Progressive atrophic rhinitis in a medium-scale pig farm in Kiambu, Kenya

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ABSTRACT

Forty-two pigs in a herd of 117 displayed various clinical signs of progressive atrophic rhinitis. The main signs included sneezing, coughing, lachrymation, serous to mucopurulent nasal discharge, and nasal bleeding in 1 pig. Three pigs had lateral deviation of the snout, while 4 had brachygnathia superior with obvious deformation of the face. Four acutely affected weaner pigs appeared weak, while the 7 chronically-affected pigs appeared smaller than their apparently unaffected penmates of the same age. Treatment of the acutely affected pigs with long-acting oxytetracycline at 20 mg/kg body weight intramuscularly, repeated once after 7 days, reduced the severity but did not clear the sneezing from all the pigs. Fifteen pigs were slaughtered 2 months after the clinical diagnosis was made. The carcasses of the chronically affected pigs were about 15 % lighter than those of the apparently normal pigs of the same age and from the same pen, which translated to a loss of 921.00 Kenya shillings per pig (US$13.7). Diagnosis of progressive atrophic rhinitis was confirmed by sectioning the snouts of randomly selected slaughtered pigs with obvious deformation of the snout. Sections were made at the level of the 1st/2nd upper premolar tooth. Varying degrees of turbinate atrophy, from mild to complete, were noted. Histopathology of the turbinates revealed metaplasia of nasal epithelium and fibrosis in the lamina propria.

Key words: atrophic rhinitis, Kenya, pigs.

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INTRODUCTION

Atrophic rhinitis is a disease that affects mainly young pigs[10] and occurs in 2 forms, non-progressive and progressive[9]. Progressive atrophic rhinitis is caused by toxigenic type D strains of *Pasteurella multocida*[5,6,12]. However, *Bordetella bronchiseptica* and certain management factors affect both the course and the severity of the disease[6,7,10]. The affected pigs have an initial rhinitis that is later followed by chronic atrophy of the turbinate bones, facial distortion and growth retardation[1,3–5,11].

Although the disease has been recognised for many years in countries with intensive pig-production systems[1,9], reports from developing countries like Kenya, with small-scale and isolated pig farms, are few. In Kenya, atrophic rhinitis is a notifiable disease (Animal Disease Act, Cap. 364) and it is mandatory for all veterinary surgeons having reason to suspect the existence of the disease on any farm or area to report suspected cases to the Veterinary Department. Currently, there are no documented reports on the occurrence of the disease in Kenya. This case report describes progressive atrophic rhinitis in a medium-scale piggery and we believe that this is the 1st documented report of the disease in Kenya.

CASE HISTORY

In February 1999, the manager of a medium-scale, open and continuous-system piggery 15 km west of Nairobi, Kenya, reported persistent sneezing in his weaner and grower-finisher pigs to the veterinary clinic of the University of Nairobi. At the time, there were 117 pigs , including 15 sows, 1 boar, 74 grower-finishers, 16 weaners and 11 piglets.

At the farm, a clinical history of the condition was taken and this was followed by clinical examination. The examination revealed that the pigs were housed in dusty pens with low stone partition walls. The main clinical signs in the affected pigs were conjunctivitis, lachrymation, tear-staining of the hair at the medial canthus of the eyes, sneezing, coughing, emaciation, lateral deviation of the snout (Fig. 1), brachygnathia superior (Fig. 2), serous to mucopurulent nasal discharge, and nasal bleeding in 1 grower-finisher. In pigs with deviation of the snout there was wrinkling of the facial skin. Snouts of pigs with excessive nasal discharge were heavily matted with dirt. The morbidity rate was 36 % with no mortality.

A few randomly-selected weaners and grower-finishers were sampled by cleaning the external nares with alcohol and inserting a cotton-tipped flexible wire into the nasal cavity midway between the nostrils and the level of the medial canthus of the eye. The samples were transported to the laboratory using Stuart transport medium. Using the laboratory procedures described by Buchanan and Gibbons[2], attempts to isolate *Bordetella bronchiseptica* and *Pasteurella multocida* were unsuccessful and only nasal commensals were isolated.

Two months later, 15 pigs, comprising 8 apparently normal pigs and 7 chronically sick pigs of the same age and from the same pen, were slaughtered. The chronically sick pigs had a mean carcass weight of 63.6 kg, while the apparently normal pigs had a mean weight of 75.0 kg. This represented a 15 % reduction in total dressed weight in the chronically affected pigs, which translated to a farm gate price loss of Kenya shillings (kshs) 921 (US$ 13.7) per pig (note: 1US $ = kshs 67 and 1 kg of pork realises kshs 80). Following the slaughter of the pigs, the pen in which the slaughtered pigs had been housed was cleaned and disinfected with glutaraldehyde and coco-benzyl-dimethyl-ammonium-chloride (Omnicide®, Cooper-Kenya).

Sections of the snouts of randomly-selected, chronically affected, slaughtered pigs were prepared at the level of the 1st and 2nd upper premolar tooth. These revealed varying degrees of nasal turbinate atrophy, with some nasal chambers revealing complete atrophy of the turbinates (Fig. 3). Histopathology revealed squamous metaplasia of the epithelium, atrophy of the glands and infiltration with lymphocytes and fibrous tissue growth into the lamina propria.

During the 1st visit all the acutely sick pigs were treated with an intramuscular injection of long-acting oxytetracycline (Tetroxy®, Bimeda, United Kingdom) at

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Fig. 1: **A 24-week-old pig with clinical atrophic rhinitis showing marked brachygnathia superior and wrinkling of the skin on the dorsum of the nose.**

Fig. 2: **A 24-week-old pig with clinical atrophic rhinitis showing severe lateral deviation of the snout.**

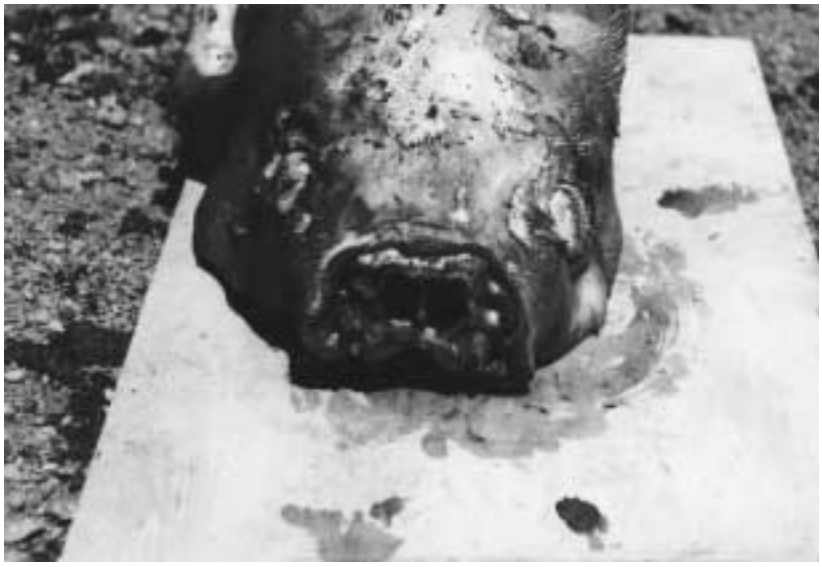

Fig. 3: **Cross-section of the snout of a 24-week-old pig at the level of 1st/2nd upper premolar. There is total atrophy of all turbinate structures.**

20 mg/kg body weight. This treatment was repeated after 7 days. The treatment reduced the number of sneezing pigs and the severity of sneezing, but did not completely eliminate sneezing in all pigs, until they were slaughtered 2 months later.

DISCUSSION

Atrophic rhinitis is a disease that has been recognised for many years in countries with intensive pig-production systems[1,5,9,10]. In Kenya, where the piggeries are small and secluded, with more than 68 % of them having fewer than 20 sows[13], the disease has not been documented to date.

In the current report, the main clinical findings were sneezing, lachrymation and deviation of the snout. A presumptive diagnosis of progressive atrophic rhinitis was based on these findings. However, this condition may be confused with other diseases that produce sneezing and/or facial deformity such as inclusion-body rhinitis, paranasal abscesses and excessive dust in the environment[1,10]. As progressive atrophic rhinitis produces atrophy of the turbinate bones, the diagnosis was confirmed by pathomorphological findings of cross-sections of the snout at the level of 1st and 2nd upper premolar tooth and demonstration of varying degrees of turbinate atrophy as reported previously[5]. Bacterial isolation was attempted but was unsuccessful, as the responsible organisms did not grow on blood agar or McConkey medium. Cultural failures have been reported previously[5].

The treatment of acutely-affected pigs with long-acting oxytetracycline at 20 mg/kg body weight intramuscularly twice with a 7-day interval reduced the incidence and severity of sneezing, but failed to eliminate sneezing in all the pigs. This drug has previously been shown to be effective in the treatment of swine herds with enzootic atrophic rhinitis[8]. The poor response in this case could have been due to poor management factors, such as the excessive dust, which could not be adequately addressed. Excessive dust has been shown to facilitate colonisation of the pig upper respiratory tract by *Pasteurella multocida*. This may contribute to the severity of the lesions and may even directly evoke mild turbinate atrophy[6].

After slaughter of the pigs, the pen in which the slaughtered pigs had been housed was cleaned and disinfected with Omnicide®, Cooper-Kenya limited. Maintaining strict hygienic measures has been cited as a good management practice in the control of atrophic rhinitis[5].

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Book review — Boekresensie

International animal health code – mammals, birds and bees (8th edition)

1999. Office International des Épizooties, Paris, 420 pp, soft cover. Price €45. ISBN 92 9044 484 3.

The International Animal Health Code represents a set of standards for the control of animal diseases, compiled by experts, to support international trade in livestock products. It is universally accepted that animal products can pose risks, in terms of both animal and human disease. These risks are increased when trade results in animals and animal products crossing international boundaries, with the concomitant possibility of introducing diseases into countries where they were previously unknown. Failure to recognise the disease and institute appropriate control measures can have far-reaching consequences. Importing countries therefore need to draw up protocols that will protect them from introducing diseases without placing unnecessary restrictions upon trade. The Code serves as a guideline for such protocols, collating in a concise manner the vast amount of information about each disease that is relevant for its control. First produced in 1968, subsequent editions of the Code appeared at irregular intervals until 1998, when it was decided that the quantity of updates justified annual revision and publication.

The text comprises four parts. Part 1 provides useful general information under the following headings: definitions, notifications and epizootiological information, veterinary ethics and certification for international trade, import risk analysis, import/export procedures, and risk analysis for biologicals for veterinary use. Part 2 consists of 15 chapters, each devoted to a List A disease (diseases with high potential for transboundary transmission and with serious consequences). In part 3 the more numerous List B diseases (diseases of socioeconomic or public health importance) are covered in 8 sections, relating to multiple species diseases, and diseases of cattle, sheep and goats, equines, pigs, birds, rabbits and bees. Part 4 comprises appendices relating to diagnostic tests for the purpose of international trade, general requirements for health and hygiene, destruction of pathogens and insect vectors, transport of animals, and epidemiological surveillance systems. Part 5 consists of 11 model international certificates approved by the OIE and includes international animal health certificates for dogs and cats originating from countries infected with rabies, for the movement of cloven-hoofed animals, for the movement of a wide range of animal products destined for various uses, for the movement of birds, rabbits, bees and brood-combs, and a model passport for the movement of competition horses. Part 6 contains the full list of diseases (Lists A and B) notifiable to the OIE.

The Code contains a wealth of information and is a compulsory reference work for state veterinarians who deal with import and export, veterinarians employed in zoological gardens and other wildlife conservation areas, as well as for veterinarians in diagnostic laboratories that perform the tests required for different diseases. Private veterinarians whose clients wish to import or export animals or animal products, and who may be involved in quarantine of animals, will find this text invaluable, as it provides the basis of the protocols within which they will need to work.

Evidently, it would be impossible to update all the chapters every year, and it is likely that in any given edition some of the information on particular diseases will be out of date, or may contain problems of syntax that are open to misinterpretation. Thus, in the chapter on African swine fever (ASF), the recommendations relating to import of domestic and wild pigs from countries considered infected with ASF could be interpreted as implying that such animals could not be imported at all, although this is clearly not the intention. Users of the Code should keep in mind that the purpose is to facilitate safe trade and to underpin rather than override local wisdom with regard to the level of control of animal diseases.

For the amount of work entailed in the production of such a comprehensive technical publication, the price is modest.

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