

Listeria abortions in sheep on the Accra plains: A case report

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ABSTRACT

An outbreak of late abortions was recorded in a flock of 121 sheep on the Animal Research Institute field station at Pokoase on the Accra Plains. Fifteen (19.2 per cent) of the 78 ewes were affected. Serological tests excluded the involvement of *Brucella* spp. Bacterial culture of 27 vaginal and preputial swabs and stomach contents of an aborted foetus yielded *Listeria* spp. The organism was also isolated from vaginal and preputial swabs of sheep at Achimota and Kade, from where breeding animals had been transferred to Pokoase and Achimota. Abortions were reported at these two stations also, showing that infection had been transmitted from Kade to the other two stations by the breeding sheep. Meningo-encephalitis and septicaemia were not features of the outbreaks. Antibiotic sensitivity test results were used to select long-acting oxytetracycline for treatment of the flock at Pokoase. No more abortions have been reported since then. It is recommended that normal laboratory screening of breeding animals against infectious agents including *Listeria* spp. should be maintained.

RÉSUMÉ

OSEI-SOMUAH, A., ANING, K. G., NARTEY, P. W. K. & ABBAM, J. K.: *Avortements listérioses dans les moutons de la plaine d'Accra: Un rapport sur un cas.* Une apparition des avortements tardifs se produisait dans un troupeau de 121 moutons sur le champ de la station de l'Institut de Recherche d'Animal à Pokoase sur les plaines d'Accra. Quinze (19.2 %) des 78 brebis étaient attaquées. Les essais sérologiques excluaient l'engagement de *Brucella* spp. La culture bactérienne de 27 prélèvements vaginaux et préputiaux et les contenus de l'estomac de fœtus avorté produisait *Listeria* spp. L'organisme était également isolé des prélèvements vaginaux et préputiaux des moutons à Achimota et Kade, d'où les animaux de reproduction avaient transférés à Pokoase et Achimota. Les avortements se produisaient à ces deux stations aussi, montrant que l'infection avait été transmise de Kade aux deux autres stations par les moutons de reproduction. Meningo-encephalitis et septicaemia n'étaient pas les traits des apparitions. Les résultats de l'essai de sensibilité antibiotique étaient utilisés pour choisir oxytetracycline à action lente pour le traitement du troupeau entier à Pokoase. Aucun avortement n'avait plus été signalé depuis lors. Il est conseillé que le test de dépistage normal au laboratoire des animaux de reproduction contre les agents infectieux y compris *Listeria* spp. doit être gardé.

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Introduction

Abortions and neonatal deaths are among the major causes of production losses in small ruminants in the humid zones of Africa, including Ghana (Tuah *et al.*, 1988/89). However, it would appear that traditional farmers do not fully recognize the importance of such losses and have, therefore, given them little attention (Osei-Somuah, 1994; Matthewman, 1977). Sheep and goats in the developing agricultural economies

are not kept as an economic enterprise, but are left to scavenge on free-range including spending the nights outside the owner's house. The animals are usually not seen for many days by their owner. This makes disease and reproductive abnormalities difficult to detect. One of such diseases, though infrequent, is listeriosis caused by *Listeria monocytogenes*. Other variants of the organism, *L. murrayi*, *L. grayii* and *L. ivanovii*, have been described in recent years (Cowan & Steel, 1974;

Kraft, Dumbusky & Theiss, 1995).

Listeria monocytogenes is a common inhabitant of the gastrointestinal tract of man and animals, and exists as a saprophyte in the soil, sewerage, and on sitagem. Listeriosis is characterized by meningo-encephalitis, septicaemia or abortion (Buxton & Fraser, 1977; Blood, Radiostis & Henderson, 1985; Iida *et al.*, 1991). Listeriosis is more prevalent in cattle and sheep (Blood *et al.*, 1989), but infections in a wide array of domestic animals have been reported in Nigeria (Oni *et al.*, 1989). There are reports (Arthur, 1973; Blood *et al.*, 1985) that infection in early pregnancy may result in abortion of up to 15 per cent in cattle and a higher percentage in ewes. Listeriosis in any of its clinical manifestations has not been previously reported in Ghana.

This report describes an outbreak of *Listeria* abortion in ewes on the Pokoase station of Animal Research Institute (ARI) in the Accra Plains of Ghana.

Materials and methods

Case history

An outbreak of abortions was recorded in the sheep flock of ARI on Pokoase station in August 1996. A flock size of 122 sheep including 44 ewes had been kept in a semi-intensive system, grazing both established pasture and in the bush. Silage was not offered to them. The flock had been kept as a source of animals for experiments. They had been treated with anthelmintics and acaricides routinely, at fortnightly and monthly intervals, respectively. The most important health problems noted in the flock had been heartwater (cowdriosis) and dermatophilosis. For nearly 20 years, abortions had not been recorded at the station.

New service rams were introduced to the ARI station in the 1st week of April 1996 from the University of Ghana research station at Kade, about 120 km north of Pokoase, in the rain forest agro-ecological zone. These rams were not tested for any infectious agents before being introduced into the Pokoase flock.

Late abortions were subsequently reported in August and September 1996. The abortions were neither preceded nor followed by any clinical symptoms. Fifteen out of the 78 ewes (19.2 %) were affected.

During the same period, a member of staff of the ARI purchased two pregnant ewes and a ram from the same research station at Kade and transferred them to Achimota for breeding purposes. Both ewes aborted their foetuses.

Follow-up investigations at Kade showed that the flock at the station had aborted foetuses 3 weeks before the outbreaks at Pokoase and Achimota.

Laboratory investigations

Serology. Serum samples obtained from the first five ewes that had aborted at Pokoase were subjected to the Rose-Bengal Plate Test at the Veterinary Laboratory, Ministry of Food and Agriculture, Accra, to detect *Brucella* antibodies.

Bacteriology. Vaginal swabs from ewes that aborted (11 from Pokoase, one from Kade, and two from Achimota) and preputial swabs from service rams (four from Pokoase, nine from Kade, and one from Achimota) were taken and subjected to bacterial culture and identification. Cultures were made on Sheep Blood Agar (SBA), Nutrient Agar (NA), and MacConkey Agar (MA) and incubated aerobically at 37 °C for 24-48 h. The growths were identified by standard methods (Cowan & Steel, 1974). The stomach contents of the only aborted foetus which were recovered from Pokoase were similarly cultured and the growth identified.

Antibiotic sensitivity tests were carried out on five of the isolates according to a modification of the "Kirby Bauer" technique (Baner *et al.*, 1966).

Treatment

Sensitivity testing was used to select long-acting oxytetracycline (Tenaline 20 %, LA, SANOFI, Canada) for treatment because of its relatively low cost and availability. All animals at Pokoase station and Achimota were treated at the

dosage of 1ml/20 kg body weight at 4-day intervals on three occasions.

Results

Laboratory investigations

Serology. Antibodies to *Brucella* were not detected in the sera of ewes that aborted.

Bacteriology. There was no bacterial growth on NA or MA. Colonies on SBA from three of the swabs from Pokoase, including a pure, profuse growth from the stomach contents of the aborted

foetus, showed beta-haemolysis. The organisms were Gram-positive, non-capsulated, non-sporing straight rods. They were catalase and Voges-Proskauer-positive and were, therefore, identified as *Listeria* spp. The same organism was isolated from the two ewes that aborted at Achimota and six service rams from Kade. Only one of the cultures from the prepuce of the three service rams transferred from Kade to Pokoase (B27, Table 1) yielded *Listeria*.

Antibiotic sensitivity test results showed that

TABLE 1

Results of Bacterial Isolation and Identification from Ovine Vaginal and Preputial Swabs and Foetus from Pokoase, Achimota, and Kade

Date	Station	Lab. no.	Specimen	Isolation and identification
22/8/96	Pokoase	B16	Swab	<i>Listeria</i> spp.
		B17	"	NG
		B18	"	"
		B19	"	"
		B20	"	"
		B21	"	NH <i>Staphylococcus</i>
		B22	"	"
		B23	"	NG
		B24	"	"
		B25	"	NH <i>Staphylococcus</i>
		B26	"	NH <i>Staphylococcus</i>
4/9/96		B27	Preputial swab	<i>Listeria</i> spp.
		B28	" "	"
		B29	" "	NH <i>Staphylococcus</i>
		B30	" "	"
		B31	Aborted foetus	<i>Listeria</i> spp.
		B32	Vaginal swab	"
		B33	" "	"
	Achimota	B34	Preputial swab	NH <i>Staphylococcus</i>
18/9/96	Kade	B35	Preputial swab	<i>Listeria</i> spp.
		B36	" "	"
		B37	" "	<i>Listeria</i> & NH <i>Staphylococcus</i>
		B38	" "	<i>Listeria</i> spp.
		B39	" "	NH <i>Staphylococcus</i>
		B40	" "	<i>Streptococcus</i>
		B41	" "	<i>Listeria</i> spp.
		B42	" "	<i>Streptococcus</i>
		B43	" "	<i>Listeria</i> and <i>Staphylococcus</i>
		B44	Vaginal swab	<i>Coliforms</i>

the five strains of *Listeria* tested were sensitive to erythromycin, chloramphenicol, furazolidone, and tetracycline.

Treatment

No more abortions have been reported at Pokoase and Achimota since treatment was given with long-acting oxytetracycline.

Discussion

Blood *et al.* (1985) reported that *Listeria* is not a common cause of disease in tropical environments. However, this case report suggests that *Listeria* was the cause of abortions in sheep.

It was not possible to identify the species of *Listeria* involved in this outbreak or the serotype of the isolates. However, the various serotypes of *L. monocytogenes* are not identified with particular clinical manifestations of listeriosis (Low *et al.*, 1993) as to make serotyping essential for reporting this clinical case.

Listeria is often found in healthy animals and is widely distributed in nature. Listeriosis is, therefore, precipitated by predisposing factors, such as heavy silage feeding and sudden changes to wet and cold weather (Blood *et al.*, 1985). In the outbreaks reported here, the most likely predisposing factors would be weather changes, as the month of August in the Accra Plains is relatively cold.

Listeria was isolated in pure culture from the stomach of the aborted foetus at Pokoase. *Listeria* was also isolated from the prepuce of five of the nine rams sampled at Kade, and from one ram each transferred from Kade to Pokoase and Achimota. This suggests that the infection was transmitted from Kade to the two stations.

Listeria was isolated from 11 out of 28 samples cultured. This represents only 39.3 per cent recovery rate. A higher rate might have been recorded for selective media like L. PALCAMY selective media or PALCAM. *Listeria* agar were used (Peters, Amsberg & Beckman, 1992). Similarly, if isolation had been carried out at 5 °C, a higher rate might have been recorded (Cowan &

Steel, 1974). Nevertheless, the results of the laboratory investigation presented in these studies have implicated *Listeria* as the causative agent of ovine abortion at Pokoase, Achimota, and Kade.

It is interesting that the other clinical forms of listeriosis, namely, meningo-encephalitis and septicaemia, were absent in the outbreaks described. This may be linked to the route of infection of the ewes. While inhalation of the organism leads to meningo-encephalitis, transmission by coitus may lead to abortion (Blood *et al.*, 1985). That only *Listeria* abortion was encountered further confirms that *Listeria* infection was transmitted from Kade to the Pokoase flock by the service rams introduced on the farm. The normal laboratory screening tests of breeding animals against infectious agents must be maintained and *Listeria* spp. should be considered in future routine tests.

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