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Ovarian Neuroglial Choristoma in a Bitch

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Introduction

Rare malformations known as neurological Christmas are composed of heterotopic mature neural tissue at a location that is not connected to the brain or spinal cord. Neurological choristomas are typically found in the head and neck in humans, with the exception of one recent case that was found in a child's foot. Neurological Christmas in domestic animals are extremely uncommon, having only been found in the retina of a dog, the pharynx and skin of two kittens, and the pharynx of a harbor seal. A cystic lesion that was 2 cm in diameter and growing in the right ovary was found in an intact female Jack Russell Terrier who presented for an elective ovariectomy at the age of three. A mass of well-organized neuroglia tissue was discovered during a histological examination of the lesion. The neuroglial origin of the mass was confirmed by using primary antibodies against, for immunohistochemistry. The dog was clinically normal seven years after the ovariectomy at the time of this writing. This case, along with a recent one that was found in a child's foot, proves that neuroglial choristomas can also be found far from the skull or spine, supporting the idea that they may be caused by an early migration defect in the embryo [1].

Description

The right ovary was expanded histologically by a cystic lesion that measured 2 centimeters in diameter, was well-defined and un-encapsulated, and consisted of well-organized neuroglial tissue with multifocal degeneration and necrosis, partially replacing the ovarian cortex. An optically empty cystic cavity was surrounded by neuroglial tissue and lined inside by ependymal tissue organized into a choroid plexus. Glial cells were present in the fibrillary eosinophilic collagen bundles that made up the lesion. There were three distinct cell types present in the glial cells. Spindle cells with irregular cell borders, a small amount of pale eosinophilic cytoplasm, round nuclei, vesicular chromatin, and nucleoli that resembled astrocytes were one type. The second kind of cells were spindle to polygonal, had a perinuclear halo, and had round, densely basophilic nuclei that looked like oligodendrocytes. Spindle cells with nuclei that resembled microglial cells and were densely basophilic, elongated, or cigar-shaped were the third type. Other large stellate cells with distinct cell borders, abundant basophilic cytoplasm, a central round nucleus with coarsely stippled chromatin, and one prominent nucleolus neuronal bodies were visible within glial cells [2].

Myelinated fibers, the elongated portion of the neurons (axons), could also be seen wrapped in varying degrees of myelin. With the loss of neuroparenchyma, granular eosinophilic necrotic debris, foamy reactive gitter cells multifocally containing intracytoplasmic granular red-brown material (ceroid), fibrin, hemorrhages, and edema replaced the neuropil. Multi-focally within the neuroglial tissue, there were extensive coalescing areas of rarefaction and cavitation. Small focal areas of liquefactive nec spongiosis, dilated myelin sheaths with swollen and degenerate axons forming spheroids, dilated myelin sheaths with necrotic debris and gitter cells (ellipsoids and digestion chambers), and a slight gliosis were also visible. Gemistocytic astrocytes, multinucleated giant astrocytes with nuclei located at the periphery of the cell and frequently polarized to one side of the cytoplasm, and scattered reactive, variably stellate cytoplasmic projections were also visible. Neurons were multi-focally characterized by neuronal swelling or shrinkage and central chromatolysis. There were also occasional necrotic neurons with no nucleus and no nissl substance. Vacuolar degeneration was exemplified by the presence of tiny, optically empty peripheral vacuoles in the cytoplasm of scattered neurons. Finally, a single layer of ciliated polygonal to cubical cells resembling ependymal cells lined the cystic cavity internally. These cells are frequently arranged in papillary structures that project into the lumen and are supported by lose connective tissue and capillaries [3].

Numerous hypotheses have been put forth in the field of human medicine regarding the pathogenesis of neuroglial choristoma. Herniation of a portion of fetal cerebral tissue, which can occur during embryonic development as in the development of encephaloceles with subsequent separation from the cranial cavity has been suggested as the cause of the phenomenon. However, due to the inability to locate the site of the herniation, the authors concluded that neural crest cells in the head and neck, which are capable of undergoing neuroglial development, were the source of glial choristomas. When it comes to glial choristomas of the tongue, the displaced neural tissue that is present early in the occipital somites, which are where the tongue muscles originate, appears to be the most reliable source. It would appear that pluripotent cell nests separate prior to the complete fusion of the neural tube and are transported together with normally migrating cells to extracranial tissues. Alternately, displaced neuroectodermal cells that undergo

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differentiation and ectopic proliferation can be the result of an error in early embryonic development.

Two previous reports have indicated that the ovary of a bitch contains normal neuroglial tissue: By Rota et al. in, and by Pires and others. Ovarian mature monophasic teratoma was identified as the entity in both of these instances However, a benign tumor of the ovary composed of mature tissue derived from at least two embryonic layers (ectoderm, mesoderm, or endoderm) is referred to as a teratoma in human and veterinary medicineIn addition, neuroectodermal tumors of the ovary, also known as monophasic teratomas, were previously referred to in human ovarian pathology as neuroectodermal tumors of the ovary. Having said that, since the present canine case was consistent with normal neuroglial tissue in an ectopic location, the definition of neuroglial choristoma was deemed appropriate. This case, along with a more recent one that was found in a child's foot shows that neuroglial choristomas can also be found far from the skull or spine, supporting the idea that they might be caused by an early embryological migration defect [4,5].

Conclusion

Neuroglial choristomas are exceedingly rare in domestic animals and they have been reported only in the retina of a dog and in the pharynx and in the skin of two kittens. In the present report we described, based on histological and immunohistochemical findings, the first case of ovarian neuroglial choristoma in canine species. This case confirms that neuroglial choristoma may also be found far from the skull or spine and suggests considering this lesion among canine ovarian pathologies.

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