

Ventricular encephalitis due to *Aspergillus fumigatus* infection in a goat

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Key words

Goat - *Aspergillus fumigatus* -
Mycoses - Encephalitis -
Saudi Arabia.

Summary

Mycotic encephalitis was reported in a goat. *Aspergillus fumigatus* was demonstrated by impression smear from the brain lesion as well as by culture. A large granulomatous lesion was confined to the brain lateral ventricle and showed small nodules and extensive fibrosis. The main clinical signs were circling, head rotation and opisthotonos. Since brain ventricles were infected without involvement of other internal organs, the possible routes of infection were discussed.

■ INTRODUCTION

Aspergillosis has been recognized for a long time as a specific disease in several animal species including chickens, ruminants and horses (1, 4, 6). The source of the fungus is usually moldy hay or other contaminated feed. When baled hay or straw has been left in the open, cultures are easily obtainable and individuals fed with this material contract aspergillosis (5, 8, 9). The digestive, respiratory and reproductive systems are commonly involved with diarrhea, pneumonia and abortion as the main clinical signs in affected animals (2). In this paper, we describe a rare case of aspergillosis involving the lateral ventricle of the brain in a goat. To our knowledge, the disease has not been reported before.

■ MATERIALS AND METHODS

A 3-year-old female goat was presented to the Veterinary Hospital of King Saud University, with signs of circling, opisthotonos and rotation of the head along its axis. The animal was in fair body condition but weak and laid down frequently. The condition was diagnosed presumptively as encephalitis and a broad spectrum antibiotic (tetracycline) was prescribed. However, the condition of the animal continued to deteriorate and euthanasia was performed two weeks after presentation and post-mortem examination was carried out. Specimens of the brain showing lesions were fixed in 10% formol-saline, embedded in paraffin wax and sectioned at 5 µm and stained with haematoxylin and eosin (H&E) for histo-

pathological examination. Slices representing the granulomatous lesions were cultured on Sabouraud's dextrose agar and incubated at 28 °C (8).

■ RESULTS

Lesions were confined to the lateral ventricle of the brain which was enlarged due to presence of a whitish turbid fluid. The ventricle was traversed with linear haemorrhages and small granulomas were dispersed on its wall (figure 1). No lesions were seen in other parts of the CNS or visceral organs. Impression smears made from the lesion and stained with Gram-stain demonstrated aggregates of Gram-positive mycelial elements and spores indicative of a systemic fungal infection (figure 2). A confluent fungal growth was obtained within 5 days of culture. *Aspergillus fumigatus* was diagnosed on the basis of colonial morphology and color as well as by microscopic examination of conidial heads (figure 3). Microscopic examination of the brain lesion showed typical fungal granuloma containing a dense fibrous capsule with numerous macrophages and Langerhan's giant cells (figure 4).

■ DISCUSSION

The diagnosis of *A. fumigatus* as a cause of encephalitis in a ruminant draws attention to the necessity for including this agent in the differential diagnosis of all forms of encephalitis in farm animals. Pier *et al.* (7) inoculated pregnant ewes intravenously as well as intrauterinally with spores of *A. fumigatus* and reported abortion, ewe mortality and stillbirths without development of

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nervous signs. Although extrauterine infection was established in the liver, spleen and kidneys, the central nervous system did not reveal evidence of infection. The authors were not aware of a previous report describing infection of brain ventricles with any fungus including *A. fumigatus*. It was difficult to suggest a mechanism for route of a primary infection of the brain with *A. fumigatus* spores. Similarly, it was equally difficult to suggest a secondary fungal brain infection since necropsy showed no respiratory or digestive tract involvement. The likely site of granulomatous lesions in the CNS of animals are the meninges and not the brain ventricles. Ventricular lesions are only possible through spinal cord infection, since the spinal canal and the cerebrospinal fluid are continuous with the brain ventricles. Although no clinical signs suggestive of spinal cord infection were observed in the investigated animal, subclinical infection could not be excluded. Another possibility was that the infection gained entrance to the blood through breaks in the oral or pharyngeal mucosa. It was difficult to explain the mechanism by which spores could have surpassed the blood-brain barrier. Cysewski and Pier (3) observed rapid clearance of *A. fumigatus* from all organs except the placenta of animals experimentally inoculated with fungal spores. The same authors recorded morphologic differences between mycelial elements of the fungus isolated from the placenta as compared to those from extrauterine organs, and commented that morphologic differences could be related to fungal persistence in the placenta. This aspect needs investigation as it may have epidemiologic implications.



Figure 1: Lateral brain ventricle showing fibrosis, small nodules (arrow) and linear haemorrhages.

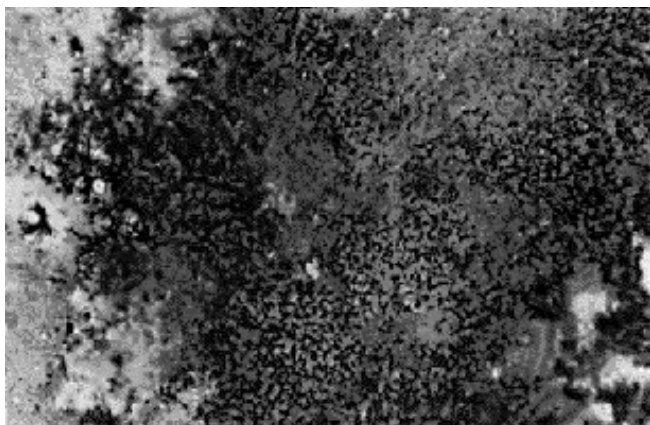


Figure 2: Impression smear from ventricular lesion showing mycelial elements. Gram-stain X 1000.

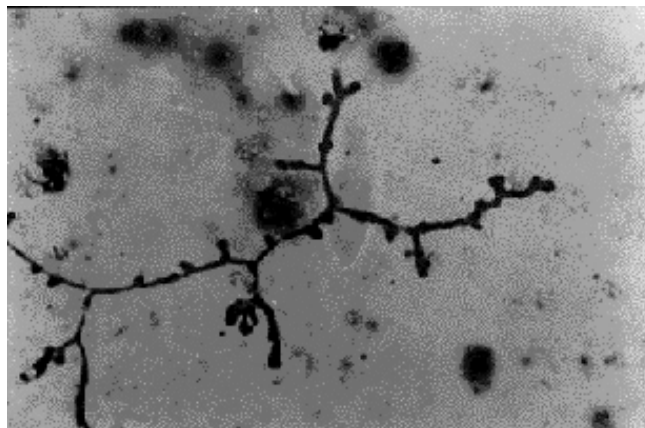


Figure 3: Conidial elements from culture smear. Gram-stain X 1000.



Figure 4: Granulomatous lesion from infected ventricle showing macrophages and Langerhan's giant cells. H&E X 250.

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Résumé

Abbas B., Mahmoud O.M., Haroun E.M., Faki M.G.
Encéphalite ventriculaire due à une infection à *Aspergillus fumigatus* chez une chèvre

Un cas d'encéphalite fongique chez une chèvre a été examiné. *Aspergillus fumigatus* a été mis en évidence par lecture du frottis de la lésion et par culture. Seul le ventricule latéral du cerveau était atteint d'une importante lésion granulomateuse et montrait de petits nodules et une fibrose étendue. Les principaux signes cliniques étaient le tournis, une rotation de la tête et un opisthotonos. Comme les ventricules du cerveau étaient infectés sans implication des autres organes internes, les trajets possibles de l'infection ont été envisagés.

Mots-clés : Chèvre - *Aspergillus fumigatus* - Mycose - Encéphalite - Arabie Saoudite.

Resumen

Abbas B., Mahmoud O.M., Haroun E.M., Faki M.G.
Encefalitis ventricular debida a una infección por *Aspergillus fumigatus* en una cabra

Se reporta una encefalitis micótica en una cabra. *Aspergillus fumigatus* fue demostrado mediante frotis de impresión de una lesión cerebral, así como mediante un cultivo. Se encontró una larga lesión granulomatosa confinada al ventrículo lateral del cerebro, mostrando pequeños nódulos y fibrosis extensa. Los principales signos clínicos fueron marcha en círculos, rotación de la cabeza y opistotono. Debido a que los ventrículos cerebrales estaban infectados, sin compromiso de otros órganos internos, se discuten las posibles vías de infección.

Palabras clave: Cabra - *Aspergillus fumigatus* - Micosis - Encefalitis - Arabia Saudita.