

Case Report: Horse HYPP, a nutritional approach

DAMIANO CAVALLINI

RESIDENT 2ND YEAR

2016

Signalment

Species: Horse

Breed: American Paint Horse

Name: Beauty

Gender: Female

Age: 6y

Body weight: 462 kg

BCS: 7



History



The owner reported:

- Muscle fasciculation on the flank and similar signs to shivering
- Mild respiratory sound
- Incapacity to move for usually one 1hr and half

Usually afternoon crisis, ending with a diarrhea episode, after the horse seemed normal

No vet treatments

No previous pathologies

Diagnostic suspicious

Neuromuscular problem???

Physical examination findings

- Temperature 37.9 ° C
- Rosy mucous membranes; CRT <2 seconds
- Heart rate 32 bpm; regular rhythm; no puffs
- Respiratory rate 12 acts/min; norm breath; no cough; no nasal discharge
- Chest auscultation: continuous rales diffused bilaterally are detected



Blood analysis



Hematology: ok

Biochemistry:

- **CK** from **291** to **649** U/L [110 – 250]
- **GOT (AST)** from 270 to **516** U/L [100 – 350]
- **Na** from **129** to 136 mEq/L [132 – 145]
- **K** from 2.97 to **8.20** mEq/L [3.0 – 4.7]
- **P** from **1.99** to 3.36 mg/dl [2.16 – 4.64]

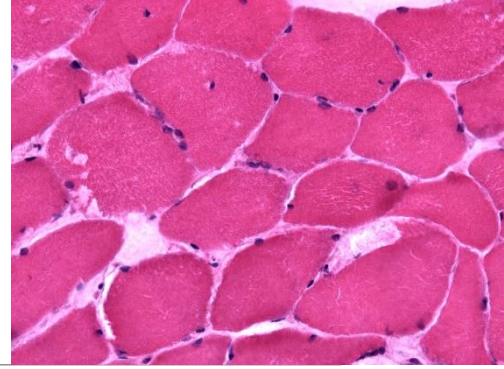
MicroMin & Vit (Se, Vit E, B1): ok

Other exams

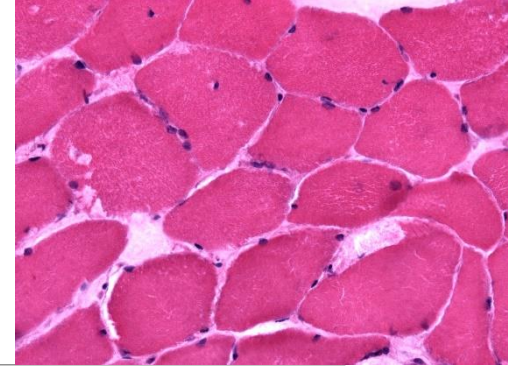


- Hematic parasites: negative
- No significant allergies
- Coagulation test: negative
- ECG: Grade II atrioventricular block
- POE Neuromuscular: ok
- RX thoracolumbar spine: negative
- Electromyography: negative

Histological exam

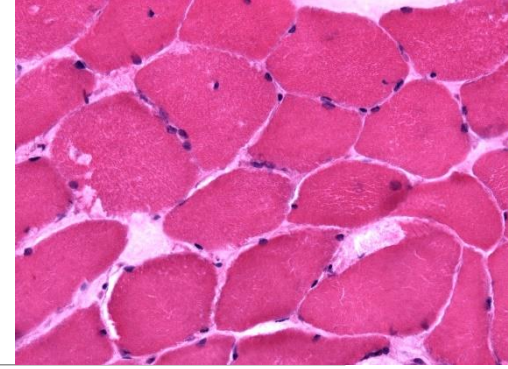


Histological exam



Sacrocaudalis dorsalis medialis muscle: No significant lesions

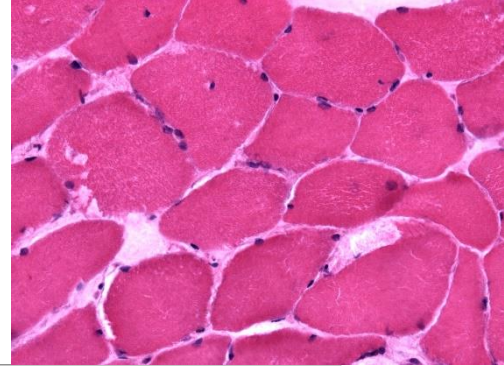
Histological exam



Sacrocaudalis dorsalis medialis muscle: No significant lesions

Semintendinosus muscle: Minimal myopathic change with mild glycogen storage

Histological exam

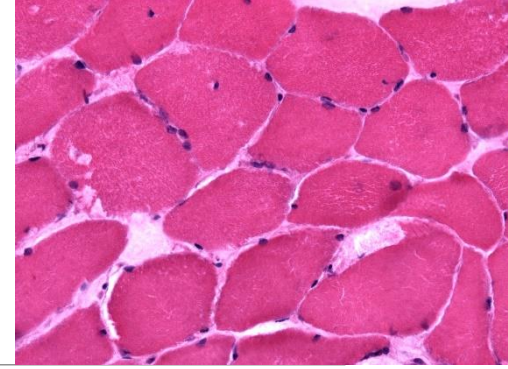


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Histopathological examination of muscle biopsies suggests the presence of a mild form of EPSM (Equine Polysaccharide Storage Myopathy).

Histological exam



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Suggested genetic tests → exclude presence of malignant hyperthermia.

EPSM

Proposed therapy



Dietary management:

Aims → eliminating carbohydrates by replacing them with fats as an energy source

- Polyphite hay ad libitum
- Beet pulp 3 kg
- Corn oil 500 ml
- Pelleted alfalfa 3 kg

2018

Follow up

2 years later...

Increasing of the signs frequency

The horse was referred to our Nutritional
consultant service



Università
degli Studi di Torino
Dipartimento di
Scienze Veterinarie

Genetic test



Polysaccharide storage myopathy type I (PSSM) Typ I - PCR
Outcome: Genotype N / N

Equine Hereditary Regional Dermal Asthenia (HERDA) - PCR
Outcome: Genotype N / N

Glycogen branching enzyme deficiency (GBED) - PCR Outcome:
Genotype N / N

Equine malignant hyperthermia - PCR Outcome: Genotype N / N

Hyperkalemic periodic paralysis (HYPP) - PCR Outcome: Genotype
N / H

Hyperkalemic periodic paralysis **HYPP**



Inherited disease

Sporadic attacks of muscle tremors (shaking or trembling), weakness, and/or collapse.

Eventually, loud breathing noises resulting from paralysis of the muscles of the upper airway.

Occasionally, sudden death can occur following a severe paralytic attack, from heart failure or respiratory muscle paralysis.

Manifestation depends on many factors: stress, diet, changes, exercise.

Different individual manifestation signs.

HYPP

Races: Quarter Horses, but also American Paint Horses, Appaloosas, Quarter Horse crossbreds.

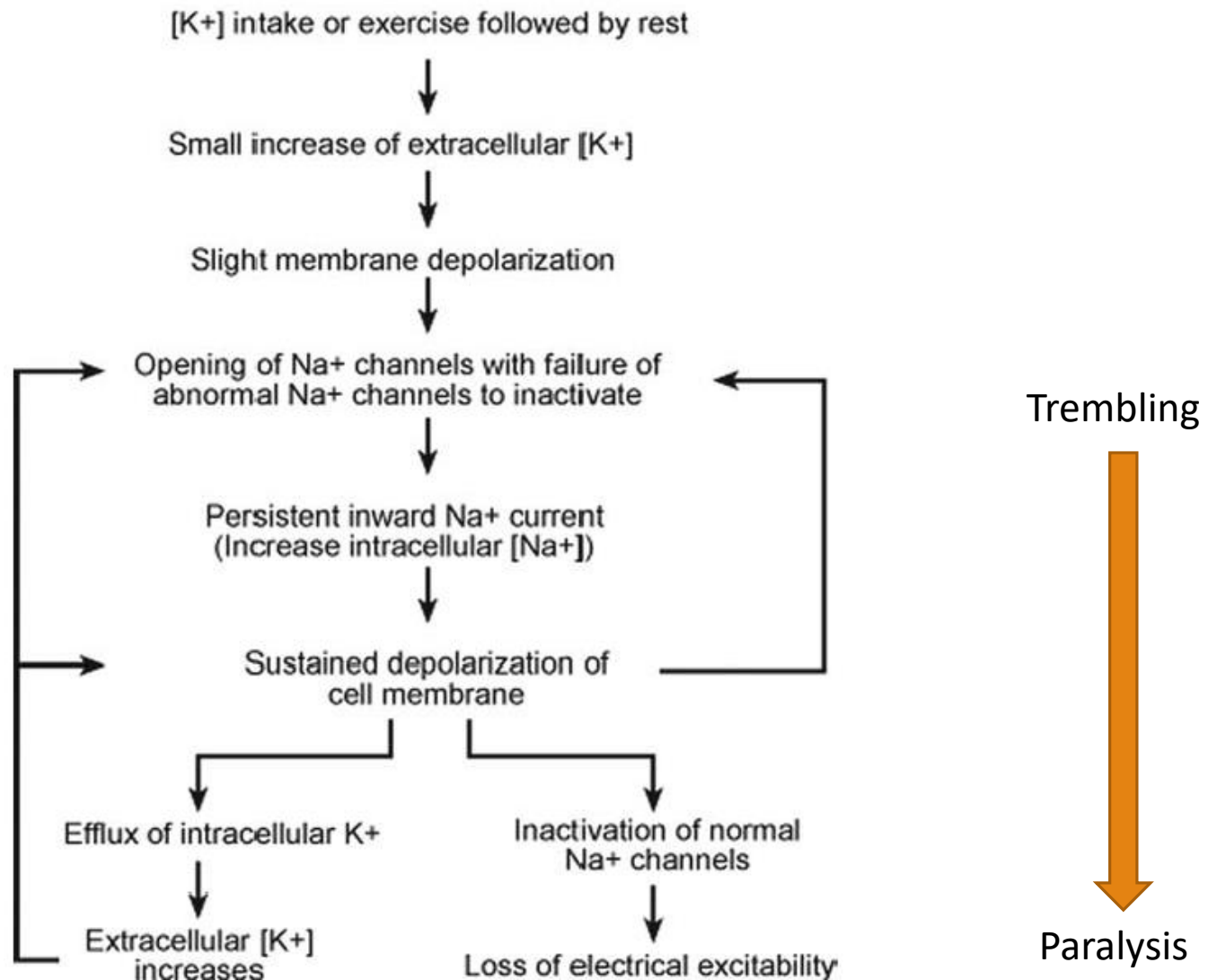
Descended from **Impressive** (1968–1995) (Bowling *et al.*, 1996).

Frequency:

- 2% of Quarter Horses (Nollet and Deprez, 2005)
- Quarter Horse populations based on use (halter, cutting, reining, racing, western pleasure, etc) from 0% to 56% (Tryon *et al.*, 2009)



Pathogenesis of paralytic attacks in horses with HYPP





Therapeutic plan

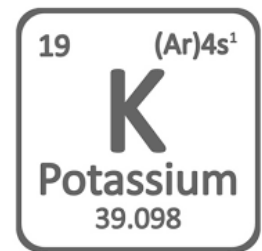
HYPP can be treated through diet and medication in most cases.

The HYPP syndromes can be alleviated by decreasing dietary intake of potassium and its concentrations in the plasma (Reynolds et al., 1998; Kollias-Baker, 1999; Wu, 2017) and providing regular exercise.

Nutritional management

- Minimize dietary potassium intake → Forage laboratory analysis
- Vit E, Se, salt and minerals supplements without potassium
- Always leave the forage available
- Avoid any sudden changes in feed
- Do not work horses in the post-prandial potassium peak (approximately 2-5hours after large meals)
- Feed small and frequent meals of concentrated foods: at least 3 meals per day: feeding at 6:00, 14:00 and 22:00 is better than that at 8:00, 12:00 and 17: 00.
- Allow access to paddocks

Potassium feed content



	K ⁺ (%)	g K ⁺ /Kg feed
High Potassium Feeds		
Electrolyte supplements	30	61.8
Molasses	6	12.3
Kelp supplements	>4	>8.2
Alfalfa hay (90% DM)	1.4–2.4	2.9–4.9
Canary grass hay	2.6	1.2
Orchard grass hay	2.4–2.6	4.9–5.4
Soybean meal	2	4.1
Medium Potassium Feeds		
Fescue hay	1.7–2.1	3.5–4.3
Rice bran	1.8	3.7
Timothy hay	1.4–2.1	2.9–4.3
Coastal Bermuda hay	1.2–1.9	2.5–3.7
Kentucky bluegrass hay	1.4	2.9
Oat hay	1.4	2.9
Low Potassium Feeds		
Pure fats and oils	0	0
Beet pulp	0.2–0.3	0.41–0.64
Corn, oats or barley	0.3–0.5	0.64–1.0
Pasture grass (23% DM)	0.3–0.8	0.64–1.64
Wheat	0.4	0.82
Wheat bran	1.2	2.48
Soybean hulls	1.2	2.48

Nutritional plan

Meadow hay: 11-12 kg

- Slow feeding net
- No potassium fertilization
- Soak the hay in warm water (Martinson, 2012)

However not possible



Grain mix: corn flakes 800g & oat 400g

Min&Vit supplement: 100g

- VitE&Se supplement

Salt mix: NaCl 20g & NaHCO₃ 10g



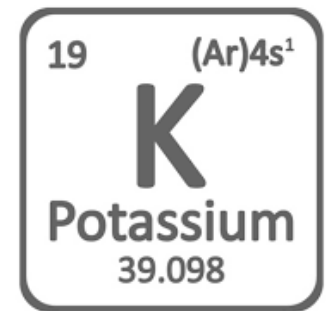
Linseed oil: 40g

Occurrence of a mild crisis it → glycemic meal

- 300 g of cereal mix
- 3-4 sugars



Diet comparison



■ EPSM diet

- Polyphite hay ad libitum
- Pelleted alfalfa 3 kg
- Beet pulp 3 kg
- Corn oil 500 ml



250 g of K/day

■ HYPP diet

- Meadow hay 11 kg
- Grain mix 1.2 kg
- Min&Vit 100 g
- Salt mix 30 g
- Linseed oil 40 g



170 g of K/day

Follow up



Thankyou for your attention!



References

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