

NIPPLE NECROSIS IN NEWBORN PIGLETS

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Introduction

Nipple necrosis is a widespread condition which occurs during the first few days of a piglets life. It destroys the subsequent functionality of the nipple and therefore decreases potential mothering ability of affected gilts. The condition is most prevalent in modern, intensive swine production units. It has been clinically described by Penny et al. (1971), who noted that the condition is more common in female than in male piglets and that the anterior teats are most prone to damage. Penny and Wright (1972) have observed that on farms in England and Australia, nipple necrosis is more prevalent among piglets farrowed on concrete floors.

We have conducted one field trial and two controlled experiments to determine the prevalence of nipple necrosis in newborn piglets on swine farms in the state of Washington and the conditions under which it occurs, to investigate various factors which may influence or be related to the occurrence of the condition and to document, both visually and microscopically, the time and sequence of events which accompany the development of nipple necrosis during the first 10 days of life.

Experimental, Results and Discussion

Field Trial. Eleven swine producers from throughout the state of Washington observed the underlines, vulvas, knees and hocks of each piglet in 10 randomly selected litters on d 1, 4 and 7 after birth. Nipple necrosis was observed in 9 of the 11 cooperating herds. The two anterior pairs of teats were most often damaged. The percentage of piglets that had one or more necrotic nipples was higher ($P < .001$) when they were farrowed and kept on concrete floors without bedding (27.2%) than on three other floor/bedding combinations including concrete floors with bedding (5.2%), non-concrete floors without bedding (0.8%) or non-concrete floors with bedding (7.2%). The number of piglets with necrotic vulvas was too low for meaningful statistical analysis, but the percentages for the four floor/bedding combinations listed above were 6.5, 6.7, 1.5 and 15.8%, respectively. The percentage of piglets with abraded knees and/or hocks was lower ($P < .05$) on concrete floors with bedding (30.2%) than on the other floor/bedding combinations (52.5%).

Experiment 1 - Floor Types

Three hundred and seventeen piglets from 37 litters were used to determine the effect of floor type on the prevalence of nipple necrosis in newborn pigs and to visually document the development of the condition. Sows were farrowed and piglets raised to 10 d of age on one of six farrowing facility/floor treatments: (A) metal quonset huts with dirt floors on pasture, (B) farrowing crates (FC) with totally slatted concrete floors, (C) FC with expanded metal floors front and rear and solid wooden middles, (D) FC with solid wooden floors with bedding, (E) FC with plastic coated expanded metal (Tenderfoot) floors and (F) FC with expanded metal floors front and rear and solid, resilient, polymeric (Tartan) flooring middles. Within 8 h after birth (d 0) and on d 1, 2, 3, 4, 5, 7, and 10, each piglet was observed for swollen or reddened teats, evidence of nipple necrosis, condition of the vulva and cuts or scabs on the knees or hocks.

The sequence of events in the development of nipple necrosis determined visually in this study was: (1) formation of a small brownish scab partially encircling the base of the nipple on d 1 or 2; (2) complete encirclement of the nipple by the scab by d 1 to 4; (3) scab covering the entire nipple by d 2 to 5; and (4) the scab sloughing off by d 4 to 10, leaving a shortened nipple.

Prevalence of nipple necrosis was highest ($P < .01$) in treatment B (concrete floors). The percentages of piglets with one or more necrotic nipples on each treatment were: (A) 7.8, (B) 42.9, (C) 10.9, (D) 2.3, (E) 8.3, and (F) 18.0. The percentage of female piglet with nipple necrosis (20.1%) was higher ($P < .01$) than for (8.8%). The average number of necrotic nipples was 2.1 per pig affected. All necrotic teats were anterior to the umbilicus, with the most anterior pair most often affected. The number of females with necrotic vulvas in treatments A, B, C, D, E, and F were 1, 4, 0, 1, 0, and 2, respectively. Of these eight piglets with damaged vulvas, six also had one or more necrotic nipples. The prevalence of abraded knees and/or hocks was lowest on treatment A (5.9%) and highest on treatments B, C, D, and F (42-60.5%).

Experiment 2 - Sow Gestation Diet, Blood Estrogen Concentration and Histology.

Two hundred and seventy-nine piglets from 35 litters were used to determine the effect of alfalfa in the gestation diet of the dam on the prevalence of nipple necrosis, to determine the relationship between blood estrogen levels of piglets within 1 h after birth and the use of alfalfa in the gestation diet and subsequent development of nipple necrosis and to histologically document the development of the necrosis. Procedures were similar to those for experiment 1.

The prevalence of nipple necrosis was slightly higher ($P < .10$) among piglets from sows not fed alfalfa during gestation (19.6%) than among those from sows fed a 50% alfalfa diet during the last 30 days of gestation (11.8%). The percentage of female piglets having one or more necrotic nipples was also higher ($P < .05$) for the 0% alfalfa group (28.8%) than for the 50% alfalfa group (21.1). Plasma estrogen concentration of piglets from sows fed the 0% alfalfa diet was also higher ($P < .002$) than that of piglets from sows fed the 50% alfalfa diet. Plasma estrogen levels of piglets born with swollen teats (852 pg/ml) or which subsequently developed nipple necrosis (822 pg/ml) were higher ($P < .002$ and $P > .05$, respectively) at birth than estrogen levels of piglets born without swollen teats (691 pg/ml) or than those that did not develop nipple necrosis (730 pg/ml). Microscopically, no inflammation was observed in the nipple epithelium during any stage of the necrosis. The condition was characterized by focalized parakeratosis, usually around the base of the nipple during the ring stage of the necrosis and involving the entire nipple in the latter stages. Shortened nipples appeared histologically normal except for their length but newly formed epithelium blocked the teat duct opening.

Conclusions

Nipple necrosis is a common condition among newborn piglets on commercial swine farms in Washington State. The prevalence of the condition is influenced by the type of floor used in the farrowing facility with concrete being the worst. High plasma estrogen levels at birth appear to predispose piglets to a higher incidence of swollen teats and subsequent nipple necrosis.

References

- Penny, R.H.C., Edwards, M.J., and Mulley, A.; Australian Vet. J. 1971, 47:529. Penny, R.H.C. and Wright, A.I.; Vet. Annu. 1972, 13:78.