Characterization of Clostridium perfringens isolates from healthy turkeys and from turkeys with necrotic enteritis

Clostridium perfringens is an important bacterial pathogen, especially in poultry, where it can lead to both subclinical and clinical disease. The aim of this study was to present data on pathological findings at outbreaks of necrotic enteritis (NE) in turkey production in Finland during the period from 1998 to 2012. Furthermore, C. perfringens isolates from healthy and diseased turkeys were characterized and their genetic diversity was investigated using pulsed-field gel electrophoresis (PFGE). Isolates (n = 212) from birds with necrotic gut lesions and from healthy flocks of 30 commercial turkey farms were characterized for the presence of cpa, cpb, iA, etx, cpb2, and cpe and netB genes. A total of 93 C. perfringens isolates, including 55 from birds with necrotic gut lesions and 38 from healthy birds from 13 different farms, were analyzed with PFGE. All contract turkey farmers (n = 48) of a turkey company that produces 99% of domestic turkey meat in Finland were interviewed about background information, management at the farm, and stress factors related to NE outbreaks. Pulsed-field gel electrophoresis analysis with SmaI restriction enzyme resulted in 30 PFGE patterns among the 92 C. perfringens isolates of high diversity. Out of all isolates, 212 (100%) were α-toxin-positive and one isolate (0.5%) was both α- and β2 toxin-positive. Fourteen isolates (6.6%) were necrotic enteritis toxin B (NetB) positive; all were recovered from turkeys with NE. In none of the isolates obtained from healthy turkeys was the netB toxin identified. In conclusion, a high diversity of C. perfringens isolates from turkeys with different health status was shown. All isolates produced α toxin, whereas only low percentages of isolates carried the netB toxin gene. The role of the netB toxin in NE in turkeys needs to be further investigated.

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