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Pituitary Gland Cyst in a Bull Mastiff Dog

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Abstract

The paper describes the incidence and histochemistry of pituitary cyst in a dog. A nine months old Bull Mastiff male dog was presented for necropsy. On examination of cranial cavity and brain, a thin membranous fluid filled cyst of 2 mm_was found attached with the pituitary gland suprasellar region. Cyst was thin walled with fibrous tissue encircling colloid content of homogenous nature. On histochemistry by Alcian blue-PAS staining, the colloid showed positive for acid mucin. Acid mucin (polysalic acid) derived from embryogenesis constitutes colloidal protein of the pituitary cyst.

Key words: Acid mucin, dog, histochemistry, pituitary gland cyst, Rathke's cyst

Rathke's cyst is a mucus containing pituitary cyst arising from Rathke cleft remnants and located intra and suprasellar region of sella turcica. It arises from Rathke's cleft situated between *pars distalis* and *pars intermedia* of pituitary adenohypophysis. It was reported in humans, dogs and cats. It was recorded mostly as incidental finding during postmortem examination without any nervous manifestations clinically. About 13-44% of Rathke's cysts were found in normal pituitary gland during autopsies (Mukherjee *et al.* 1997; Osborn and Preece, 2006; Trifanescu *et al.* 2012) whereas 13.2 % in dogs and 12.3 % in cats were recorded during necropsies (Polledo *et al.* 2018). It is rare and mostly asymptomatic, occasionally they become space occupying lesion causing pressure to adjacent structures and alter their functions (Schiefer and Hanichen, 1967; Duperrier *et al.* 2022). This paper describes the occurrence of pituitary cyst in a nine months old Bull Mastiff dog as an incidental finding during necropsy with its histochemical property.

A nine months old Bull Mastiff dog was presented for necropsy. Systematic necropsy was conducted. Brain along with pituitary gland were removed by careful dissection and fixed in 10% formalin. Tissue was processed as per standard paraffin embedding technique and 3 µm tissue sections were prepared and stained with haematoxylin and eosin. Duplicate sections were stained with Alcian blue-PAS stain as per standard protocol (Layton and Bancroft, 2019).

On gross examination, brain revealed fluid filled thin sac-like cystic structure (Rathke's cyst) measuring 2 mm in diameter which was adhered to the pituitary gland. Microscopically, the structure composed of fluid filled sac lined with single layer of ciliated columnar epithelium, which was further surrounded by thin fibrous stroma. Under haematoxylin and eosin staining, the cyst composed of homogenous, eosinophilic material. Alcian blue-PAS staining showed arctic coloured cystic fluid, positive for acid mucin.

Rathke's cyst is a benign pituitary cyst of sellar lesion originating from the remnants of Rathke's pouch as a congenital defect. Rathke's pouch forms as a dorsal diverticulum from the ectodermal stomodeum. It extends cranially to form the craniopharyngeal duct. Obliteration of the craniopharyngeal duct is associated with involution of the pouch (Trifanescu *et al.* 2012). Failure of obliteration of the lumen results in the development of cyst (Rosol and Grone, 2016).

Occurrences of Rathke's cysts were reported way back during 1860 and 1913 by Luschka and Goldzieher, respectively from postmortem as incidental finding (Ringel and Bailey, 1972; Teramoto *et al*., 1994; Trifanescu *et al.* 2012). Among the dogs, the incidence was reported to be high in brachicephalic breeds (Ringel and Bailey, 1972; Polledo *et al.* 2018) which was substantiated with the present report of pituitary cyst in a brachiocephalic Bull Mastiff breed. On contradictory, present report is documented in a 9 months old dog as compared to previous report with mean average age of 7 years (5-9 years). Cysts of pituitary varied in size ranged from 1.6 to 2.7 mm (Polledo *et al.* 2018) and reached up to 50 mm (Mukherjee *et al.* 1997). The cystic content was thick and

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Fig 1. Thin membranous fluid filled cyst (2 mm) attached with the pituitary gland.

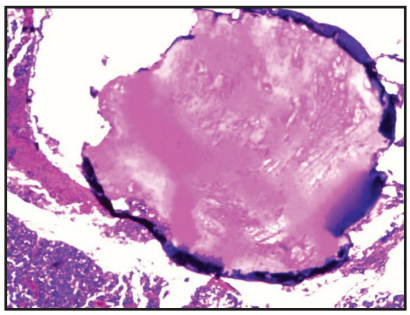

Fig 2. Cyst with homogenous, eosinophilic content attached to *pars distalis* (arrow) - H&E x40

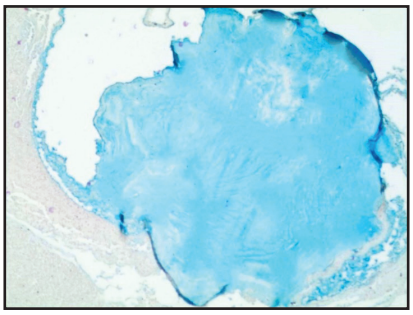

Fig 3. Arctic coloured acid mucin positive – Alcian blue-PAS stain x40

composed of colloid made of cholesterol and protein (Karavitaki and Wass, 2009).

The histochemistry using Alcian blue-PAS staining of pituitary cyst in the present case concluded that the colloid content was primarily composed of acid mucin on par with mucin of digestive and respiratory tract. Acid mucin was negatively charged. It contained carbohydrates with carboxylate (COO-) or sulphonate (SO3) groups, both of these ionized at a physiologic pH to produce an overall negative charge on these mucin molecules. Acid mucin form either simple (carboxyl) or complex (sulfated) group. Amidst various acid group in the body, polysialic acid was documented to be greater significance in brain and immune cell development during embryogenesis (Schnaar *et al*. 2014; Villanueva-Cabello *et al*. 2022). Hence, based on the above evidence we suggested that acid mucin of pituitary gland might be composed of polysialic acid which was derived during neurogenesis from embryo.

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