Proceedings 3rd World Rabbit Congress, 4-8 April 1984, Rome – Italy, Vol. 2, 210-315

CUTANEOUS STAPHYLOCOCCOSIS IN RABBITS

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Summary

An outbreak of cutaneous staphylococcosis caused high mortality among newborn and very young rabbits. This type of staphylococcal infection is due to a special rabbit pathogenic biotype of Staphylococcus aureus. The most typical lesions were exudative dermatitis in the youngest, subcutaneous abscesses in rabbits of all ages and mastitis in lactating does. Generalized staphylococcosis was a frequent secondary manifestation of the disease.

Résumé

L'apparence d'une forme cutanée de staphylococcose a été la cause de pertes importantes dans un élevage de lapins. Cette forme est due à un biotype de Staphylococcus aureus qui est particulièrement pathogène pour le lapin. Les lésions les plus typiques sont une dermatite exsudative chez les lapereaux, des abces souscutanés chez des lapins de toutes ages et des mammites chez les nourrices en lactation. La forme généralisée de staphylococcose est une manifestation secondaire de cette maladie.

Introduction

In most rabbitries staphylococcosis caused by Staphylococcus aureus occurs sporadically and is only a minor cause of losses. A special form of staphylococcal disease associated with important mortality in young rabbits was first described in the U.S.A. by Hagen (1963). Renault (1980) reported that the disease is widespread in France. He considered it as the cause of death in 24.4% of necropsies of suckling rabbits originating from 143 different farms. A similar condition has also been reported in

Italy (Bartolomeo 1980). Devriese and others (1981) found that this form of staphylococcosis is associated with a special rabbit virulent biotype of S. aureus which was called "the mixed crystal violet type C group" or "mixed CV-C group".

In the present communication a detailed description is given of the disease history in a rabbitry consisting of 2 well separated stables infected with a rabbit pathogenic strain and a human strain.

Material and methods

Animals and breeding methods : The rabbitry belongs to a research station where mainly feeding experiments and selection programmes are performed on small livestock. Two stables are reserved for rabbits, designated hereafter stable A and stable B.

The breeding stock consisted of approximately 60 Californian and 60 Burgundy Red does in stable A. Approximately 180 selected crosses of New Zealand White and Termonde White does were reared in stable B. They were housed in 3-floor cage batteries (stable A and stable B) and also in flat deck cages (stable B). The nest boxes in stable A were wooden trays placed in the cages 3 days before kindling. In stable B closed metal nest boxes with plastic bottoms were used. After weaning, the nest boxes, the feeders and the bottoms of the does' cages were cleaned. Nest boxes and feeders were desinfected in a phenolic desinfectant solution, the metal bottoms were treated with a gas burner. Whenever a doe died or was culled the whole cage was desinfected.

During the observation period no does were introduced from outside the farm. From time to time males were replaced by others originating from other farms and young rabbits were moved from stable B to stable A and vice versa.

The does were normally remated between 10 and 15 days after parturition. The young rabbits were weaned after 5 weeks. After weaning, the rabbits were kept in a separate compartment in the same stable (broiler rabbits and young breeding stock for replacement). Rabbits of all ages were fed ad libitum with a commercial diet.

Bacteriological procedures : Material from lesions was cultured on sheep blood agar plates, on Tryptose Agar (Difco, Detroit) supplemented with 5 percent horse serum or on Tryptose Soya Agar (Oxoid, Basingstoke). Nasal swabs were taken at irregular intervals throughout the observation periods from unselected healthy animals on 4 different dates in stable A and on 8 different dates in stable B. On each sampling day between 20 and 35 nasal samples were collected and were inoculated on Baird-Parker medium (Oxoid) supplemented with acriflavine, colistine and sulphamezathine as described by Devriese (1981). Swabs taken from the stable surfaces and equipment (floors, walls, nest boxes, cages, drinking nippels, feeders) were similarly inoculated. All staphylococcal strains from nares and equipment and part of the strains from lesions were identified, biotyped and phage-typed as described previously (Devriese and others 1981).

Results

Effect on suckling rabbits : During the year 1980 a comparative reproduction experiment with young primiparous does was carried out in both stables. The breeding results are summarized in Table 1. In this stable the litters which died completely before 4 days of age were excluded, because this was suspected to be mainly due to bad or insufficient maternal behaviour.

Table 1 : Breeding results of primiparous does in stable A (contaminated with the CV-C strain) and stable B (contaminated with a strain of human origin) during the period January 1st 1980 to December 31th 1980

	Stable A	Stable B
Number of litters examined	181	62
Mean numbers of young born alive per litter	8.06 ± 2.84	7.30 ± 1.96
Number of litters which died completely between 4 days of age and weaning	27	1
Percentage of total number of litters	14.9	1.6
Mean number of youngs per remaining litter	4.40 ± 3.00	6.25 ± 2.18
Percentage at wean of the youngs born alive	53.7	90.5

The litters which died completely after 4 days were included as well as all the other youngs which died between 1 day and weaning age. The observation period (January 1st to December 31th, 1980) was chosen because during this period only stable A was contaminated with a mixed CV-C group strain of the phage type 3A/3C/55/71 (47 of 53 isolations from nares) whereas the in the other stable only a human biotype strain susceptible to phage 81 (32 of 32 isolations from nares) was found to be present. The housing conditions and the rabbit breeds also differed between the 2 groups (see material and methods) ; all other conditions being similar. Compared to stable B, the percentage of litters which died completely was high and the average number of youngs per litter that reached weaning age was low in stable A. This resulted in an extremely low percentage of weaned rabbits (53.7% of all rabbits born alive compared to 90.5% in stable B).

On the 1st of June 1980 a detailled investigation on mortality in suckling rabbits was started in stable B. This allowed us to make another comparison between the necropsy results of suckling rabbits in stable B before and after the mixed CV-C group strain appeared in this stable and almost completely replaced the human strain. During the first period (June 1st 1980 to March 31th 1981), 131 young rabbits were examined. Only one case of generalized staphylococcosis was found. The isolated strain belonged to the human biotype that was endemic in this stable during this period.

In April 1981, a one week old rabbit showed exudative dermatitis, and from that lesion the first S. aureus strain of the mixed CV-C group was isolated in stable B. During the second period (April 1981 to January 1982), 154 young rabbits which died or were culled between 1 day and weaning age were examined. Sixty-two of them showed signs of staphylococcosis (40%). The youngest animal that died with signs of staphylococcosis (lesions) was 6 days old.

The different forms of disease that were observed were the following :
- Exudative dermatitis, with small superficial pustules occurred in the youngest hairless animals. Losses due to this form were high during the second week. Usually the whole litter was affected and died.
- Subcutaneous abscesses of different sizes could be found in older animals.
- Purulent rhinitis and conjunctivitis was a frequent symptom in suckling rabbits.

- In several cases, the superficial form of the disease was followed by generalized staphylococcosis (purulent pneumonia, abscesses in the liver and septicaemia) : 25% of the youngs which were necropsied showed pneumonic lesions. This represents a sharp increase compared with the first period when only 4.6% of the youngs died of pneumonia. Twenty S. aureus strains were isolated from the lungs during the second period. Pasteurella multocida was associated with lesions in only 2 and 5 cases before and after the appearance of the rabbit virulent staphylococci.

Effects on broiler rabbits and adult breeding animals : Subcutaneous abscesses from which pure cultures of S. aureus were isolated were found frequently in rabbits of all ages. Usually these abscesses did not harm seriously : the death percentage during the fattening period was not higher than normal (less than 10 percent).

Adult breeding rabbits showed a higher incidence of pododermatitis ("sore hocks"). From all examined cases of pododermatitis S. aureus was isolated. The most disadvantageous effect in breeding does was the frequent occurrence of mastitis. This mastitis was usually not of the "blue breast" type, but more superficial with an exudation developing into a suppurative inflammation of the skin next to the teats. Inflammation of the deeper tissue was only seen in a few post-mortem examinations, but it is possible that the attendants did not observe this form as easily as the superficial form. In stable B, we examined to what extent staphylococcosis was a cause of replacement of does. Between September 1981 and February 1982, 155 young does were introduced in the breeding unit. On the First of March 1982, only 78 of them were still present ; 26 animals died and 51 were sold. Twenty-four of those 51 were removed because of lesions of staphylococcosis (12 pododermatitis, 3 pododermatitis and mastitis, 6 mastitis en 3 subcutaneous abscesses). At least 15% of the breeding does had to be replaced before they reached the age of 1 year, as a consequence of staphylococcosis.

Discussion

In the rabbitry, studied here, the appearance of the special rabbit pathogenic S. aureus strain resulted in high mortality of the suckling rabbits, especially in breeding does. The results indicate that this type

of staphylococcosis has serious consequences on the economical profitability of rabbit farms. The important losses in stable A shown in Table 1 cannot be attributed to differences in breeds and housing conditions, 2 factors which can influence fertility and losses in the first days of live. The history of stable B before and after the appearance of the CV-C strain is another illustration of this point. Considering the heavy economic losses involved, it is important that practitioners recognize this severe form of staphylococcosis to avoid further spreading of the rabbit pathogenic S. aureus strains.

It is clear from the description of the lesions that the disease provoked by the CV-C strain is primarily a cutaneous infection. The term "Cutaneous staphylococcosis of suckling rabbits" ("La staphylococcose cutanée du lapereau") used in France (Renault, L., personal communication) more appropriately designates the peculiar characteristics of this form of staphylococcal disease in rabbits, than the term"Disseminated staphylococci infection in young domestic rabbits" used by Hagen (1963). It must be recognized, however, that the infection also affects older animals and that the cutaneous lesions frequently develop into a generalized infection, especially in very young animals.

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