Klebsiella septicaemia – Information for pig keepers and vets

Animal and Plant Health Agency

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Klebsiella pneumoniae subsp. _pneumoniae_ is a cause of sudden death of preweaned pigs due to septicaemia with a seasonal occurrence between May and September

Background

Nineteen outbreaks of septicaemia in preweaned pigs due to infection with *Klebsiella pneumoniae* subspecies *pneumoniae (Kpp)* were diagnosed on 16 pig farms in England between 2011 and 2015. *Kpp* was previously recognised as a cause of sporadic disease in individual pigs often concurrent with other diseases and the organism is an opportunistic pathogen causing mastitis in sows. These recent outbreaks involve disease in several piglets and in multiple litters. *Kpp* is a commensal of the healthy porcine alimentary tract and is ubiquitous within the environment. *Kpp* can cause human infections including pneumonia, urinary tract infections and neonatal septicaemia, but it is not a recognised zoonosis. Infections in humans are commonly hospital-acquired and/or in immune compromised patients. There is no evidence of any related human *Kpp* infection on farms affected with outbreaks in piglets.

Case Definition

Based on consistent findings in all outbreak cases, the case definition is as follows: 'Pigs found dead with lesions consistent with septicaemia and pure/predominant growths of *Klebsiella pneumoniae* subsp. *pneumoniae* isolated from internal sites in multiple pigs'.

Aetiology

Molecular characterisation of the outbreak *Kpp* isolates has shown that, by multi locus sequencing, all are sequence type 25 (ST25) with a unique combination of a 4.3kb plasmid and *rmpA* virulence gene.

Epidemiology

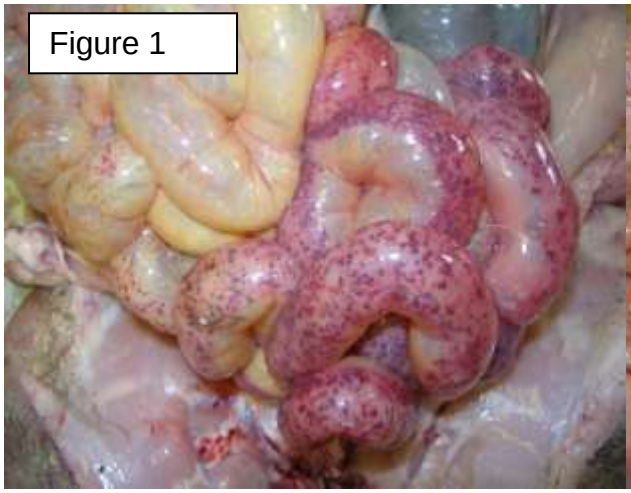
All outbreaks have occurred on commercial breeding units between May and September. Incidence is higher on outdoor units with only two outbreaks diagnosed on indoor units. Incidence is highest in East Anglia with one outbreak in North East England and one in South West England. The disease is predominantly diagnosed in preweaned pigs, aged 10 to 28 days old, and on one occasion was diagnosed at 36 hours post weaning. The duration of disease in herds is very variable ranging from one day to, more commonly, about 12 weeks. Mortality is usually between 1 and 5 % but on one farm reached 16%. Three units have had a recurrence of disease two to three years after the initial outbreak. The source of infection or any predisposing factors which precipitate disease have not been identified and there are no obvious epidemiological links between units such as pig movements or shared breeding pig source or pyramid.

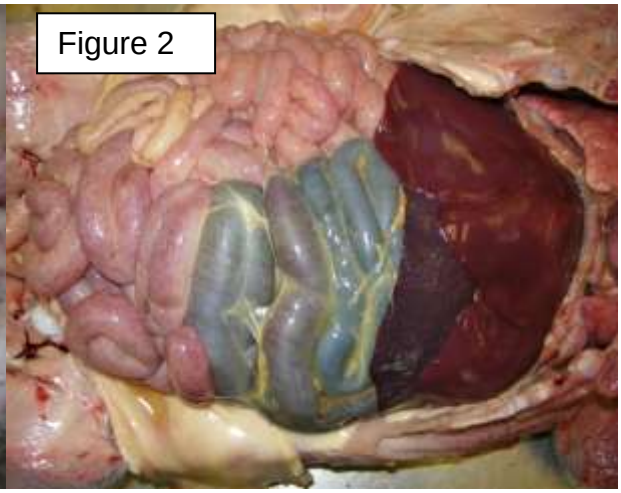
Clinical Signs

The affected pigs are in good bodily condition. The predominant presentation is of pigs found dead although occasional piglets are seen in extremis, recumbent, cyanosed and mouth breathing followed by rapid death. On one farm, concurrent with the outbreak of septicaemia in piglets, there was an outbreak of severe, and in some fatal, mastitis in sows due to infection with *Kpp* ST25.

Diagnosis

Lesions at post-mortem examination are variable and non-specific and are similar to those seen in cases of septicaemia due to other porcine pathogens such as *Erysipelothrix*, *Streptococcus suis* or *Actinobacillus suis*. The most consistent finding has been the presence of fibrin strands in the abdominal cavity. Other findings include ventral skin reddening, reddened lungs, intestinal serosal haemorrhages, pleural effusions and reddened lymph nodes. *Kpp* is isolated in pure growth from visceral sites (most commonly brain, liver and lung) by standard aerobic bacterial culture.





Intestinal serosal haemorrhages (figure 1) and abdominal fibrin (figure 2) in a piglet which died of *Klebsiella* septicaemia

Disease Control

The reasons for the emergence of *Kpp* as a cause of outbreaks of disease in piglets has not yet been elucidated and therefore no specific advice is available on control measures. All of the laboratory isolates of *Kpp* from these cases have an innate ampicillin resistance and most have shown *in vitro* sensitivity to other antimicrobials tested. On one unit, multiple drug resistance was detected. Interventions to control disease have included the use of antimicrobial treatment of remaining piglets in affected litters, the introduction of unmedicated or medicated creep feed prior to weaning or treatment of neonatal piglets with a combination of antimicrobial and iron (outdoor breeding units do not usually offer creep feed or supplement neonatal piglets with iron). These various interventions have shown cessation or reductions in mortality (parenteral antimicrobial with or without iron, medicated and unmedicated creep) however as no groups of pigs were monitored without the intervention, efficacy cannot be assessed and the disease was also self-limiting on farms which did not implement any interventions. Once weaned, there are no reports of continuing disease at rearing sites.

What should I do if I suspect a case of *Klebsiella* septicaemia?

The clinical signs of sudden death are non-specific and further investigation, including post mortem examination and culture, is essential to confirm a diagnosis of *Klebsiella* septicaemia. The recommended approach in GB is for pig producers to contact their veterinary surgeons in the first instance. Where the problem needs further investigation, the veterinary surgeon should submit samples for diagnosis (to include samples for bacteriology collected from pigs examined post-mortem on-farm) or contact their post-mortem provider to discuss submission of pigs (typically up to three freshly dead, untreated cases) for full post-mortem examination (see link http://ahvla.defra.gov.uk/postcode/pme.asp). Alternatively, vets can contact a Veterinary Investigation Officer in the usual manner at their local APHA or SRUC Regional Laboratory.