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Clostridium difficile prevalence in an integrated swine operation in Texas*

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Introduction

Recently, there has been an epidemic of human disease in North America caused by the bacterium *Clostridium difficile* (Cd). It appears to be due to a new strain that is more virulent than previous strains, produces more toxins, and causes more severe disease (McDonald et al., 2005). The origin of the new strain is unknown. Genetic analysis suggests that the strain is 80% related to some swine Cd isolates. No epidemiological information is available on the prevalence of Cd in apparently healthy swine in commercial operations. The objectives of the present study are to: 1) determine the prevalence of Cd among different age groups of swine in a commercial operation; 2) determine the antibiotic resistance of swine isolates of Cd and compare them to resistance patterns of human clinical isolates; and 3) compare the genetic relatedness of swine Cd isolates to human epidemic strain Cd isolates.

Materials and Methods

Over an 8 month period, composite fecal samples were collected from 685 swine of all production groups from an integrated swine operation in Texas. Each sample represented a minimum of 10 animals. Samples were collected from 5 farrow-to-finish units, 6 grower-finisher units, 1 boar quarantine facility, and 1 slaughter plant from 4 different geographical locations. Cultivation for Cd was performed according to the enrichment techniques described by Rodriquez-Palacios et al. (2006). Isolates were tested for toxins A and B by use of a commercial ELISA kit (*C. difficile* Tox A/B II, TechLab). Antibiotic sensitivity testing to 10 antibiotics was accomplished by use of Etest (AB Biodisk). Once cultivation is finished, Cd isolates also will be tested for toxins A and B genes (PCR), *tcdC* gene deletion (PCR/sequencing), PFGE, and PFGE dendrograms developed by CDC to compare pig isolates to human isolates.

Results and Discussion

From July 2006 to January 2007, 35 Cd were isolated from 483 samples; of the Cd isolated, 30 came from farrowing barns (piglets, lactating sows, effluent). In February and March 2006, an additional 26 Cd were isolated from 202 samples, the majority being from farrowing barns. Only 5 isolates were were cultivated from grower-finisher pigs, 3 from boars, 3 from nursery pigs, and no Cd was isolated from pork trim. There appeared to be a seasonality of Cd prevalence as 41 of 61 (67%) of the isolates occurred during Jan., Feb., and Mar. The majority (78%) of isolates came from 3 farms (all farrow-to-finish). All but 2 of a total of 61 isolates were positive for toxins A and B. Of the 35 original isolates, all were resistant to cefoxitin, ciprofloxacin, and imipenem, and 30 to clindamycin; 28 intermediate to ampicillin, 3 to tetracycline and 5 to clindamycin; and the remainder susceptible to tetracycline, metronidazole, chloramphenicol, pipercillin/tazobactam, and amoxicillin/clavulanic acid. On the basis of these preliminary results, it appears that piglets have the highest prevalence of Cd. Because of the very low carriage rate, we do not consider finisher pigs a risk for transfer of Cd to the food chain.

References

McDonald, LC et al. (2005). N. Engl. J. Med. 353:2433-2441.

Rodriquez-Palacios, A et al. (2006). Emerg. Infect. Dis. 12:1730-1736.

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