Division of Neurological Sciences

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Clinicopathological features of canine “paediatric” gliomas

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Introduction/Material and Methods

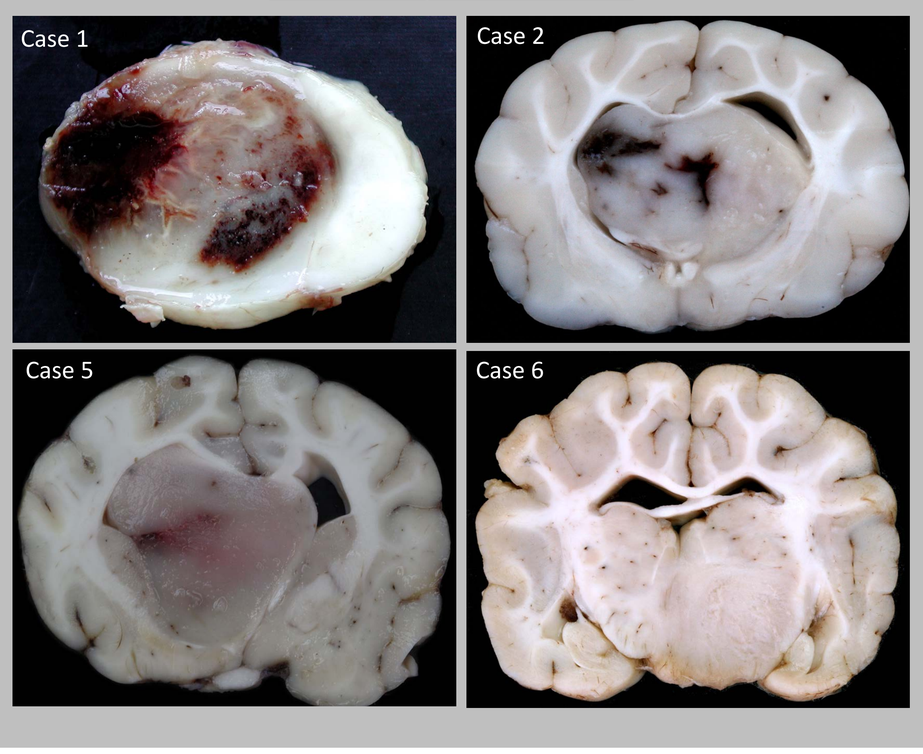
Primary CNS tumours are the most common solid tumours in children, with gliomas accounting for approximately one third. Gliomas are the most common CNS tumours in adult dogs, occurring at a median age of 8 years and most commonly in predisposed breeds (e.g. Boxers, Bulldogs, Boston Terriers), but they have rarely been reported in puppies. Therefore, this study describes the clinicopathological features of canine “paediatric” gliomas based on a case series of six dogs < 1 year of age with a diagnosis of glioma that were collected from the neuropathological archive of the Division of Neurological Sciences.

Results

Anamnestic and clinical data of canine „paediatric“ glioma cases

Case	1	2	3	4	5	6
Breed	Dobermann	Chihuahua	Newfoundland dog	Boxer	Cavalier King Charles	Jack Russel Terrier
Age at first diagnosis (months)	6	4	8	9	9	5
Survival time (days)	90	4	9	19	1592	unknown
Sex	f	f	m	m	f	m
Cranial nerve deficits	x	x		x		x
Proprioceptive deficits	x		x	x		
Head tilt	x					x
Ataxia	x		x	x		x
Seizures					x	
Facial twitching				x		
Pain					x	
Altered mentation		x	x	x		
Recumbency		x	x	x		
Opisthotonus		x				
Pyrexia			x	x		
Tachypnea			x			

Macroscopical features



Neuropathological features of of canine “paediatric“ glioma cases

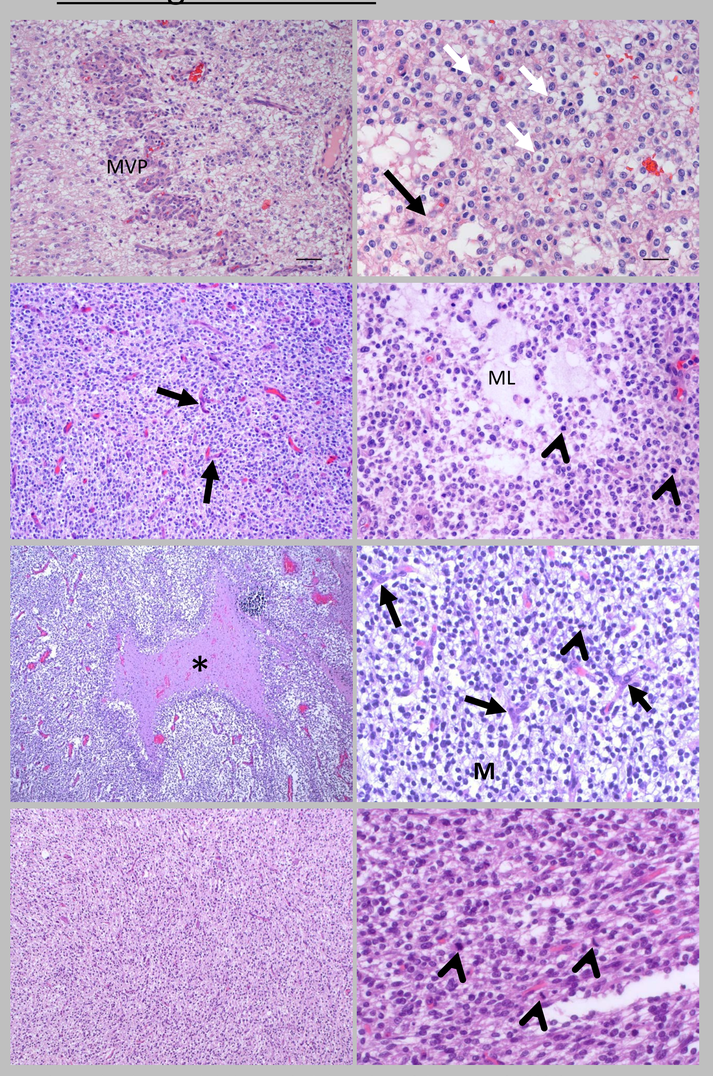
Case	Glioma type (Grade)	Glioma location	Midline	Growth	Mitoses/10 HPF	MVP	Necrosis	IHC GFAP	IHC Olig-2
1	oligodendroglioma (III)	Medulla oblongata, C1	n	circumscribed	1	+	+	-	+
2	oligodendroglioma (III)	Septum, fornix, lateral ventricles	y	circumscribed	30	-	+	-	+
3	oligodendroglioma (III)	Septal nuclei, lateral ventricles	y	circumscribed	4	+	+	-/+	+
4	oligodendroglioma (III)	Piriform and temporal lobe	n	circumscribed	1	+	-	-	+
5	oligodendroglioma (III)	Septal nuclei, left lateral ventricle	y	circumscribed	2	+	+	-/+	+
6	astrocytoma (III)	Midbrain, thalamus	n	circumscribed	7	-	-	+	+

* MVP: Microvascular proliferation

Summary of results

- All “paediatric” gliomas were circumscribed/compact and high grade.
- All “paediatric” gliomas showed typical histopathological features of adult gliomas.
- Most were high-grade (III) oligodendrogliomas.
- Only one “paediatric” glioma was hemispheric, all others were midline, deep and/or infratentorial.
- This series contained only one case in a glioma-predisposed breed (Boxer)
- Survival time varied widely (4-1592 days)

Histological features



MVP: microvascular proliferation. M: mucinous background. ML: mucin lakes. Asterisk: necrosis. White arrows: perinuclear halo (honeycomb pattern). Black arrows: delicate chicken wire vessels. Black arrowheads: Mitotic figures.

Conclusions

- The high proportion of high-grade oligodendrogliomas in puppies reflects the high prevalence of high-grade oligodendrogliomas in adult dogs and contrasts with the high rates of low-grade and astrocytic subtypes in human paediatric gliomas.
- Similar to human paediatric gliomas, puppy gliomas tended to occur in infratentorial or deep brain areas, often near the midline.
- Known susceptible breeds were not over-represented in this puppy population.
- These observations suggest molecular differences in oncogenesis between "paediatric" and adult gliomas in dogs.
- Genetic alterations and potential differences in the molecular landscape compared to adult canine gliomas remain to be determined.

References:

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