

Practical Approach to Muscle Disorders

Diagnose, Prognose, and
Treat-for-the-Treatable

Patient Evaluation

- Signalment
- History
- Physical and Neurological Exams
- Localization of Lesion
- Differential diagnosis
- Diagnostic plan
- Diagnosis/Prognosis
- Treatment/Evaluate



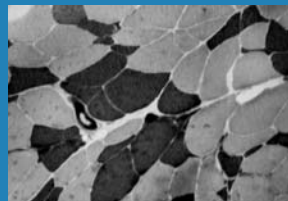
Minimum Database

- CBC
- Chemistry
 - Bile acids
 - Cholinesterase
- Urinalysis
- Chest and abdominal radiographs
- Abdominal ultrasound
- Heartworm test
- Fecal



Ancillary Neurologic Tests

- Electrodiagnostics
 - EMG
- Muscle Analysis
 - Muscle Biopsy
 - Histochemistry
 - Fiber type analysis
 - Muscle enzymes
 - CK
 - AST
 - Aldolase
 - Lactate/Pyruvate levels
 - Pre and post exercise
 - Urinary organic acid concentrations
 - Carnitine levels



Muscle Analysis

- **Comparative Neuromuscular Laboratory**
 - Basic Science Building, Room 1107
 - University of California, San Diego
 - La Jolla, CA 92093-0612
 - 858.534.1537
 - 858.534.7319 (fax)
 - http://medicine.ucsd.edu/vet_neuromuscular
 - musclelab@ucsd.edu

Electrodiagnostics

- **EMG**
 - Evaluates the LM Unit
 - Motor neurons
 - Motor nerves
 - Neuromuscular junction
 - Muscle

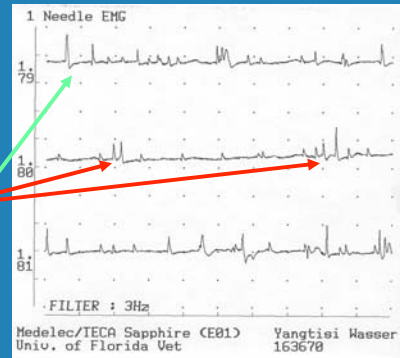


Electrodiagnostics

- **EMG**

- Needle EMG looks for abnormal spontaneous potentials

- Fibrillation potentials
- Fasciculation
- Complex repetitive potentials



Muscle Disease

- Most muscle problems show signs of

- Muscle pain
- Stiffness
- Stilted gait
- Weakness
- Reluctance to move
- Normal neuroexam

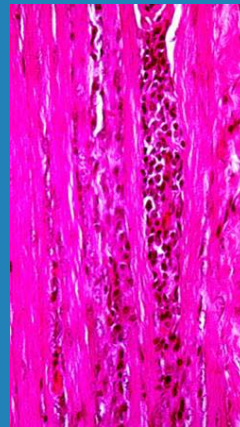


Polymyositis



Polymyositis

- **EMG**
 - Positive sharps waves & fibrillation potentials
- **Biochemical Changes**
 - Elevated CK, AST, Aldolase
 - Neg for Toxo/Neospora
- **Muscle biopsy**
 - Muscle inflammation & cellular infiltration



Polymyositis

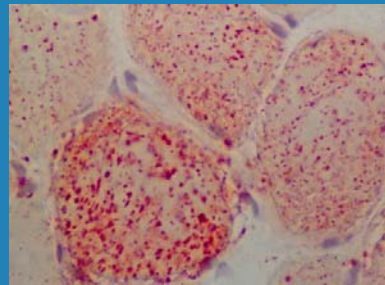
- **Prednisolone**
 - 1-2 mg/kg q12h until remission of signs
 - Taper dosage to 0.25-1 mg/kg qod
- **Cyclophosphamide**
 - 1-2 mg/kg/day for 4 days, then off for 3 days
 - Repeat cycle until remission
- **Azathioprine**
 - 2 mg/kg/day until remission
 - 2 mg/kg qod
- **Antioxidants**
 - Vitamin E
 - 5-50 IU/kg/day
 - Vitamin C
 - 5-10 mg/kg q12h
 - Selenium
 - 1 µg/kg/day
 - Beta Carotene
 - 125 IU/kg/day
 - Vitamin B complex
 - 0.5 mg/kg q12h
- **Anti-inflammatories**
 - Bromelain
 - 1 mg/kg q8-12h
 - Curcumin
 - 2 mg/kg q8-12h

Carnitine (Lipid Storage) Myopathy



Carnitine (Lipid Storage) Myopathy

- **EMG**
 - Essentially normal
- **Biochemical changes**
 - Decreased plasma & muscle carnitine
 - Lactic acidemia
 - Lactic & pyruvic aciduria
- **Lipid droplets on muscle biopsy**



Oil Red O Stain

Carnitine (Lipid Storage) Myopathy

- **L-carnitine**
 - 2.5-50 mg/kg q12h
- **Coenzyme Q-10**
 - 0.5 mg/kg/day
- **Riboflavin**
 - 0.5 mg/kg q12h
- **Vitamin E**
 - 5-50 IU/kg/day
- **Vitamin C**
 - 5-10 mg/kg q12h
- **Selenium**
 - 1 µg/kg/day
- **Beta Carotene**
 - 125 IU/kg/day
- **Vitamin B complex**
 - 0.5 mg/kg q12h

Mitochondrial Myopathy



Mitochondrial Myopathy

- **EMG**
 - Positive sharp waves & fibrillation potentials or normal
- **Biochemical Changes**
 - Increased pre & post exercise lactate & pyruvate levels
- **Muscle biopsy**
 - Ragged-red muscle fibers
 - Red mitochondria on Gomori-modified trichrome stain

