable vesicular diseases ruled out by testing. Current thinking is that SVA is a virus which emerged in pigs in the US in the early 1980s and then spread to other regions of the Americas. The virus may have evolved to one with greater virulence for pigs leading to the current outbreaks in the Americas. There is no known public health risk and no statutory legal/trade implications relating to SVA.

Situation Assessment
Little is known about the epidemiology or transmission of SVA in pigs. The virus is a member of the Picornaviridae family of non-enveloped single-stranded RNA viruses (of which foot-and-mouth disease viruses, polioviruses and rhinoviruses are also members) and as such is likely to be relatively environmentally stable. Many such viruses in this family cause disease in mammalian hosts. Excretion of these viruses occurs in faeces, saliva and the presence of a viraemic stage means that blood, meat and meat products and other products of animal origin may be a source of virus with transmission pathways relating to ingestion or inhalation of these secretions, excretions or products, or to fomites contaminated with them. Therefore, although there are no proven transmission routes for SVA, a range of transmission pathways need to be considered until further evidence is available. In addition, as the lesions in clinical disease involve the skin and feet, and there is a viraemic stage, mechanical transmission by vectors such as biting flies cannot be ruled out. The host range is also not fully understood at this stage. There have been infections historical reports of seropositive cattle and virus is capable in experimental conditions of infecting human cells but there have been no reports of associated disease or clinical stages with infection.

The reason for the rapid emergence of disease outbreaks associated with SVA in Brazil and, more recently, the occurrence of similar disease in the USA is not known. Introduction into the USA from Brazil via live pig movements is considered unlikely as although USA regularly imports live pigs from Canada, it rarely does from other countries. Other fomite or feed-associated introduction pathways cannot be ruled out. The reason for the apparent increase in pathogenicity in animals infected with
SVA is also not known, but further sequence analysis of recent isolates and other studies may help inform that situation.

A preliminary study in Brazil has reported the following risk factors have been associated with outbreaks of PIVD: neighbouring farms with ETNL; cattle in close proximity to the pig unit; use of pelleted feed; presence of bovine or swine plasma in feed and; use of some vaccines (which may be indicative of iatrogenic transmission rather than a viral contamination). However, without a risk pathway or successful infection studies, these factors may be a statistical anomaly. Studies are in progress in the US to investigate SVA and associated diseases and their epidemiology further.

Trade and Imports:

The USA and Canada are approved for imports into the European Union of live pigs. There are stringent import conditions applied to these imports and only two consignments of high genetic value breeding pigs were imported into the UK in 2014 and six in 2015.

Additional disease control measures for vesicular stomatitis were added to the regular veterinary certification in accordance with Regulation (EU) No 206/2010, as amended by Commission Implementing Regulation (EU) No 102/2013, which requires that when the country or region of origin is not free of vesicular stomatitis for at least 6 months, the pigs must undergo pre-export isolation for 30 days and only clinically healthy animals should be certified for export; this includes the USA. This period of isolation would mean that any outbreak of PIVD or ENTL would clear but it is not known how long virus excretion persists following clinical recovery or whether there is a carrier state for the infection, and therefore this may not entirely prevent introduction.

Brazil is not approved for imports of live swine into the EU.

Pig herds which are part of the pig assurance scheme (which covers 92% of pigs produced in the UK) should only be fed purchased compound feed or feed materials from assured compounders or merchants and must only use those, which are permitted under UK and EU law. Blood products for animal feed are approved for import into the EU, but have only very limited use in the UK pig market currently and are not allowed under Red Tractor Farm Assurance scheme for UK pig farms (Red Tractor Assurance, 2013). In addition, any feed imports from USA containing spray dried pig blood products or raw pig blood products must be stored for 6 weeks under dry storage conditions prior to export.

There have only been three consignments of pig semen imported into the UK from non-EU states this year and again, strict conditions are applied to imports. The import of pork meat from non-EU countries to the UK is covered by 2007/777/EC and while there are no specific treatments required for pork meat originating in Brazil or USA, all animals destined for the food chain must be healthy and free of signs of
disease when they enter the slaughter-house. There have been a small number of consignments of porcine products (dried, frozen and processed) from Brazil and we therefore remind all livestock keepers about the requirement to uphold the swill feeding ban and to remind people travelling abroad that it is illegal to bring products of animal origin into the country under a specific licence has been issued.

The risk of introduction via fomite transfer is unknown. However, anyone visiting a pig farm in the UK after returning from any non-EU country or an EU country where a notifiable disease is present in pigs should always follow advice from the pig industry and the livestock keeper about using good biosecurity. This applies also the USA or Brazil.

Conclusions
SVA is now proven to be the causative agent of the vesicular (PIVD) disease presentation. Vesicular disease due to SVA is a differential diagnosis for notifiable vesicular disease. Suspicion of such disease must be reported to the Animal Health authorities (APHA) and would necessitate restrictions be put in place during investigation to rule out notifiable disease. The result would be costly to the owner and to government, but could also result in complacency in reporting signs of vesicular disease.

From a diagnostic point of view, the Pirbright Institute has suitable tests to distinguish notifiable vesicular diseases, as part of their role as the National Reference Laboratory for such pathogens but there are no routine tests at this stage for this emerging virus, although test development for SVA is in progress.

At present it is difficult to assess the level of risk until further information is available on virus excretion and infectivity, transmission pathways, and other epidemiological data and the global geographical distribution of the virus are better understood.

We consider that there is a very low risk of introduction through importing products of animal origin, because of the very low volume of imports and the swill feeding ban throughout the EU.

We consider there is a very low risk of introduction via legal imports of live pigs or semen either directly to the UK or via another EU Member State as a result of these outbreaks, providing appropriate biosecurity and isolation controls and checks are in place but, until there is more information about SVV excretion from healthy pigs, the pig industry should raise awareness about these Senecavirus-associated diseases with potential importers and recommend that imports from herds which have had outbreaks of PIVD/ETNL should be avoided. Other routes of transmission, such as fomites or feed cannot be ruled out at this time.

We will continue to keep the situation under review as further information becomes available.
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References
All Commission Legislation is available from the Commission website


AASV website
https://www.aasv.org/aasv%20website/Resources/Diseases/SenecaValleyVirus.php


US information: http://www.swinehealth.org/emerging-disease-information/