

CHOROID PLEXUS HYPERPLASIA IN AN ADULT COW WITH CLINICAL SUSPICION OF BOVINE SPONGIFORM ENCEPHALOPATHY (BSE)

Choroid plexus hyperplasie bij een volwassen koe klinisch verdacht van Boviene Spongiforme Encefalopathie (BSE)

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ABSTRACT

This paper reports on a choroid plexus hyperplasia in an adult cow suspected of having BSE. The cow was a seven-year-old Belgian Blue with a history of progressive ataxia in the front and hind limbs. No improvement was observed after treatment. On macroscopic examination of the brain, several grayish red masses were found dorsally between the cerebrum and the cerebellum. Histopathology revealed a benign proliferative process of the choroid plexus. This abnormality of the choroid plexus is to be considered in the possible differential diagnosis of bovine spongiform encephalopathy.

SAMENVATTING

In dit artikel wordt een geval van hyperplasie van de choroidale plexus beschreven bij een volwassen koe, klinisch verdacht van BSE. Het ging om een zeven jaar oud dier van het Belgisch Wit-blauwe ras met progressieve ataxie ter hoogte van de voor- en achterpoten. Er kon geen verbetering opgemerkt worden na therapie. Bij macroscopisch onderzoek van de hersenen werden meerdere grijsrode massa's opgemerkt dorsaal tussen het cerebrum en het cerebellum. Histopathologisch onderzoek toonde aan dat het ging om een goedaardig proliferatief proces uitgaande van de plexus choroïdeus. Deze pathologie uitgaande van de choroïdale plexus, kan als een mogelijke differentiaal diagnose van boviene spongiforme encefalopathie vermeld worden.

INTRODUCTION

Bovine spongiform encephalopathy (BSE) is a fatal, progressive, transmissible neurodegenerative disease of adult cattle. Since its first detection in the United Kingdom in 1986 (Wells *et al.*, 1987), numerous countries have identified the disease in their own cattle population. On the basis of these findings, these countries have introduced BSE epidemiosurveillance networks. These networks depend mainly on the reporting of suspected animals on the basis of well-defined clinical symptoms. However, it has become evident not only that the clinical signs are often not so well defined as has been reported, but also that other diseases can mimic BSE signs. In fact, McGill and Wells (1993) reported a list of neuropathological changes in cattle with clinically suspect but unconfir-

med BSE. Besides inflammatory lesions and metabolic diseases, this list also includes tumors. Among these, a neurofibroma of the trigeminal nerve, a meningeal sarcoma, an adenocarcinoma and a glial tumor are described (Jeffrey, 1992).

The aim of this report is to add choroid plexus hyperplasia in the cerebellopontine angle - a choroid plexus abnormality that can mimic tumors - to the differential diagnoses list for bovine spongiform encephalopathy.

CASE REPORT

A seven-year-old Belgian Blue cow originating from a 615-unit meat herd was presented to the practicing veterinarian with a history of progressive ataxia in the front and hind legs. This resulted in a staggering

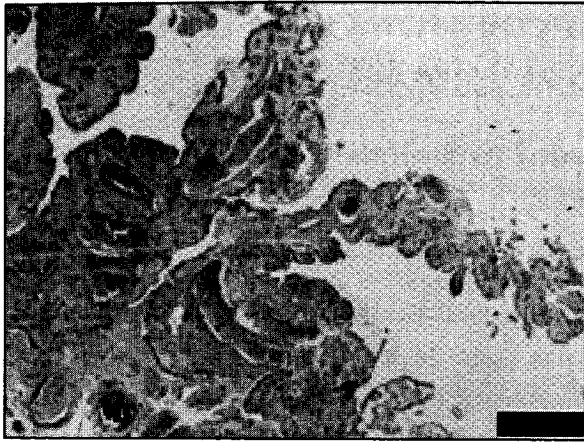


Fig. 1. Histopathological pattern of the choroid plexus hyperplasia: typical branching arboriform structures of the process in the leptomeninges of the cerebellum (Hematoxylin Eosin staining).

gait, which was treated with anti-inflammatory drugs and antibiotics, though without any noticeable improvement. Subsequently, the animal was submitted to the routine protocol for cases of suspected BSE (Vanopdenbosch *et al.*, 1998). After the exclusion of rabies and BSE (Vanopdenbosch *et al.*, 1998), samples of the brainstem, cerebrum and cerebellum were taken for further histological examination. Rabies was excluded using a direct immunofluorescence technique and isolation on cultures of neuroblastoma cells; BSE was excluded using electron microscopical examination (control for the presence of scrapie associated fibrils) and histopathological and immunohistochemical examination of the brain stem (Vanopdenbosch *et al.*, 1998). The histopathological examination showed branching arboriform structures (Fig 1A) in the leptomeninges of the cerebellum. No infiltrative growth could be observed in the underlying brain tissue. The region involving the process was in the cerebello-pontine angle. The structures were visible macroscopically as small granular grayish red masses measuring 1 to 3 cm in diameter and lacking a capsule. The lateral ventricles were dilated but no tumorous process involvement could be noted. The arboriform structures consisted mostly of a single layer of normal-sized cells covering a modest vascular stroma. The nuclei were ovoid and exhibited a mild anisokaryosis. Some hyalinization, hemorrhage and mineralization were also noted (Fig 1B). No mitosis was observed. The fourth ventricle was not involved. Based on these histopathological features, a choroid plexus hyperplasia was diagnosed (Britz *et al.*, 1996; Hirano *et al.*, 1994; Welch *et al.*, 1983).

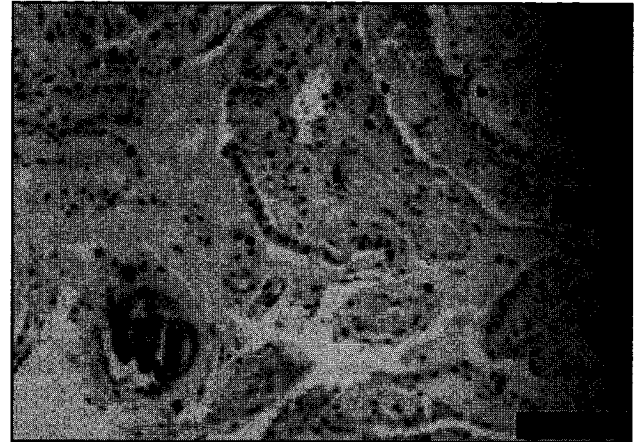


Fig. 2. Some histopathological features of the lesion: single layer of cuboidal cells (a) covering a vascular stroma (b). Hyalinization (c) of the stroma with occasional mineralization associated with the vascular structures (d) was also noted. (Hematoxylin Eosin staining).

Primary intracranial nervous-system tumors in cattle have been infrequently described in the literature (Fankhauser *et al.*, 1974; Yamada *et al.*, 1998). Choroid plexus tumors are rare in animals (Jubb and Huxtable, 1993). They may be papillomas or carcinomas (Cordy, 1990; Koestner and Jones, 1997; Koestner *et al.*, 1999; Storts, 1995; Summers *et al.*, 1995). Neoplasms of this structure have been described in humans, dogs, and occasionally cats.

A papilloma by definition implies a discrete mass; thus, it is distinct from villous hyperplasia, in which diffuse enlargement of the entire choroid plexus can occur (Hirano *et al.*, 1994, Welch *et al.* 1983). In addition, hypertrophy of the choroid plexus implies an increase in the size of the cells comprising the choroid plexus (Britz *et al.*, 1996). Up till now, Yamada *et al.* (1998) have been the only ones to describe a choroid plexus papilloma in detail in a cow. The lesion consisted of a well-defined mass in the fourth ventricle. In man, diffuse villous hyperplasia of the choroid plexus is extremely rare (Britz *et al.*, 1996). In animals, hyalinization and calcification - especially of the choroid plexus - of the lateral ventricles with advancing age is described. Especially in older horses, the formation of tumor-like nodules, usually referred to as cholesteatomas, has been reported (Jubb and Huxtable 1993).

Clinical symptoms are apparently related to increased intracranial pressure, presumably as a result of excess secretion by new growth (Britz *et al.*, 1996; Koestner and Jones, 1997). The onset of the signs may be either sudden or insidious, being manifested by various symptoms such as the loss of equilibrium, weakness in pelvic limbs, incoordination, listlessness,

aggressive behavior, seizures, staggering, circling and, occasionally, sudden death (Koestner and Jones, 1997). The clinical history in the case described by Yamada *et al.* (1998) mentioned symptoms similar to those in our case, including ataxic gait. In addition, their case also showed right side rotatory movement and head-tilt to the right side.

It can be concluded that tumors or tumor-like abnormalities of the choroid plexus must be considered in the differential diagnosis of bovine spongiform encephalopathy.

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