

Collagenous choristoma at the cerebellar peduncle of a Nelore bull

Coristoma colagenoso em pedúnculo cerebelar de um bovino Nelore

Matheus Viezzer Bianchi^{1*}; Gisele Silva Boos²; Lauren Santos de Mello¹; Neusa Barbosa Castro¹; Luciana Sonne³; Saulo Petinatti Pavarini³; David Driemeier³

Abstract

Choristomas are mature normal tissues in abnormal anatomical positions. Reports in domestic animals are uncommon to rare, usually restricted to cattle, with the proliferation of different tissues in various locations, such as subcutaneous tissue, thoracic cavity, retroperitoneal and ocular regions. No age range is predominantly affected, but there are more reports in young cattle. The Laboratory of Veterinary Pathology at the Universidade Federal do Rio Grande do Sul received a brainstem sample of a bull, Nelore breed, 5 years old, from the project of Supplementary Diagnostic Methods of Transmissible Spongiform Encephalopathies (TSEs). The animal presented recumbency at the time of slaughter; was alert, with a complete fracture to the right femur and without neurological signs. On gross examination, there was a white oval firm mass, located caudally to the left caudal colliculus, on the left cerebellar peduncle. In the microscopic examination, there was a well-demarcated area, unencapsulated and composed predominantly of connective tissue fibers (collagen). Immunohistochemical examination for glial fibrillary acidic protein was negative. Due to the gross and microscopic characteristics, a diagnosis of collagenous choristoma at the cerebellar peduncle was established, since the presence of collagen within the brain tissue itself is abnormal.

Key words: Brain, ruminant, tumor-like lesions

Resumo

Coristomas são tecidos normais maduros em posições anatômicas anormais. Relatos em animais domésticos são incomuns a raros, restringindo-se geralmente à espécie bovina, com proliferação de diferentes tecidos em várias localizações, como tecido subcutâneo, cavidade torácica, região retroperitoneal e ocular. Não há uma faixa etária predominantemente afetada, porém há mais relatos em bovinos jovens. O Laboratório de Patologia Veterinária da Universidade Federal do Rio Grande do Sul recebeu uma amostra de tronco encefálico de um bovino Nelore, macho, cinco anos de idade, vinculado ao projeto de Complementação de Métodos Diagnósticos de Encefalopatias Espongiformes Transmissíveis (EETs). O animal apresentava-se no momento do abate em decúbito; estava alerta, com uma fratura completa no fêmur direito e sem sinais neurológicos. No exame macroscópico, observou-se uma massa branca oval, firme, localizada caudalmente ao colículo caudal esquerdo, sobre o pedúnculo cerebelar esquerdo. No exame microscópico, observou-se uma área bem delimitada, não encapsulada, composta predominantemente por fibras de tecido conjuntivo fibroso (colágeno). O exame imuno-histoquímico para proteína ácida fibrilar glial foi negativo. Devido às características macroscópicas e microscópicas, o diagnóstico de coristoma colagenoso foi estabelecido, visto que a presença de colágeno no encéfalo é anormal.

Palavras-chave: Encéfalo, ruminante, lesões tumoriformes

¹ Discentes, Universidade Federal do Rio Grande do Sul, UFRGS, Porto Alegre, RS, Brasil. E-mail: matheusviezzerb@hotmail.com; lauren_mello@hotmail.com; neusa.nbc@hotmail.com

² Discente, Justus-Liebig-Universität Gießen, JLU, Giessen, Alemanha. E-mail: gi_boos@yahoo.com.br

³ Profs., UFRGS, Porto Alegre, RS, Brasil. E-mail: lusonne@yahoo.com.br; sauloppvet@yahoo.com.br; davetpat@ufrgs.br

* Author for correspondence

Introduction

According to Kusewitt (2012), choristomas are composed of normal mature tissue located at an abnormal location, namely, at an ectopic site. These alterations frequently arise from errors in embryogenesis and can be readily distinguished from metastatic lesions by the histological appearance, with choristomas composed of well-differentiated cells. There are no data to suggest that these lesions are more prone to develop into neoplasms (CULLEN et al., 2002).

Case descriptions of choristoma in domestic animals are uncommon to rare (WHITTEN et al., 2006), with reports in cattle (BASSI et al., 2010; BINANTI et al., 2012; BRUDENALL et al., 2008; OLIVEIRA et al., 2009), canines (BENTLEY et al., 2006; WHITTEN et al., 2006) and felines (FRANÇA et al., 2010). In cattle, there are descriptions of different tissues proliferating within the thoracic cavity, diaphragm, retroperitoneal region, adrenal gland region, and subcutaneous tissue (BASSI et al., 2010). The ocular region is another described location for choristomas, frequently termed ocular dermoid, that usually present as a unilateral lesion (BRUDENALL et al., 2008), with a similar low prevalence in all breeds, other than the Hereford (BARKYOUUMB; LEIPOLD, 1984). Oliveira et al. (2009) described a pulmonary choristoma associated with a meningocele in a bovine; however, the animal did not present any neurological signs and the mass was located at the subcutaneous tissue of the frontal region of the skull, preventing cranial symphysis closure. Prevalence studies providing evidence of which age range is the most frequently affected were not found; however, according to Bassi et al. (2010), Brudenall et al. (2008) and Oliveira et al. (2009), choristomas have a higher occurrence in young cattle.

This report described the gross and microscopic features of a collagenous choristoma at the cerebellar peduncle of a bull, as well as the origin and location.

Case Report

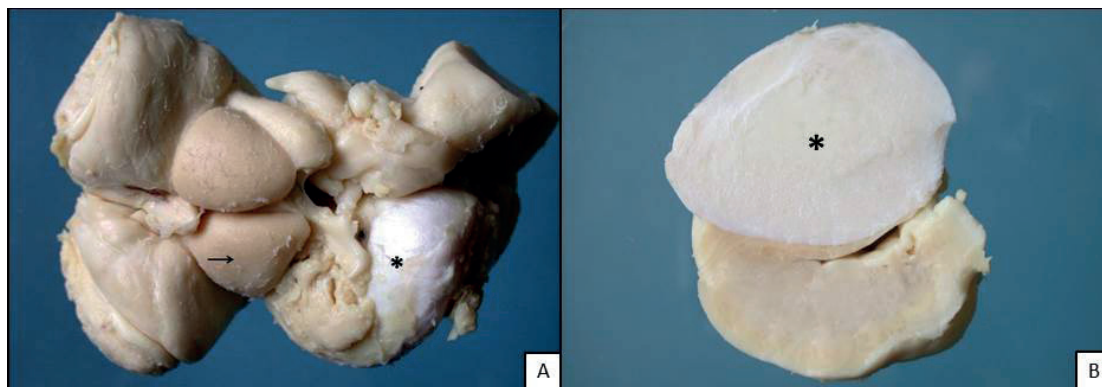
A sample of the brainstem from a slaughterhouse located at Mirassol D'Oeste, Mato Grosso state (MT), under federal meat inspection (SIF) number 2911, was submitted to the Veterinary Pathology Laboratory at the Universidade Federal do Rio Grande do Sul (SPV-UFRGS). This sample was received due to a research project named "Supplementary Diagnostic Methods of Transmissible Spongiform Encephalopathies" (TSE), where samples of brainstem are cut on the obex region, processed routinely, stained with hematoxylin and eosin (HE) and submitted to an anti-prion immunohistochemistry exam (IHC). The sample analyzed was from a bull, Nelore breed, five years of age that presented, at the time of slaughter, was alert with lateral right recumbency and a complete fracture to the right femur. This animal was received at the slaughterhouse alive, without demonstrating neurological signs, according to SIF, and submitted to emergency slaughter. Thereafter, the sample composed of brainstem was trimmed, fixed with 10% formalin solution, processed routinely, embedded in paraffin and sectioned at 3 µm. Staining methods included hematoxylin and eosin (HE) and Masson's trichrome.

The sample was also submitted to IHC analysis using the streptavidin-biotin peroxidase complex. Tissue sections were treated with a 10% hydrogen peroxide in methanol solution for 10 minutes to block endogenous peroxidase activity. Antigenic retrieval was done with Tris-EDTA buffer (pH 9.0) in a water bath for 10 minutes, and tissue sections were later incubated *overnight* at 4°C with polyclonal antibody anti-glial fibrillary acid protein (GFAP), diluted at 1:500 in PBS. After this procedure, tissue sections were incubated with secondary biotinylated antibody linked to streptavidin-peroxidase (LSAB-HRP), for 20 minutes each step. The reaction was stained with 3,3-diaminobenzidine (DAB) and counterstained with Harris' hematoxylin.

On gross examination, there was a white, firm, well-defined, measuring 3 x 4 x 3 cm located caudally to the caudal colliculus, over the left cerebellar peduncle, invading the fourth ventricle

and compressing the mesencephalic aqueduct, which enlarged the third ventricle (Figure 1.A). At the cut section, the mass was uniform, whitish and firm (Figure 1.B).

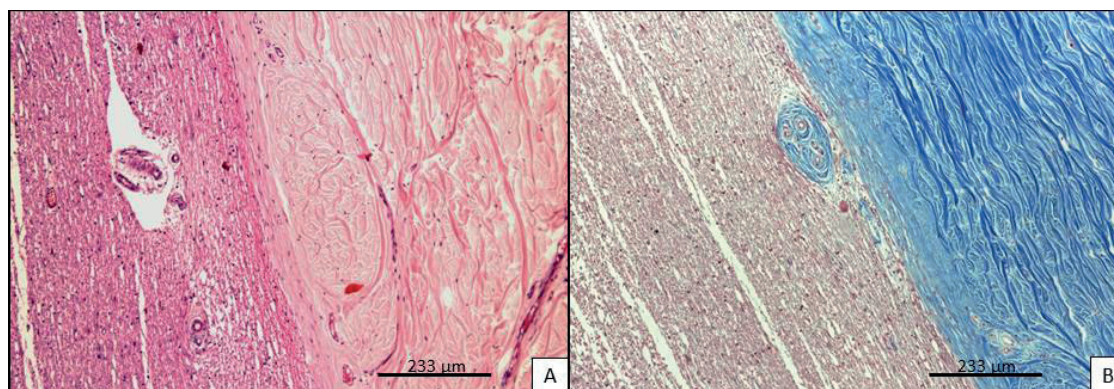
Figure 1.A. Bovine. Collagenous choristoma. White oval mass (asterisk), well circumscribed, measuring 3 x 4 x 3 cm, located caudally to the left caudal colliculus (arrow), over the left cerebellar peduncle. Dorsal view. **B.** Bovine. Collagenous choristoma. On the cut section, the mass was uniform and whitish.



On microscopic examination, there was proliferation of well-circumscribed and unencapsulated tissue composed of fibers of connective tissue (collagen) and mild neovascularization. These fibers were arranged in large bundles, occasionally in whorls, with

a few nucleated cells. These were spindle with eosinophilic cytoplasm, oval to elongated nuclei and scattered chromatin (Figure 2.A and 2.B). This tissue stained strongly with Masson's trichrome, showing distinction from the nervous tissue adjacent to the mass. On IHC, there was no immunostaining for GFAP.

Figure 2. A. Bovine. Collagenous choristoma. Well-circumscribed and unencapsulated tissue composed mainly of fibers of connective tissue (collagen) to the right and mild neovascularization. Hematoxylin and eosin Obj. 10x. **B.** Bovine. Collagenous choristoma. Fibers of connective tissue (collagen) are highlighted to the right with mild neovascularization. Masson's trichrome Obj. 10x.



Due to the gross and microscopic findings, a diagnosis of collagenous choristoma at the cerebellar peduncle was established since the presence of collagen itself in the brain is abnormal. Differential diagnosis of hamartoma and choristoma is essential. Hamartomas are an overabundance of normal tissue in a normal location, while choristomas are normal tissue in an abnormal position (CULLEN et al., 2002), as was observed here. This case reported showed well-differentiated cells that did not invade blood vessels and were well circumscribed; therefore, it was not classified as a neoplasm. There are no reports in the literature of choristomas in the central nervous system (CNS) of cattle. In humans, Park et al. (2008) reported an occurrence of an intradural extracerebral neuroglial choristoma accompanied by nasopharyngeal teratoma and cleft palate in an infant, who presented neurological signs.

The pathogenesis of choristomas is unknown; however, it is speculated that these cells originate from ectopic pluripotent cells, which then have complex proliferation containing a predominant tissue (YOUNG et al., 1990). The mass was located at the cerebellar peduncle, and although the sample did not contain the cerebellum, it is possible that the mass compressed this organ, which may have caused a gait abnormality (ataxia), leading to stumbles and possibly the fracture, thus resulting in the recumbency observed before slaughter. Subcutaneous and ocular choristomas (dermoids) have favorable prognosis because they can be easily removed surgically (BASSI et al., 2010). However, in the bovine reported here, the prognosis would be considered poor due to the compression of the CNS caused by the mass and the difficult surgical approach.

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