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The prevalence of Chiari-like malformation and Syringomyelia in several toy breeds in the Netherlands

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Introduction

Chiari-like malformation (CM) is caused by herniation of the cerebellum through the foramen magnum (Rusbridge et all, 2009), figure 1. The herniation might be the result to the apparent mismatch in volume between the caudal brain structures and the caudal skull (Carrera et all, 2009).

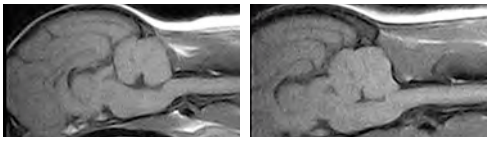

Figure 1. Left: Transversal mri of a dog with a normal round-shaped cerebellum. Right: Transversal mri of a dog with a herniation of the cerebellum.

Syringomyelia (SM) is defined as a dilatation of the central canal, larger than 2 mm (Mandigers, Rusbridge, 2009), figure 2. Until now several hypotheses have been raised addressing the pathogenesis of SM. It is generally believed that SM and CM are two disorders associated with each other and that they are not separate diseases.

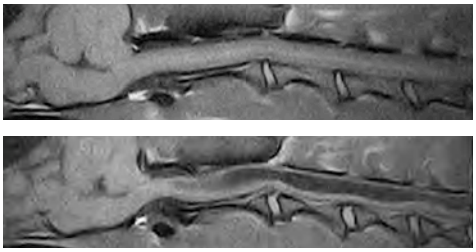

Figure 2: Transversal mri of a dog with a normal spinal cord and a transversal mri of a dog with syringomyelia

Most of our knowledge comes from studies performed in the Cavalier King Charles Spaniel (CKCS) and the Griffon breeds. Recently we analysed over 1000 MRI scans obtained from CKCS and except for one all suffered from CM and 70% of all CKCS had some degree of SM.[2] This study focuses on other toy breeds depicted in table 1.

Aim of the study:

The aim of this study is to investigate the prevalence of CM and SM in several toy breeds in the Netherlands.

Material and methods

A total of 2000 MRI scans (made between 2002-2012) were available for analysis. The scans were obtained from the various MRI centre in the Netherlands. Only 236 scans were suitable for evaluation.

References:
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2. Eggelmeijer W., Mandigers P. Prevalence of Chiari-like malformation and Syringomyelia in Cavalier King Charles Spaniels in the Netherlands between 2004 and 2012. Students thesis FVM-UU, Utrecht 2013
3. Mandigers P, Rusbridge C. Chiari-like malformation--syringomyelia in the Cavalier King Charles Spaniel. TijdschrDiergeneeskd. 2009; 134(18):746-5
4. Rusbridge C, MacSweeny JE, Davies JV, Chandler K, Fitzmaurice SN, Dennis R, et al. Syringohydromyelia in Cavelier King Charles Spaniels. J am Anim Hosp Assoc 2000; 36 (1): 3441.

Results

CM and SM was observed in several toy breeds. The number of avalaible scans was sadly enough low in several breeds. Only in five breed numbers allowed a statistical analysis (Table 2).

Breed	Number of dogs	Median in years	Range in years
Chihuahua	35	4.01	0.25 - 10.4
Chinese Crested	1	8.1	8.1
Miniature Pinscher	3	7.1	1.23 – 13.05
Miniature Schnauzer	3	4.6	1.53 – 9.01
English Bulldog	4	7.4	4.4 – 9.5
French Bulldog	85	4.2	0.56 – 9.5
Griffon	26	3.42	0.56 – 8.37
Japanese Chin	5	2.36	1.01 – 3.46
Maltese	15	5.32	0.51 – 12.3
Pug	8	3.12	0.43 – 7.53
Pekingese	2	6.78	4.22 – 9.36
Shih Tzu	4	5.74	4.6 – 7.5
Silky Terrier	1	1.47	1.47
Staffordshire	1	0.57	0.57
Dachshund	23	6.57	0.2 – 12.86
Toy Poodle	1	0.75	0.75
Yorkshire Terrier	19	5.99	0.33 – 13.42
Pomeranian	1	4.74	4.74

Table 1. Number of dogs, range and median in years

	Clear	Only CM	Only SM	CM & SM
French Bulldog	45	19	12	24
Chihuahua	23	23	11	43
Griffon	15	39	4	42
Dachshund	57	30	13	0
Yorkshire Terrier	10	37	21	32

Table 2. Percentage of CM and SM in several toy breeds. Note that SM was observed in several breeds with or without CM. French bulldog (n=88), Chihuahua (n=35), Griffon (n=26), Dachshund (n=23), Yorkshire Terrier (n=19).

Discussion

CM and SM do occur in several toy breeds but only in five breeds the number of cases was high enough for a reliable statistical analysis. Apparently CM and SM does occur also in other brachycephalic breeds like the French Bulldog, Chihuahua, Dachshund, and Yorkshire terrier. CM was seen with and without SM as seen in the CKCS. But interestingly SM was also seen in dogs without CM.

The rather high prevalence of CM and SM in toy breeds makes that the two disorders are of interest for both breeders and veterinarians. These results of this study may suggest that CM is not the primary cause of SM as published earlier.

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