

# VENTRICULAR MEASUREMENTS TO QUANTIFY CANINE HYDROCEPHALUS IN THE ASSESSMENT OF BRAIN VENTRICULAR ENLARGEMENT

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**Introduction** : Assessment of brain ventricular enlargement in case of absent space occupying lesions is made difficult because of the varying size of brain ventricles shown by CT scanning in the dog. Ventricular measurements obtained from CT images shall provide sufficient data of normal and abnormal ranges in both mesati- and brachycephalic dogs to draw limits between normal, borderline, and abnormal appearance.

**Materials and Methods** : 104 complete canine brain studies were evaluated retrospectively. The mesati- and brachycephalic patients were divided into 3 groups each of clinically normal and CT-normal (M0, B0), neurologically abnormal but CT-normal (M1, B1), and both neurologically and CT-abnormal (M2, B2) dogs. At 5 determined levels a, b, b\*, c, and d the diameters of all ventricular structures found within the image were obtained. The data were listed to calculate indices and ratios, some of which had been derived from human brain. The ventricle:skull ratio was related of each section of the ventricular system to the inner diameter of the skull of the very same plane. Spaulding&Sharp's calculations SSC were compared to other measurements like frontal horn index FHI, cella media index CMI, and Huckman number HN.

**Results** : Values and thresholds of the ventricle:skull ratio VSR as determined normal, borderline, or abnormal are listed in the table below. Relating Spaulding&Sharp's calculations onto these data, most of the dogs in all groups showed ventricular systems within normal range, although there were space occupying masses found. Applying FHI, CMI and HN led to opposite results; nearly all of the brachycephalic dogs and many of the mesaticephalic dogs were considered hydrocephalic, although not all of them were clinically apparent.

Ventricle:skull ratio VSR (%) distance at level (...)	mesaticephalic dogs			brachycephalic dogs		
	normal	<i>borderline</i>	enlarged	normal	<i>borderline</i>	enlarged
frontal horn height (a)	<5	-	>8	<10	-	>15
frontal horn width (a)	<5	-	>7	<5	-	>10
cella media height (b)	<8	-	>10	<10	-	>15
cella media width (b)	<10	-	>15	<10	-	>15
temporal horn height (c)	<8	-	>10	<5	-	>10
temporal horn width (c)	<10	-	>15	<10	-	>15
temporal horn tip (b*)	<5	-	>8	<5	-	>10
3 <sup>rd</sup> ventricle (b)	<6	-	>8	<8	-	>10
suprapineal recessus (c)	<8	-	>10	<6	-	>8
aqueduct (c)	<3	-	>4	<4	-	>6
fourth ventricle (d)	<3	-	>4	<4	-	>6
<b>Indices</b>						
frontal horn index FHI	> 5.0	-	<4.0	> 5.0	-	<4.0
cella media index CMI	>2.5	-	<2.4	>2.5	-	<2.4
Huckman number HN	<25	-	>29	<29	-	>33

**Conclusions** : The grade of hydrocephalus expressed as VSR is more sensitive than subjective grading alone; in borderline cases calculation of FHI, CMI, or HN is helpful to make a decision.