

Pain Relief in Sows Can Help Reduce Post-Farrowing Activity, Which Could Lead to Reduced Piglet Crushing

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Summary and Implications

Sows lying on their piglets causing them to be crushed is a major cause of piglet mortality. Crushing may be due to increased sow position changes from pressure sores that develop because of hard flooring in farrowing crates. The objective of this study was to determine if administration of an analgesic would allow sows to lie more restfully. Data collected showed that administration of butorphanol tartrate to sows decreased the number of body position changes. If piglet mortality can be decreased by administration of butorphanol, an analgesic protocol that is simple to conduct can be developed. Alternatively, utilization of more comfortable flooring or an increase in sow body fat may be a more practical solution that will allow the sow to lie more comfortably.

Introduction

Piglet mortality is one of the largest detrimental factors influencing the proficiency of the swine industry today. In response to this dilemma, much research has been conducted to look for a solution to the problem of piglet mortality. A major cause of this preweaning mortality is due to sows lying on their piglets causing them to be crushed. Crushing is a factor in many preweaning deaths. Almost 80% of the total preweaning mortality occurs during parturition and within the first three to four days of life. More specifically, it is during the first 48 hours post-farrowing that the majority of crushing deaths occur.

Farrowing crates were introduced to save piglet lives by decreasing the rate of crushing, but their efficacy is debatable. Although crates reduce mortality, loss due to crushing is still estimated to be between 4.8 and 18%. Even at the modest rate of 5%, in 1997 crushing cost swine producers in the United States approximately \$499 million

For modern, lean-type sows, farrowing crates are relatively hard and unforgiving even though they may be equipped with plastic-coated expanded metal flooring. This is evident by many sows developing pressure-point sores on their shoulders, which probably contribute to the sows' discomfort. These sores may cause the sow to change positions more frequently to lie comfortably, thus increasing her chances of crushing piglets.

We hypothesized that by alleviating the sow's pain there might be a decrease in body position changes. When applied to large-scale swine production, a decrease in position changes could have a profound effect on piglet survival and producer income. This study was designed to determine if a pain reliever (butorphanol) administered to sows immediately after farrowing would allow the sows to lie more restfully.

Materials and Methods

Sixteen Yorkshire \times Landrace sows were assigned to either the control group (C, $n = 8$) or the butorphanol-treated group (B, $n = 8$) and observed during farrowing for any complications. All sows gave birth in traditional farrowing crates (1.5 \times 2.3 m) with a width of 61 cm for the sow and creep areas on both sides for piglets (45.72 cm \times 2.3 m). All crates were equipped with plastic-coated expanded metal flooring and a heat lamp, which was placed 20 cm off of the sow's shoulder.

The C sows were allowed to farrow naturally and were not given analgesic. The B sows were administered an injection of butorphanol at a dose of .15 mg/kg BW within four hours post-farrowing. Injections were given in this time period to be sure farrowing was completed and subsequently were administered every six hours until three days post-farrowing. All injections were given i.m. in the trapezius muscle and alternated between the right and left side when feasible (lying on a particular side would prevent alternation). Data were collected on all sows using time-lapse photography (1 frame/.4 seconds) for a 3-day duration upon the initiation of farrowing. To assess the degree of comfort of each sow, body position changes were recorded when sows switched between lying, sitting, and standing. Each position change was assigned a value of one, and upon summation of these values, the activity level of the sow was determined.

To determine if there were significant differences, data were analyzed using the one-way analysis of variance applied to ranks procedures of SAS. Data were analyzed on all sows for the 72 hours of observation by 12-hour periods.

Results and Discussion

Litter size was similar between treatments with C sows farrowing $11.71 \pm .78$ and B sows farrowing 11.63 ± 1.22 pigs. Piglets born to C and B sows weighed $1.60 \pm .04$ and $1.37 \pm .04$ kg, respectively. During the 72 hours of observation, B sows tended to perform fewer body position changes than C sows ($P = .10$, Figure 1). Analysis of specific 12-hour periods found that there were no differences in position changes between treatments from 0 to 48 hours postpartum ($P > .50$, Figure 2). But from 48 to 60 hours postpartum, B sows tended to perform fewer body position changes than C sows ($P < .06$, Figure 2). During the 60- to

72-hour period postpartum, B sows performed almost half the number of position changes than C sows ($P < .015$, Figure 2).

Butorphanol did not appear to affect piglet activity, suckling bouts, or normal behaviors. Furthermore, there were no physiological adverse effects, such as diarrhea, observed in the sows or piglets. As expected with such a relatively small sample size, there was no difference in rate of crushing between treatments ($C=5$, $B=5$).

Butorphanol administration to sows within 4 hours post-farrowing significantly decreased the number of body position changes during the third day of the experiment. These results are promising as most crushing occurs when the sow moves-upon standing up or lying down-and when she is standing or walking. If sow position changes can be reduced during the 3 days after farrowing, there may be a substantial decrease in piglet crushing.

Piglet crushing may be due to an alteration of swine genetics (selection for fast-growing animals with large litters, predominately overlooking maternal behavior) and the sow's environment. This environment consists of a farrowing crate with little room to move and hard flooring that may cause open sores on the sow's legs, shoulders, and hips. It is evident from these sores that the sows are uncomfortable. To find a more comfortable position, sows may perform more body position changes. Because of this increased movement, piglets have a greater chance of being crushed.

Farrowing crates were introduced in the 1960s to save piglet lives. Farrowing crates were designed to greatly reduce the sow's ability to move, thereby reducing the

incidence of crushing. Even though farrowing crates may greatly reduce the welfare of the sow, it is well known that the crates reduce crushing and thereby increase piglet welfare. Although crates reduce crushing, it is not eliminated. The number of piglets weaned per litter has increased by only one piglet per litter during the past 25 years, despite increasing litter size. So although the industry has been successful in increasing litter sizes, piglet mortality is also on the rise, consuming most of these increases. Thus, piglet mortality, of which piglet crushing can be as high as 56%, is still a major problem in today's industry and it may be growing worse.

Based on the common occurrences of pressure-point sores on the sows, we hypothesized that the sow's uncomfortable environment caused her to perform more body position changes. These sudden and frequent movements may increase her chances of crushing piglets. The sows given butorphanol showed a reduced number of body position changes 48 hours after parturition. The dose was low, and a larger dose may have had a greater effect. In addition, we noted a large variation between sows for position changes in both C and B sows. This variability in the rate of sow position changes may be due to individual differences in both maternal behavior and protective fat covering. Within breeds there are individual differences on how "carefully" the sow will lie down post-farrowing. Occasionally sows will flop down, which is risky for piglets. Our research showed that certain sows are more apt to perform these risky lying-down behaviors than others, suggesting that some sows may be "better" mothers.

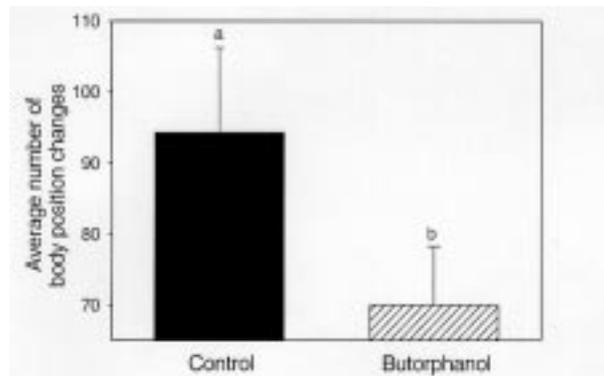


Figure 1. Average number of sow body position changes during the three days of observation. Means \pm SEM with different letters tended to be different ($P = .10$).

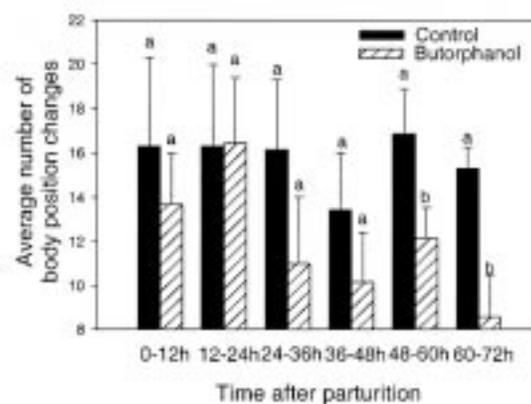


Figure 2. Average number of sow body position changes during the 3 days of observation, broken into 12-hour periods. Means \pm SEM with different letters differ (48 to 60 hours, $P = .06$; 60 to 72 hours, $P = .015$).