Table S1- Minimum Sequences and Parameters Used for Brain MR Imaging (1.5T)

Sequence Name	TR (ms)	TE (ms)	FA (º)	FOV (mm)	Matrix	Voxel (mm)	Slice Thk (mm)	Gap (%)	Notes
2D T2W Sag TSE	>2500	100-120	90/≥160	≤150	≥256	0.58 X 0.58 X 3	3	10	
2D T2w Trans TSE	>2500	100-120	90/≥160	≤150	≥256	0.58 X 0.58 X 3	3	10	
3D T1W IR-GRE	5-25	2.4-4.5	10-20	≤150	≥150	1 mm isotropic	1	0	TI = 400-450 ms
2D T2*W Trans GRE	500-1050	16-26	18-20	≤150	≥256	0.58 X 0.58 X 3	3	10	
2D T2W FLAIR TSE	>6000	92-140	90/≥160	≤150	≥256	0.58 X 0.58 X 3	3	10	TI =2000-2800 ms
2D DWI SS-EPI Inject contrast	>5000	minimal	90/180	≤150	128	1.2 X 1.2 X 4	≤ 4	0	b value of 0 and 1000
3D T1w IR-GRE +C	5-25	2.4-4.5	10-20	≤150	≥150	≤ 1 mm isotropic	1	0	TI = 400-450 ms

Table S1 Key: TR- time of repetition; ms- milliseconds; TE- time of echo; FA- flip angle; FOV- field-of-view; Slice thk- slice thickness; Gap- interslice gap; 2D- two dimensional; T2W- T2-weighted; Sag- sagittal; TSE- turbo spin echo; 3D- three dimensional; T1W- T1-weighted, IR- inversion recovery; GRE- gradient recalled echo, TI- time of inversion; T2*W- T2*-weighted, FLAIR- fluid attenuated inversion recovery, DWI- diffusion weighted imaging; SS-EPI- single shot echo planar imaging; +C- post contrast medium administration. Adapted from Packer et. al., 2018.[7]

Table S2- Summary of Linear and Volumetric Criteria Used to Assign Therapeutic Responses in Canine Gliomas

	RECIST (1D)	RAVNO (2D)	Total T2W Tumor Volume (TTV)	Contrast Enhancing Tumor Volume (CEV)
Complete Response (CR)				
• **Imaging criteria**	Elimination of all enhancing tumor	Elimination of all enhancing tumor; Stable or decreased T2/FLAIR lesion burden; No new lesions	Elimination of entire T2W tumor burden	Elimination of all enhancing tumor
• **Clinical criteria**	Not applicable	Stable or improved clinical status; Dog not receiving steroids; All of the above required for CR	Stable or improved clinical status; Dog not receiving steroids	Stable or improved clinical status; Dog not receiving steroids
Partial Response (PR)				
• **Imaging criteria**	≥30% decrease in LD	>50% decrease in enhancing tumor SPD; Stable or decreased T2/FLAIR lesion burden; No new lesions	≥65% decrease in TTV	≥65% decrease in CEV
• **Clinical criteria**	Not applicable	Stable or improved clinical status; Stable or decreased steroid dose; All of the above required for PR	Stable or improved clinical status; Stable or decreased steroid dose	Stable or improved clinical status; Stable or decreased steroid dose
Stable Disease (SD)				
• **Imaging criteria**	All other findings	<50% decrease or <25% increase in enhancing tumor SPD; Stable or decreased T2/FLAIR lesion burden; No new lesions	All other findings	All other findings
• **Clinical criteria**	Not applicable	Stable or improved clinical status; Stable or decreased steroid dose; All of the above required for SD	Stable or improved clinical status; Stable or decreased steroid dose	Stable or improved clinical status; Stable or decreased steroid dose
Progressive Disease (PD)				
• **Imaging criteria**	≥20% increase in LD	>25% increase in enhancing SPD; Increased T2/FLAIR lesion burden; New lesion(s) present	≥40% increase in TTV	≥40% increase in CEV
• **Clinical criteria**	Not applicable	Clinical deterioration; Any of the above qualifies as PD	Clinical deterioration	Clinical deterioration

Table S3- Tumor Measurement Efficiency by Rater, Method, and Batch

	1D RECIST	2D RAVNO	TTV	CEV
Rater 1, Batch 1	2.04 (.59)	6.08 (1.52)	5.22 (1.23)	10.24 (1.9)
Rater 1, Batch 2	1.72 (.6)	6.92 (1.74)	5.80 (1.2)	9.56 (1.63)
Rater 2, Batch 1	3.24 (.58)	7.88 (1.84)	7.92 (1.38)	17.80 (3.65)
Rater 2, Batch 2	2.72 (.66)	7.84 (1.73)	7.36 (1.57)	15.84 (3.06)
Rater 3, Batch 1	3.28 (.77)	8.6 (1.44)	8.4 (1.32)	25.36 (5.61)
Rater 3, Batch 2	2.64 (.62)	6.56 (1.69)	5.84 (1.41)	16.64 (3.17)

Data presented as mean (SD) of measurement time in minutes; n=25 MRI analyzed/batch

Figure S1

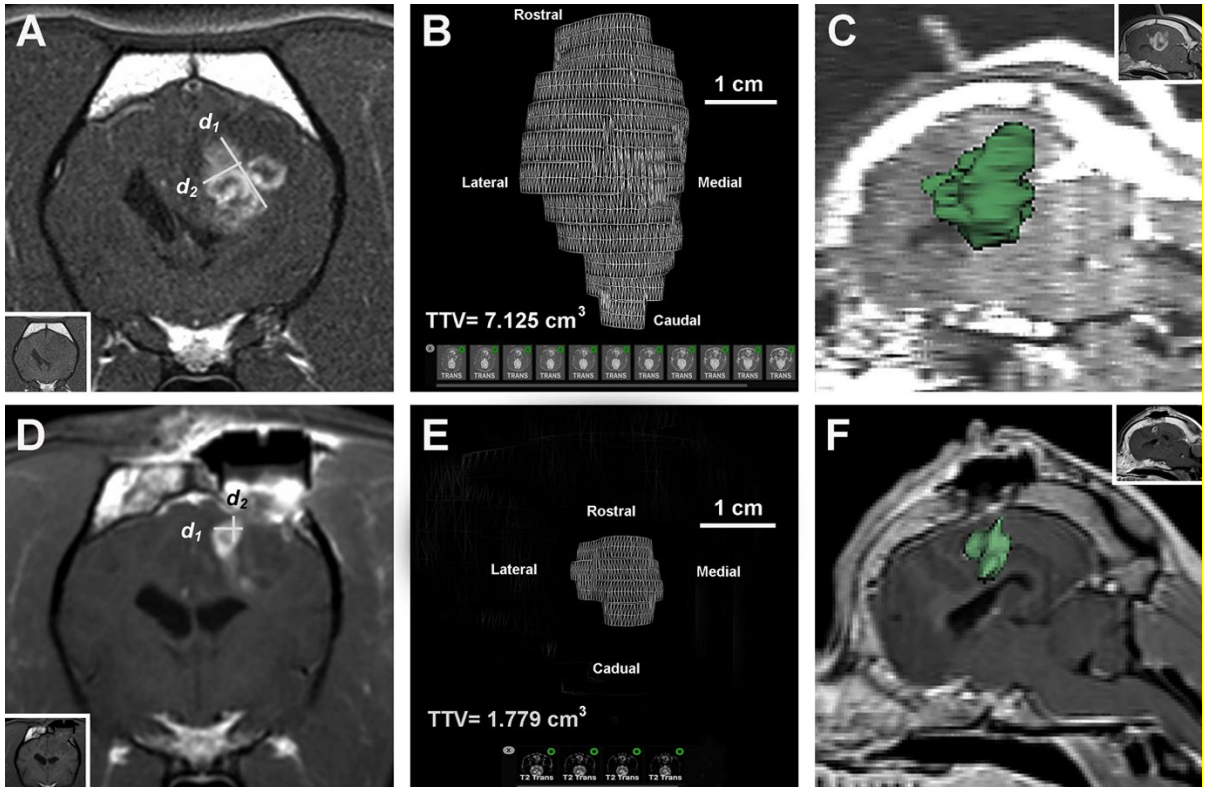

Figure S1 Legend- Partial response (PR) determined in a dog with a contrast-enhancing astrocytoma. Compared to baseline measurements (**A**-**C**), a reduction in tumor size meeting criteria for PR is evident on the followup scan (**D**-**F**) using 1D RECIST (*d1*; **A, D**) 2D RAVNO (*d1* x *d2*; **A, D**), dorsal planar reconstructed total tumor volume (TTV; **B**, **E**), and contrast-enhancing volume (CEV [green]; **C, F**) measurements. Insets of **A** and **D** are pre-contrast T1W images and are T1W post-contrast images in **C** and **F**.

Figure S2

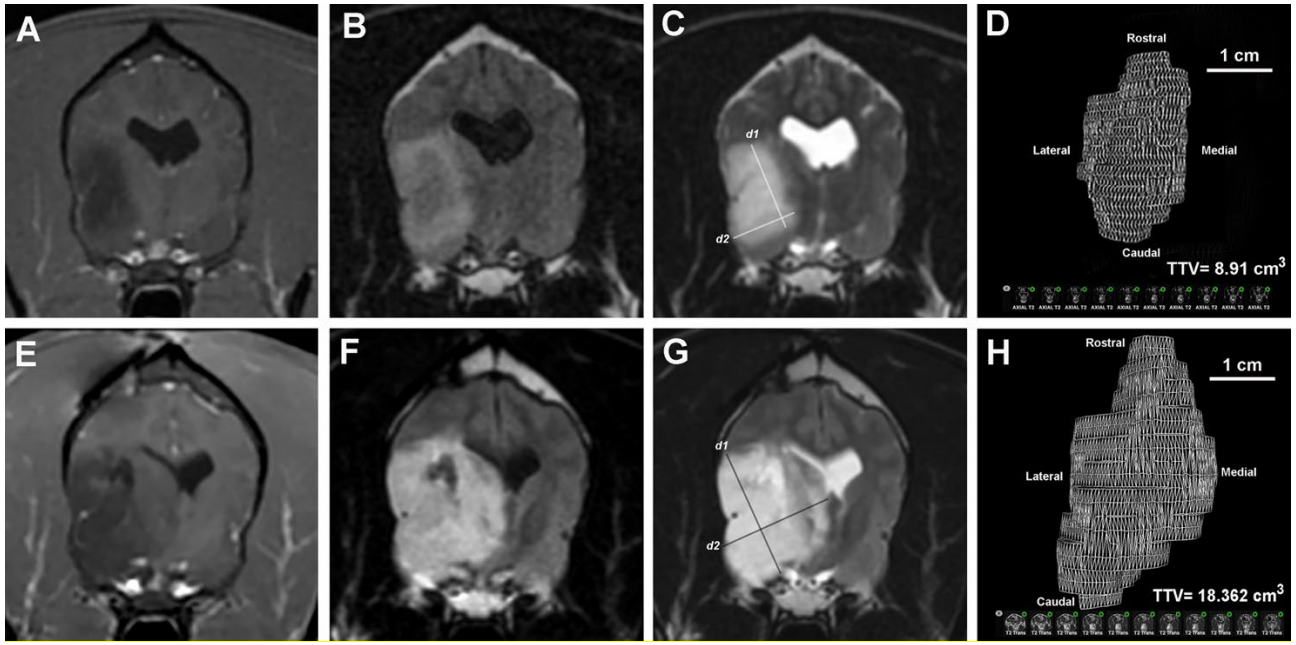

Figure S2 Legend- Progressive disease (PD) with quantitative measurements obtained from T2-weighted (T2W) images in a dog with a non-enhancing, high-grade oligodendroglioma. Compared to the tumor nadir measurements (**A**-**D**), an unequivocal increase in tumor size meeting criteria for PD is evident on the followup scan (**E**-**H**) using 1D RECIST (*d1*; **C, G**), 2D RAVNO (*d1* x *d2*; **C, G**), and dorsal planar reconstructed total tumor volume (TTV; **D**, **H**) measurements. Qualitative evaluations included review of T1-weighted post-contrast images (**A**, **E)**, fluid attenuated inversion recovery images (**B**, **F**), and T2W images (**C**, **G**).