

Congenital swine pox: A sporadic skin disorder in nursing piglets

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Summary

Congenital swine pox infection was identified in 13 piglets with typical gross cutaneous lesions that were present at birth. Characteristic microscopic features of swine pox infection were noted in the more acute cases, whereas chronic cases presented less specific skin lesions. In the four affected herds, disease occurred as a sporadic condition with low morbidity and high case fatality rates. Episodes were of short duration and the economic impact was negligible. Congenital infection was the only manifestation of the disease in these herds.

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Swine pox was first reported in North America in 1929.¹ The disease occurs worldwide and is usually associated with operations that have poor sanitation. Swine pox virus is the only member of the genus *Suipoxvirus* in the family Poxviridae. The virus is very resistant and may persist for almost a year in desiccated conditions.² Infected swine are the reservoir and pig lice (*Haematopinus suis*) serve as a mechanical vector, although direct transmission may occur.³ Congenital pox infection in swine has been previously described on only a few occasions and presents with low morbidity and high case fatality rates.^{4–6} This report describes the diagnostic features of sporadic cases of congenital swine pox on four unrelated farms.

Clinical history

There was no history of swine pox or pediculosis in any of the four case herds, and the sows (parity one to six) that farrowed the affected piglets were clinically normal.

Thirteen of the 14 affected piglets from the four case herds were born with cutaneous pox lesions (Table 1). One piglet (Fig 4) developed

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cutaneous lesions at 1 week of age that were similar to those of its congenitally infected littermate. According to the attending swine specialists, the lesions on the limb extremities made the piglets reluctant to move and decreased their nursing capability. Affected piglets, other than those submitted alive for necropsy, either died or were euthanized *in extremis* within the first 10 days of life because their condition rapidly deteriorated.

Pathological and microbiological findings

Gross cutaneous lesions were multifocal and distributed over the entire body (Figure 1) except on Pig 3, where lesions were mainly confined to the snout and limb extremities. Skin lesions were generally circular, 1 mm–1.5 cm in diameter, and varied in appearance. Lesions presented as papules (raised, firm, circumscribed lesions); as pustules that evolved into flattened and crusted brown lesions; or as ulcers (Figures 2 and 3). Lesions were often severe and coalesced on the distal part of the limbs, particularly over the coronary band, heel, and sole. Pustular and ulcerative lesions were also found on the tongue and hard palate of four piglets (Figs 2 and 5–7). Significant lesions were not found in the internal organs of the affected animals.

Microscopic skin lesions included epidermal and infundibular hyperplasia, ballooning degeneration of keratinocytes with intracytoplasmic eosinophilic inclusion bodies and clear intranuclear vacuoles (central nuclear clearing), spongiosis, and hyperkeratosis (Figure 4). In more advanced lesions, intraepithelial pustules formed with necrosis of the keratinocytes progressing to the development of ulcers. Viral inclusion bodies were found in the skin of five of the seven piglets necropsied (Figs 1 and 4–7) and also in the oral mucosal epithelium of two piglets (Figs 6 and 7).

Bacterial culture of the skin of these piglets yielded no significant growth and any internal organs cultured were also negative. Poxvirus particles were observed in Figs 4–7 by transmission electron microscopy in formalin-fixed skin or in skin homogenate preparations following negative staining (Figure 4).

Discussion

The morbidity and mortality observed in these herds were consistent with those of previous reports of congenital swine pox.^{4–6} The episodes were minor and of short duration. Typical evolution of pox

Table 1

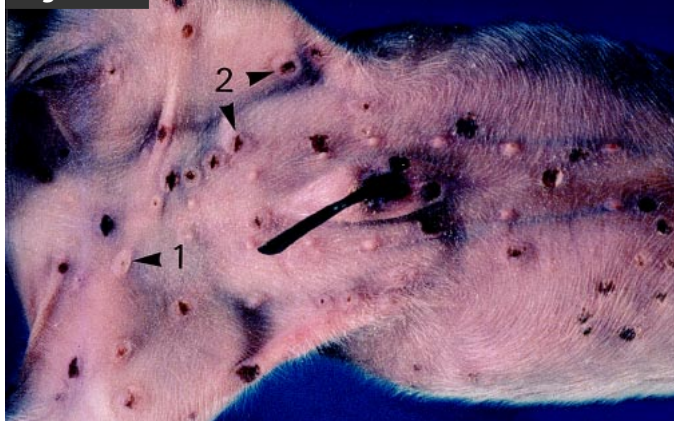
Herd histories			
Herd	Litters affected/ pigs affected per litter	Skin lesions present at birth	Number of pigs submitted for necropsy
#1. 1500-sow, high health farrowing operation	6/1 1/2	6/6 2/2	1 (Pig 1) 2 (Pigs 2–3)
#2. 140-sow, farrow-to finish operation	1/2	1/2	1 (Pig 4)
#3. 700-sow, farrowing operation	2/1	2/2	1 (Pig 5)
#4. 450-sow, farrowing operation	1/2	2/2	2 (Pigs 6–7)

Figure 1

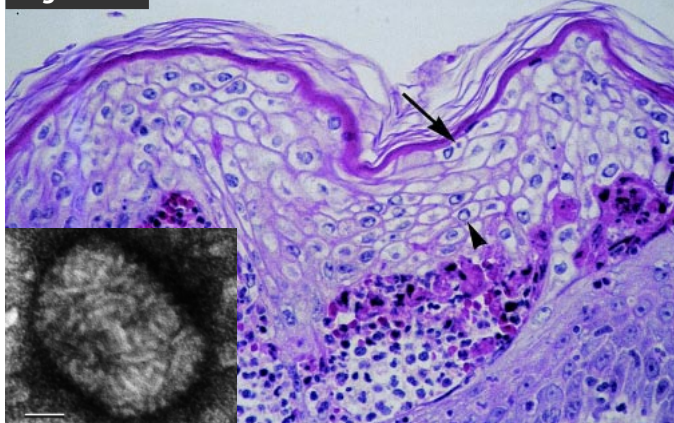
Skin; Pig 7: generalized distribution of cutaneous pox lesions in a 1-day-old piglet

Figure 2

Skin; Pig 4: numerous cutaneous circular papules and pustules covered by brown crusts (ear); includes crusts that are eventually shed

Figure 3

Skin; Pig 6: ventral lesions including papules (1) and ulcerated papules with brown crusts (2)

Figure 4

Skin; Pig 7: hyperplastic epidermis showing intraepidermal pustules, ballooning degeneration, eosinophilic intracytoplasmic inclusions (arrow), and intranuclear vacuoles (arrow head); HPS stain; bar = 30 μ m
Inset: transmission electron micrograph of negatively-stained poxvirus particle observed in skin homogenate preparation; bar = 60 nm

lesions includes the classical stages of erythematous macules and papules evolving to pustules without a significant vesicular stage. The final stage includes crusts that were eventually shed. The reported time from macule formation to resolution of lesions is 3–4 weeks, with secondary bacterial infection prolonging the resolution of lesions.³ In this report, the lesions found at birth were subacute to chronic in several piglets, suggesting that the infection had occurred some time before birth.

The differential diagnoses of skin disorders similar to these in nursing piglets should include swine pox, vesicular diseases of swine, parvovirus infection, early stages of ringworm, thrombocytopenic

purpura, bite wounds, insect bites, allergic skin reactions, and localized streptococcal and staphylococcal epidermitis.³ Among these conditions, only swine pox virus and parvovirus are reported to cause congenital infections. A porcine parvovirus has been associated with a vesicular disease in 1- to 4-week-old pigs, but the lesions were not present at birth and there was no evidence that the infection was congenital.⁷ Vaccinia virus causes very similar lesions, although smaller and more transient. Intranuclear vacuoles, as seen in Pigs 4–7, are considered in pigs to be specific to swine pox and can be used to differentiate swine pox from vaccinia lesions.³ Virus isolation was not attempted in our cases, but swine pox virus has been successfully isolated on a few occasions in similarly affected piglets.^{4,6}

In this report as in previous cases, there was no evidence of pox infection in the herds other than the congenital disease. It is impossible to determine whether Pig 4, which developed the lesions at 1 week of age, acquired the infection in utero or represented a case of horizontal transmission from its littermate.

The pathogenesis of congenital swine pox virus infection in pigs has not been studied. It has been speculated that infection may occur in fetuses after a low-level viremia in the sow by causing fetal membrane infection.⁴ Compartmentalization of the placental membranes in swine

probably explains why some fetuses are affected and others are not, and why those affected may be at different stages of infection.

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PRACTICE TIP

Help with prepuce and navel sucking

If prepuce and navel sucking is a problem in your clients' herds, you may want to ask the following questions:

- Do the pigs travel to the nursery (trucking) or are they at the same site?
- What is the protocol for pigs placed?
- How is feed delivered to pigs?
- What is the water source?

We stress to our personnel that they need to aggressively feed and water pigs newly placed in the nursery. For instance, we place small bits of paper or cardboard in the nipple of nipple waterers to slow the drip of water. The paper will eventually dissolve, and this seems to help the pigs recognize where the water source is. We have also used small pan waterers underneath the nipples in pens of small pigs to provide additional help finding the water source.

For feeding, we place mats by the feeders and provide a prestarter diet for at least the first 3–7 days after pigs are placed in the nursery. Diets are adjusted by weight and are fed accordingly. We will feed the pigs on the mats up to 4 times daily to get pigs on feed. For smaller pigs, we will make a small amount of gruel in a pan to help encourage better appetites. We make the gruel fresh 3–4 times a day and rinse the pans between each feeding. Feedings of gruel are tapered down each day until pigs are eating out of their feeders.

This protocol does work well in both two- and three-site production systems. While this does not eliminate the prepuce/navel sucking, it does reduce it to a much more manageable level.

—submitted by Dr. Lisa Becton, Princeton, Missouri

