A survey to investigate the implementation methods of rotavirus ice cubes on swine farms

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Key Points

- Little research has been done to characterize the varying methods and effectiveness of using rotavirus ice cubes to expose gestating dams
- This study was able to describe the range of varying methods used at each stage of the ice cube process, and point towards further areas of exploration

Background

The swine industry continues to investigate best practices to control pig neonatal diarrhea. Porcine rotaviruses groups A, B, and C are some of the etiologic agents of atrophic enteritis causing neonatal diarrhea, which is primarily observed during farrowing and early nursery. Rotavirus associated disease has been described to increase mortality by 3 to 20% and decrease weaning weight by 0.5 to 1.0 pounds. As rotavirus continues to be a major cause of economic losses attributed to neonatal diarrhea, advancing the current rotavirus control method efficacy is critical. Natural planned exposure of rotaviruses to gestating dams using rotavirus ice cubes is a practice implemented in swine barns aimed to help reduce the occurrence of neonatal diarrhea. Rotavirus ice cubes are made by harvesting and blending piglet intestines with a diluent to make a homogenate, and later freezing. The intestinal homogenate is then thawed and administered to gestating dams, with the hope that the dams will create an antibody response and pass those antibodies to their offspring in colostrum. Research on the effect of different rotavirus ice cube procurement and implementation methods on swine farms has been limited. Therefore, the objective of this survey was to summarize current procedures in the industry for the preparation, storage, and use of rotavirus ice cubes.

Materials and Methods

A web-based anonymous survey using a targeted sampling approach was sent to nineteen swine veterinary clinics, production systems, and veterinarians, representing over two million sows. The survey was composed of multiple-choice questions (n=19) focused on different preparation, storage, and administration procedures for rotavirus ice cubes.

Results

A total of 35 questionnaires were voluntarily received. Of the 35 responses, 69% did and 31% did not use rotavirus ice cubes for neonatal diarrhea control. Of the respondents that utilized rotavirus cubes, 40%, 52%, and 8% thought the procedure was very effective, somewhat effective, or neutral, respectively. Most commonly, 86% of respondents used on farm specific rotavirus ice cubes, while 14% of respondents used a system wide stock or both. Regarding donor selection for material preparation, 74% of respondents harvested intestinal material from colostrum-deprived neonatal pigs, whereas 16% chose 1-5 day-old scouring pigs and 10% selected 6-10 day-old scouring pigs. Procedure effectiveness for neonatal diarrhea control was not associated with age at donor selection (p=0.72). Various diluents were utilized with intestinal material to create a homogenate, namely, phosphate buffered saline (PBS; 31%), milk replacer (27%), sterile or well water (30%). Procedure effectiveness for neonatal diarrhea control was associated with diluent type (p=0.02). Estimated ratios of intestines to diluent for composition of intestinal homogenate were most commonly 10% intestine to 90% diluent or 75% intestine to 25% diluent, used by 31% and 37%, respectively. Estimated sows per cube when administering the homogenate were most commonly 51-60 (25%) and greater than 60 (44%). Several methods for rotavirus cube storage were described: top of a fridge freezer (62%), chest freezer (27%), or a -80 Celsius freezer (11%). The most common week to administer the first dose of homogenate was six weeks (38%), followed by the last dose at three weeks (48%) pre-parturition.

Discussion

The aim of this study was to summarize current procedures in the industry for the preparation, storage, and administration of rotavirus ice cubes for neonatal diarrhea control. Overall, there was a considerable amount of variation in the way rotavirus ice cubes are prepared and administered on swine farms. The differences amongst homogenate preparation may contribute to variable levels of rotavirus control throughout the industry. This survey highlighted the application of seven different diluents, which had a potential effect on the perceived effectiveness of the rotavirus ice cube on controlling neonatal diarrhea. The ratio of intestinal material to diluent when creating the intestinal homogenate could lead to varying concentration of rotavirus in these ice cubes on farms. Commonly, respondents tended to use colostrum deprived pigs as intestine donors to make a homogenate. A 60 dams per ice cube dose was often used when administering the rotavirus ice cubes, leading to a relatively diluted dose given to each dam. A majority of respondents had an on farm specific stock of rotavirus ice cubes that were stored in a top of refrigerator freezer. Some consideration when looking at freezer type is that some fridge-freezer combos go through freeze-thaw cycles to prevent frost build up. This leads to a fluctuation in temperature while these cubes are in the freezer and could potentially impact viability of the virus in these ice cubes over time. Further research on the effect of diluent type, along with other preparation, storage, and usage methods for rotavirus ice cubes are critical to assess the efficacy of this control measure for neonatal diarrhea.