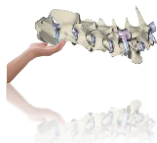


Feeding the giant puppy



Wobbler or not Wobbler?

Two case studies on neurological issues and related nutritional support

Maria Grazia Cappai (Resident), Annette Liesegang (Supervisor),
M.A. Evangelisti (ODV), M. Di Todaro (ODV), M.L.G. Manunta (ODV)



Name: **Leo (Lion)** ♂
Breed: **English Mastiff**
Age: **7 months**
Body weight: **40 kg**
Estimated adult BW: **75-80**



Name: **Luna d'argento (silvery Moon)** ♀
Breed: **Neapolitan mastiff**
Age: **8 months**
Body weight: **44 kg**
Estimated adult BW: **~65**



At present belongs to Pinscher and Schnauzer

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Symptoms reported by the owner

Swaying **ATAXIA** **LOSS OF**
Reluctance to movement Abnormal behaviour
Slippery walk **APPETITE**

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Clinical and instrumental investigation

Anamnestic data

Leo had a history of cystitis and currently under antibiotic therapy but since ten days displayed such "behavioural anomalies"

Luna no other symptoms before those happening since more than one week.

General physical data:
Body temperature: 38.5 °C
HB/min: 100
Breath rate/min: 20
Mucosa: normal
Responsiveness: normal
Hip displasia: negative

General physical data:
Body temperature: 38.5 °C
HB/min: 85
Breath rate/min: 16
Mucosa: normal
Responsiveness: normal
Hip displasia: negative

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Clinical and instrumental investigation

Diet information

Both of dogs did not follow individual dietary prescriptions but owners tended to feed commercial dry food for giant puppies, following manufacturer indications. BUT, in both cases (more frequently with Leo), feeding consisted also of home made food without balanced rations.

Meanwhile, biochemical and hematological exams running

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Clinical and instrumental investigation

Nutritional and developmental (muscle, joint and bones) checks

Both the dogs were evaluated to have a harmonic development for the growth stage and the body condition appeared to be adequate

Muscle masses condition (0-3 points scale) of the pelvic limb appeared low (Leo: 1.5; Luna: 1)

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Clinical and instrumental investigation

Neurological investigation

•Esteroeption was conserved.

•Anomalies of spinal reflexes of the front and rear legs:

Leo

PROPRIOCEPTION OF REAR: diminished
PATELLAR REFLEX (L4-L6): exaggerate
TIBIAL REFLEX (L4-L6): exaggerate

Luna

FLECTION OF FRONT LEG (C6-T2): diminished
PATELLAR REFLEX (L4-L6): absent

•Magnetic resonance was conducted

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Results of biochemical analysis



| REF: 100 (LACT/HEMO) | | | | | | | | | | |
|----------------------|--------|-------|-----------|---------------|--------|--------|-----------|----------------------|--------|--------|
| Parameter | Result | Unit | Reference | Parameter | Result | Unit | Reference | Parameter | Result | |
| Glucose | 100 | mg/dL | 70-110 | Urea | 10 | mg/dL | 7-15 | Calcium | 10 | mg/dL |
| BUN | 10 | mg/dL | 7-15 | Creatinine | 0.5 | mg/dL | 0.3-1.0 | Phosphorus | 5 | mg/dL |
| Alb | 4.5 | g/dL | 3.5-5.0 | ALT | 10 | U/L | 0-40 | Alkaline Phosphatase | 100 | U/L |
| AST | 10 | U/L | 0-40 | Gamma-GT | 10 | U/L | 0-40 | Cholesterol | 100 | mg/dL |
| TP | 7.5 | g/dL | 6.0-8.0 | Triglycerides | 10 | mg/dL | 0-40 | Protein | 7.5 | g/dL |
| Albumin | 4.5 | g/dL | 3.5-5.0 | Iron | 100 | µg/dL | 50-150 | Iron | 100 | µg/dL |
| Cholesterol | 100 | mg/dL | 0-40 | Copper | 10 | µg/dL | 0-10 | Copper | 10 | µg/dL |
| Triglycerides | 10 | mg/dL | 0-40 | Zinc | 100 | µg/dL | 0-100 | Zinc | 100 | µg/dL |
| Protein | 7.5 | g/dL | 6.0-8.0 | Magnesium | 10 | mg/dL | 0-10 | Magnesium | 10 | mg/dL |
| Albumin | 4.5 | g/dL | 3.5-5.0 | Sodium | 140 | mmol/L | 135-145 | Sodium | 140 | mmol/L |
| Cholesterol | 100 | mg/dL | 0-40 | Potassium | 4.0 | mmol/L | 3.5-5.0 | Potassium | 4.0 | mmol/L |
| Triglycerides | 10 | mg/dL | 0-40 | Chloride | 100 | mmol/L | 95-105 | Chloride | 100 | mmol/L |
| Protein | 7.5 | g/dL | 6.0-8.0 | CO2 | 20 | mmol/L | 18-22 | CO2 | 20 | mmol/L |
| Albumin | 4.5 | g/dL | 3.5-5.0 | pH | 7.4 | | 7.35-7.45 | pH | 7.4 | |
| Cholesterol | 100 | mg/dL | 0-40 | Base Excess | 0 | mmol/L | -2-2 | Base Excess | 0 | mmol/L |
| Triglycerides | 10 | mg/dL | 0-40 | Base Deficit | 0 | mmol/L | -2-2 | Base Deficit | 0 | mmol/L |
| Protein | 7.5 | g/dL | 6.0-8.0 | Base Excess | 0 | mmol/L | -2-2 | Base Excess | 0 | mmol/L |
| Albumin | 4.5 | g/dL | 3.5-5.0 | Base Deficit | 0 | mmol/L | -2-2 | Base Deficit | 0 | mmol/L |

| Sample | Result | Unit | Reference | Sample | Result | Unit | Reference |
|---------------|--------|-------|-----------|---------------|--------|--------|-----------|
| Glucose | 100 | mg/dL | 70-110 | Urea | 10 | mg/dL | 7-15 |
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| Cholesterol | 100 | mg/dL | 0-40 | Copper | 10 | µg/dL | 0-10 |
| Triglycerides | 10 | mg/dL | 0-40 | Zinc | 100 | µg/dL | 0-100 |
| Protein | 7.5 | g/dL | 6.0-8.0 | Magnesium | 10 | mg/dL | 0-10 |
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| Cholesterol | 100 | mg/dL | 0-40 | Potassium | 4.0 | mmol/L | 3.5-5.0 |
| Triglycerides | 10 | mg/dL | 0-40 | Chloride | 100 | mmol/L | 95-105 |
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| Cholesterol | 100 | mg/dL | 0-40 | Base Excess | 0 | mmol/L | -2-2 |
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| Protein | 7.5 | g/dL | 6.0-8.0 | Base Excess | 0 | mmol/L | -2-2 |
| Albumin | 4.5 | g/dL | 3.5-5.0 | Base Deficit | 0 | mmol/L | -2-2 |

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Wobbler or not Wobbler?

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Results of Magnetic Resonance



Leo

Hyperdense vertebral image in C6, T1 and T2

Luna

Spinal cord compression C1-C2

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Cervical spondylomyelopathy (Wobbler disease)

There are few diseases in veterinary medicine that have been referred to 14 different names.

Wobbler syndrome,
Caudal cervical spondylomyelopathy,
Cervical spondylopathy,
Cervical spondylopathy disc associated compression,
Cervical vertebral instability,
Cervical malformation/malarticulation syndrome,
Cervical spondylolisthesis,
Cervical stenotic myelopathy,
Disc-associated wobbler syndrome,
Cervical spinal stenosis,
Cervical subluxation,
Cervical vertebral instability-malformation syndrome,
Cervical spondylotic myelopathy



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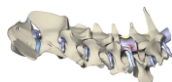
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Cervical spondylomyelopathy (Wobbler disease)

Not only developmental orthopedic disease of long bones but also cervical tracts involvement with neurological signs

Cervical spondylomyelopathy (CSM) is a common disease of the cervical spine of large and giant breed dogs

CSM is characterized by dynamic and static compressions of the cervical spinal cord, nerve roots, or both, leading to variable degrees of neurologic deficits and neck pain.



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Cervical spondylomyelopathy (Wobbler disease)

Not only developmental orthopedic disease of long bones but also cervical tracts involvement with neurological signs

CSM is a controversial disease.

The pathogenesis, diagnosis, and treatment of CSM are also controversial.

However
Something we have to deal with!!

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Cervical spondylomyelopathy (Wobbler disease)

ETIOLOGY

The etiology of CSM is *still unknown*. Proposed etiologies include genetic, congenital, body conformation and nutrition

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Cervical spondylomyelopathy (Wobbler disease)

ETIOLOGY

The etiology of CSM is *still unknown*. Proposed etiologies include genetic, congenital, body conformation and nutrition

Genetic

Many investigators have proposed a genetic origin (*controversial*)

Congenital

A study of neonatal Dobermans investigated the computed tomography (CT) features of the cervical spine in 27 dogs (*plausible, stenosis of the canal, epidemiology supports*)

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Cervical spondylomyelopathy (Wobbler disease)

ETIOLOGY

The etiology of CSM is *still unknown*. Proposed etiologies include genetic, congenital, body conformation and nutrition

Body Conformation

Body conformation has been proposed as a predisposing factor (*unlikely*)

Nutrition

Dietary factors, including overfeeding and excessive dietary calcium, were implicated as contributory factors in Great Danes (*controversial*)

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Cervical spondylomyelopathy (Wobbler disease)

ETIOLOGY

?

THERAPY

???

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Cervical spondylomyelopathy (Wobbler disease)

Osseous associated CSM

CSM is seen predominantly in young adult giant breed dogs. Because the disease is seen at an earlier age, a congenital cause might be likely or early appearing.

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Cervical spondylomyelopathy (Wobbler disease)



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University of Zurich^{un}

Cervical spondylomyelopathy (Wobbler disease)

An important mechanism to explain the development of clinical signs in dogs with either disc- or osseous-associated CSM is the concept of **dynamic lesions**.

CSM can affect dogs of all ages and breeds, even small dogs, albeit uncommonly

Although most affected Dobermans tend to be middle-aged, Great Danes and giant breeds (**Mastiffs**, Rottweilers, Bernese, and Swiss Mountain dogs) are usually **younger**

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University of Zurich^{un}

Cervical spondylomyelopathy (Wobbler disease)

Proprioceptive ataxia is seen in most dogs with CSM. Dogs with lesions in the cranial or midcervical spine tend to present with ataxia affecting all 4 limbs more equally. However, affected dogs typically have obvious pelvic limb ataxia.

The **pelvic limb reflexes** will be normal to **increased** (this is the case with Leo but not with Luna!)

Many neurologic diseases can cause at least one of these signs, and the primary differentials to consider are spinal neoplasia, intervertebral disc disease, trauma, discospondylitis, vertebral osteomyelitis, meningitis or meningomyelitis, synovial or subarachnoid spinal cysts, fibrocartilaginous embolic myelopathy, and polyneuropathies or polymyopathies

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University of Zurich^{un}

Cervical spondylomyelopathy (Wobbler disease)

Dynamic lesions + giant breed + growing puppy

Nutritional management should be in clinical focus!

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Cervical spondylomyelopathy (Wobbler disease)

- Oversupply of dietary energy is a problem for the biomechanical development of musculoskeletal tissues of puppies
- Organic matrix and inorganic components of bones (getting more resistant under gravity of developing masses, above all of long bones over time) are in dynamic changes until growth will be complete.
- Vertebral bodies must ensure the right ratio between spinal canal and osseous components, to harmonize morphology of vertebral discs and nerve emergence.

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Cervical spondylomyelopathy (Wobbler disease)

Treatments

The clinical signs of CSM are either improved or stable in 81% of dogs managed medically.

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Cervical spondylomyelopathy (Wobbler disease)

Nutritional support of therapy



Name: **Leo (Lion)** ♂
Breed: **English Mastiff**
Age: **7 months**
Body weight: **40 kg**
Estimated adult BW: **75-80**
About **50%** of adult BW

Name: **Luna d'argento (silvery Moon)** ♀
Breed: **Neapolitan mastiff**
Age: **8 months**
Body weight: **44 kg**
Estimated adult BW: **~65**
About **70%** of adult BW

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Cervical spondylomyelopathy (Wobbler disease)

Nutritional support of therapy



Daily energy requirements

$175\text{kcal} \cdot 40^{0.75}/\text{d} = 2783 \text{ kcal}$ (FEDIAF)
 $[(30 \cdot 40) + 70] \cdot 2.2 = 2794$ (AAFCO)
 (kcal ME/d) = 2800

Daily energy requirements

$175\text{kcal} \cdot 44^{0.75}/\text{d} = 2989 \text{ kcal}$
 $[(30 \cdot 44) + 70] \cdot 2.2 = 3058 \text{ kcal}$
 (kcal ME/d): 3000

Dry food

Energy content: 3556 kcal ME /kg
 Crude protein: 32%
 Calcium: 1.1%
 Phosphorus: 0.92%

Dry food

Energy content: 3609 kcal ME /kg
 Crude protein: 29%
 Calcium: 1.1%
 Phosphorus: 0.92%

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Cervical spondylomyelopathy (Wobbler disease)

Nutritional support of therapy



Feed supply g/d= 790 g

Calcium supply= 3.09 g/1000 kcal/d
 or 217 mg/kg BW/d

Feed supply g/d= 830 g

Calcium supply= 3.04 g/1000 kcal/d
 or 207 mg/kg BW/d

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Cervical spondylomyelopathy (Wobbler disease)

Nutritional support of therapy



Feed supply g/d= 790 g

Calcium supply= 3.09 g/1000 kcal/d
 or 217 mg/kg BW/d

Feed supply g/d= 830 g

Calcium supply= 3.04 g/1000 kcal/d
 or 207 mg/kg BW/d

In support of medical therapy:

- rest
- Dexamethasone 0.25 mg/kg/d for the first three days, then 0.1 mg/kg/d until the first two weeks.
- NSAID, meloxicam at a dosage of 0.1 mg/kg/d, modulated in the follow-up.

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Thank you for your attention!!

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