ENTEROCOCCUS CECORUM SEPTICEMIA AS A CAUSE OF BONE AND JOINT LESIONS RESULTING IN LAMENESS IN BROILER CHICKENS

Enterococcus cecorum septicemie met beender- en gewrichtsproblemen bij slachtkuikens

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ABSTRACT

A severe outbreak of lameness with joint and bone lesions and evidence of bacterial infection due to *Enterococcus cecorum* was diagnosed on a Dutch broiler farm. Morbidity and mortality were as high as 10%, while the remaining chickens performed well. Bacterial chondronecrosis and osteomyelitis with loosening of the femoral heads (femoral head necrosis) in the end stage was the most frequently observed lesion. The same pathological process was seen, though rarely, in the T3/T4 spine articulation. Septicemia resulting in pericarditis, local myositis and, most prominently, bone and joint lesions, was the major diagnosis. *E. cecorum* could be isolated from nearly all lesions when appropriate isolation methods (blood agar incubated in a carbon dioxide-enriched atmosphere) were used.

INTRODUCTION

The enterococcal species *E. cecorum* has recently been implicated as a cause of lameness and bone lesions in broiler chickens in Scotland (Wood *et al.*, 2002). The bacterium was consistently isolated from lesions of the thoracic vertebra, most commonly T4, at postmortem examination of chickens of around four to five weeks of age and older with a history of paresis similar to that seen with spondylosthesis ('kinky back').

In the present communication we report on an outbreak on a broiler farm of lameness and septicemia with prominent joint and bone lesions similarly associated with *E. cecorum*.

CASE DESCRIPTION

The outbreak occurred on a Dutch broiler farm with three houses containing 20,000 chickens each. The first cases of lameness were seen at 19 days of age, and all three houses became affected. Animals in apparently perfect condition suddenly became lame and had to be removed. In birds that had remained alive for a few days more, loosening of the femoral heads

became evident. Treatment with flumequine was initiated in one house, but remained without apparent effect.

Fourteen chickens were made available for examination. Prominent gross lesions included: purulent arthritis of the hock in five, and purulent or fibrinous pericarditis in four animals. A macroscopically visible cartilaginous swelling with necrosis of the T3/T4 articulation of the spine was found in one chicken. Histological examination of the nervus ischiadicus, the pancreas and the brains revealed no abnormalities; lymphoid hyperplasia and mild central apoptosis were seen in the bursae fabricii. Strong infiltration of heterophils and macrophages with oedema was observed in the hock joints.

Enterococcus cecorum was isolated from 6 of 7 chickens cultured on Columbia blood agar plates (Oxoid, Basingstoke, UK) and incubated in a 5% CO_2-enriched atmosphere. Profuse and pure or nearly pure growth of non-hemolytic or weakly alpha-hemolytic *Streptococcus uberis*- or *Streptococcus gallolyticus*-like colonies was obtained from the hock joints and the pericardial fluids, as well as from a yolk sac remnant. Cultures from liver and kidneys of two animals yielded a few colonies of the same type. Identifi-

cation was based on the capnophilic nature of the bacteria, on their failure to grow on Slanetz & Bartley agar (Oxoid) and on their unique reaction profiles in API 20 STREP (Biomérieux, La Balme-les-Grottes, France). These profiles (not included in the API data base) were: 5–6–7–2–4–5–1 and 5–6–7–2–4–7–1. The identification was confirmed by tDNA intergenic spacer PCR (Baele et al., 2000). Antibiogram testing on blood agar in 5% CO_2 using Neosensitab tablets (Rosco, Taastrup, Denmark) revealed that the bacteria were susceptible to ampicillin (amoxycillin) and enrofloxacin, while being resistant to macrolides, lincomycin, tetracyclines, aminoglycosides and flumequine. This was confirmed with the E test system (AB Biodisk, Solna, Sweden), which yielded the following Minimal Inhibitory Concentrations (MIC): amoxycillin: 0.75 µg/ml, enrofloxacin: 0.25 µg/ml, tetracycline: 64 µg/ml, and erythromycin >250 µg/ml.

DISCUSSION

The finding of E. cecorum as the apparent cause of severe disease and losses in chickens is most unusual as this species has been described as a component of the normal intestinal flora of chickens (Devriese et al., 1991). In fact, it is numerically the most important enterococcal inhabitant of the intestines of chickens older than twelve weeks. Its association with disease was first described in humans (De Baere et al., 2000; Greub et al., 1997; Hsueh et al., 2000). In these human cases the infection was diagnosed in patients with serious underlying disease (liver cirrhosis, obesity and continuous ambulatory peritoneal dialysis). No particular association with any other disease, disease agent or other condition was seen in the Scottish cases described by Wood et al. (2002). In the present outbreak, a spray vaccination with Clone-30 vaccine (half dose) had been performed at two weeks of age, five days before the first cases were seen. A contamination of the suspending fluid of this vaccine, demineralized water, seems unlikely because E. cecorum is not an environmental or water-associated germ. In Scotland, no association with vaccinations was apparent.

It should be noted that the Dutch case was not completely identical with the original Scottish cases: the disease started earlier (first case at 19 days instead of four to five weeks), and the thoracic vertebra were less often affected. More recently, Wood et al. (2002) also isolated E. cecorum from the femurs of chickens with so-called femoral head necrosis, and several re-

cent cases in the U.K. of E. Cecorum-associated septic arthritis, in flocks which later on showed spinal lesions, were first detected at around 16-18 days.

The bacteriological diagnosis of E. cecorum infection may present certain difficulties as this Enterococcus is atypical in being unable to grow on the commonly used enterococcal selective media containing sodium azide, and in its requirement of 5% carbon dioxide for growth. Phenotypically, the bacteria more closely resemble the streptococci than the enterococci. For this reason, they were originally described as Streptococcus cecorum (Devriese et al., 1983), but phylogenetic investigations revealed that the species belongs to the enterococci (Williams et al., 1989).

A second reason why difficulties are encountered in the bacteriological diagnosis of E. cecorum is that the species does not figure in the analytical profile indexes of the commercially available biochemical identification galleries, as is the case also with many other less-well known animal-associated bacteria. This difficulty can be overcome by using the following API 20 STREP reaction profiles indicative of E. cecorum: 5,7 - 4,6 - 6,7,5,4,1 - 2,6 -0,1,2,3,4,5,6,7 - 4,5,7 – 0,1,2,3. These profiles have been drawn up in the author's laboratory on the basis of several hundred strains isolated from different animal species.

Whether or not E. cecorum infections in chickens can be treated successfully with antibiotics remains to be seen. As enrofloxacin and other fluoroquinolones used in veterinary medicine are definitely more active on Gram-negative bacteria, ampicillin (amoxycillin) appears to be the drug of choice. In any case, a therapeutic effect can only be expected in the initial stages of the disease.

ACKNOWLEDGMENTS

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Uit het verleden

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In de 19de eeuw werden vooral in België talrijke zogenaamde porceleinkaarten geproduceerd, waarmee handelaars, fabrikanten en andere zelfstandigen uitpakten om hun zaak of hun beroepsactiviteit de nodige publiciteit te geven. Deze meestal zeer fraai uitgevoerde kaarten vormen naast een gezocht verzamelobjectief, ook een rijke documentatiebron voor het 19[de]-eeuwse bedrijfsleven.

Ook dierenartsen maakten gebruik van dergelijke kaarten, getuige de in dit tijdschriftnummer gepubliceerde afbeeldingen van Gentse porceleinkaarten (verzameling A. Verbeke).

De meest opvallende en mooiste exemplaren stellen de praktijk van Charles Lecompte voor. Deze dierenarts behoorde tot de eerste lichting afgestudeerden (1838) aan de veeartsenijschool van Kuregem (stichting: 1831). Zijn blijkbaar belangrijke zaak was gelegen aan de toenmalige rue d'Anvers (heden Dampoortstraat, in werkelijkheid een korte zijstraat daarvan). Op het vooraanzicht rechts van het grote praktijkhuis zijn nog kazematten te zien van hetgeen toen nog overbleef van het naastgelegen Spanjaardskasteel. Lecompte was de opvolger van Pieter Milliau, die nog in de Franse tijd zijn diploma in Alfort bij Parijs behaald had. Vermoedelijk slaagden beide heren er in een grote praktijk op te bouwen in het zich toen aan de Gentse Dampoort sterk ontwikkelende havengebied met druk vrachtvervoer (denk maar aan de Antwerpse natiepaarden).

Waarschijnlijk veel chiquer volk zal zich gewend hebben tot Charles - Albert Douterluigne in de Regnessestraat, pal in het stadscentrum (verdwenen bij de aanleg van het Sint-Baafsplein). Deze ex-militaire dierenarts werd samen met zijn broer gevormd te Utrecht in de Hollandse tijd. Hij was directeur van het Gentse slachthuis. Zijn broer bracht het tot zowat de meest prestigieuze positie die een dierenarts zich toen kon dromen: vétérinaire des écuries de S.M. Léopold I.

Minder prestigieus zal allicht de praktijk van Charles Minne in de Kortrijk(sepoort)straat geweest zijn. Vermoedelijk behoorde Minne tot een familie die samen met nog drie andere gedurende vele eeuwen het monopolie van het Gentse beenhouwersambacht bezat. Zijn naam komt niet voor in het standaardwerk van Marc Mammerickx, *Histoire de la médecine vétérinaire belge* (Brussel, 1967), waaraan we de meeste hier vermelde persoonsgevens ontleenden.

L.D.