野鳥肉毒桿菌毒素中毒之診斷

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摘要

禽類肉毒中毒(botulism)又稱軟頸症(limberneck)，為食入肉毒桿菌(*Clostridium botulinum*)分泌之毒素造成癱瘓甚至死亡之疾病。肉毒桿菌可產生 A~G 等 7 種不同型別的神經毒素，於禽類較常發生的為 C 型肉毒中毒，而禽類 D 型或 E 型肉毒中毒病例亦曾有報告。禽類肉毒中毒初期出現腳部麻痺，接著由腳部推展至雙翼、頸部與眼瞼部，最後造成心臟與呼吸衰竭而死亡，本病死亡之鳥類屍檢時，大多無明顯之肉眼與顯微病變。確診肉毒中毒需由病禽血清中或胃腸道內容物中證實是否含有肉毒神經毒素，可利用小鼠進行腹腔注射加以證明檢體中是否有肉毒神經毒素存在，並進行中和試驗以檢測神經毒素之型別，後來更發展出利用聚合酶鏈鎖反應(PCR)鑑別肉毒神經毒素之基因型別。

今(2015)年 1-6 月本實驗室收到 5 例野鳥疑似肉毒中毒案例，若檢體為血清，則以小鼠試驗偵測毒素；若為死鳥或臟器，則以 PCR 偵測肉毒桿菌毒素基因並進行分型。病例中有 4 例發生於黑面琵鷺，其中 2 月 27 日至 3 月 2 日的疫情共有 14 隻黑面琵鷺受到影響，最終造成 7 隻黑面琵鷺死亡，依據臨床症狀、小鼠試驗與 PCR 結果判定本波黑面琵鷺死傷疫情為 C/D 型肉毒桿菌毒素中毒所致。第 5 例為 3 月 5 日至 12 日發生於高屏溪，約有 1,000 隻水鳥受到影響，包括小水鴨、赤頸鴨、琵嘴鴨等。依據臨床症狀、小鼠試驗與 PCR 結果判定本波高屏溪水鳥疫情亦為 C/D 型肉毒桿菌毒素中毒所致。同時進行小鼠試驗與 PCR 試驗檢測毒素與肉毒桿菌毒素基因型別，可快速確診野鳥肉毒桿菌毒素中毒，盡速進行治療，並防止或減少疫情更進一步的擴散。

Diagnosis of Botulism in Wild Birds

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Avian botulism, also known as limberneck, is a parsalytic, often fatal disease of birds resulting from ingestion of toxin produced by the bacterium *Clostridium botulinum*. Seven types of botulinum neurotoxin, designated as types A through G, have been identified. Almost all outbreaks in poultry are caused by type C, although types D or E are also involved. Clinically, paralyzed legs were usually the first symptom being observed in avian botulism, and the paralyses were later demonstrated in wings, neck, and eyelids. Death can result from water deprivation, electrolyte imbalance and respiratory failure. There are no characteristic gross lesions in birds dying of botulism. The most reliable test for avian botulism is the mouse protection test, although the PCR technique is also successfully applied in the detection and differentiation of the neurotoxin genes.

During January and June in 2015, our laboratory received five botulism-suspected cases of wild birds. Four of the cases were black-faced spoonbills. The sera of the cases were tested by the mouse inoculation test to detect the toxins; moreover, carcasses or organs of the cases were tested by the PCR to detect the botulism neurotoxin genes and to identify their types. The outbreak during February 27 and March 2 attacked 14 black-faced spoonbills and resulted in seven deaths. According to the clinical signs and the results of the mouse inoculation tests and the PCR tests, the mosaic C/D neurotoxin of botulism was the etiologic agent of this outbreak in the black-faced spoonbills. The fifth case occurred in Gaoping River during March 5 and 12. There were near 1,000 waterfowl affected, including teals, European wigeons, and shovelers. The mosaic C/D neurotoxin of botulism also contributed to this outbreak in Gaoping River. Detecting and typing *Clostridium botulinum* and their toxins by the mouse inoculation test and the PCR simultaneously could bring about rapid and definitive diagnosis and the treatment of sick birds, and could therefore prevent or minimize further cases.