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Not Normal Soreness

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Mercy Health Muskegon

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Disclosures

- None

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History of Present Illness

9/14/18

- Patient is a **15 year old male** who presented to the sports medicine clinic complaining of bilateral "**thigh aches**." He stated the symptoms would come and go and have been getting **progressively worse** over the past 12-16 months. He describes symptoms that seem to get **worse with more exercise**. He was previously one of the fastest athletes on the football team but is now the slowest. He reports times where he experiences **"leg weakness**" and there have been instances where he has fallen due to leg weakness and **trouble with coordination**. He can now only play one football series before he experiences symptoms that force him to stop playing. He **has no known family history** of rheumatologic disease, autoimmune disease, muscular dystrophies, or metabolic conditions. He eats a normal diet. He has noticed **no difference with rest or anti-inflammatory medications**. He denies numbness or tingling of his extremities. He denies vision changes, blurred vision, double vision, or difficulty swallowing or speaking. He denies changes in appetite. He denies unintended weight loss or weight gain.

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Medical History

- No known medical conditions
- Tympanostomy tubes, tonsilectomy, adenoidectomy
- Taking Motrin 200 mg and a multivitamin
- No known Allergies
- Family History of HTN in Father
- Denies smoking, alcohol use, or illicit drug use

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Review of Systems

- Constitutional: **+Fatigue**, denies fever or night sweats
- Eyes: Denies blurred vision, double vision or vision loss
- ENT: Denies hearing loss, hoarseness, or trouble swallowing
- CV: Denies chest pain or palpitations
- Resp: Denies cough or shortness of breath
- GI: Denies heartburn, nausea, or blood in stool
- GU: Denies dysuria, hematuria
- Skin: Denies rashes, nodules, or lesions
- Neuro**: +weakness**, denies numbness, dizziness
- Psych: Denies depression, or sleeping problems
- Endocrine: Denies heat or cold intolerance
- Heme: Denies bleeding problems or bruising

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Physical Exam

- Vital signs are within normal limits for age.
- Constitutional: Well nourished and developed. No Acute Distress. Non-antalgic gait.
- Awake, Alert, oriented to person, place, and time.
- Cranial Nerves II-XII intact.
- **Muscles strength is 5/5 in all muscle groups except Iliopsoas which is 4/5**.
- Reflexes are 3+ on bilateral L4 and S1 and 2+ on bilateral C5, C6, and C7.
- Hoffman's sign negative. Babinski downgoing. No clonus.
- No cerebellar Dysmetria with finger to nose or heel to shin. No Dysdiadochokinesia.
- No nystagmus.
- Light touch sensation is intact through all dermatomes.

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Differential Diagnosis

- Muscular Dystrophy (Becker's)
- Myasthenia Gravis
- Multiple Sclerosis
- Multiple System Atrophy
- Huntington's Disease
- Amyotrophic Lateral Sclerosis
- Lambert-Eaton Syndrome
- Polymyositis
- Polymyalgia Rheumatica
- Juvenile Rheumatoid Arthritis
- Glycogen Storage Disorders (McArdle's)
- Exertional Rhabdomyolysis

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Diagnostic Testing

- **Bilateral Lower Extremity Electromyelogram: Normal study. No evidence of radiculopathy, neuropathy, or myopathy.**
- Hemoglobin A1C: 5.4% (4.0 - 6.0)
- Sedimentation Rate: 2 mm/hr (0 - 15)
- C-Reactive Protein: 0.8 mg/dL (0.5 - 1.0)
- Vitamin B12: 747 pg/mL (180 - 914)
- Folic Acid: >24.0 ng/mL
- TSH: 2.77 mcIU/mL (0.45 - 5.33)
- **Creatinine Kinase: 284 IU/L (38 – 174)**

- Sodium: 142 mMol/L (135 -145)
- Potassium: 4.2 mMol/ (3.5 - 5.0)
- Chloride: 103 mMol/L (98 - 111)
- Carbon Dioxide: 27 mMol/L (21 - 31)
- BUN: 15 mg/dL (6 - 20)
- Creatinine: 0.8 mg/dL (0.9 - 1.3)
- Glucose: 100 mg/dL (70 - 106)
- Calcium: 9.4 mg/dL (8.4 10.2)
- WBC: 8.5 thou/mcL (4.0 -10.5)
- Hemoglobin: 15.6 g/dL (11.7 -15.6)
- Platelet count: 274 thou/mcL (140 -450)
- Urinalysis: no blood, glucose, ketones, leukocyte esterase, nitrites, or protein.

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Diagnostic Testing (cont)

- **ANA titer: 1:320 (<1:80)**
- **ANA screen: Positive (negative)**
- Anti Jo1: 3 units (<20)
- ENA Sjögren A (Ro) Antibody: 3 units (<20)
- Anti Scleroderma (Scl-70): 6 units (<20)
- Double Stranded DNA antibody: 77 IU/mL (<=200)
- ENA Sjögren B (La) Antibody: 4 units (<20)
- ENA RNP Antibody: 5 units (<20)
- Smith (Sm) Antibody: 6 units (<20)
- Cyclic Citrullinated Peptide Ab IgG: 5 units (<20)
- Aldolase: 7.4 units/L (1.2 - 7.6)
- **ACh Receptor Blocking Ab: 68 (<15)**
- **ACh Receptor Binding Ab: 31.00 (<=0.50)**
- **ACh Receptor Modulating Ab: 86 (<32%)**
- **MRI Brain: Negative non-contrast Brain MRI**

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Continued Evaluation

10/4/19

- Patient referred to Neurology for treatment for presumed Myasthenia Gravis
- CT to evaluate for Thymoma
  - 98 - 100% likelihood to have thymoma when Ach Antibodies are positive
  - Negative Predictive value on thymoma in absence of antibodies is 99.7%
  - Had Ach antibodies been negative, can consider MuSK antibodies
- Thoracic surgery referral for possible thymectomy
- Pyridostigmine started 60 mg TID started

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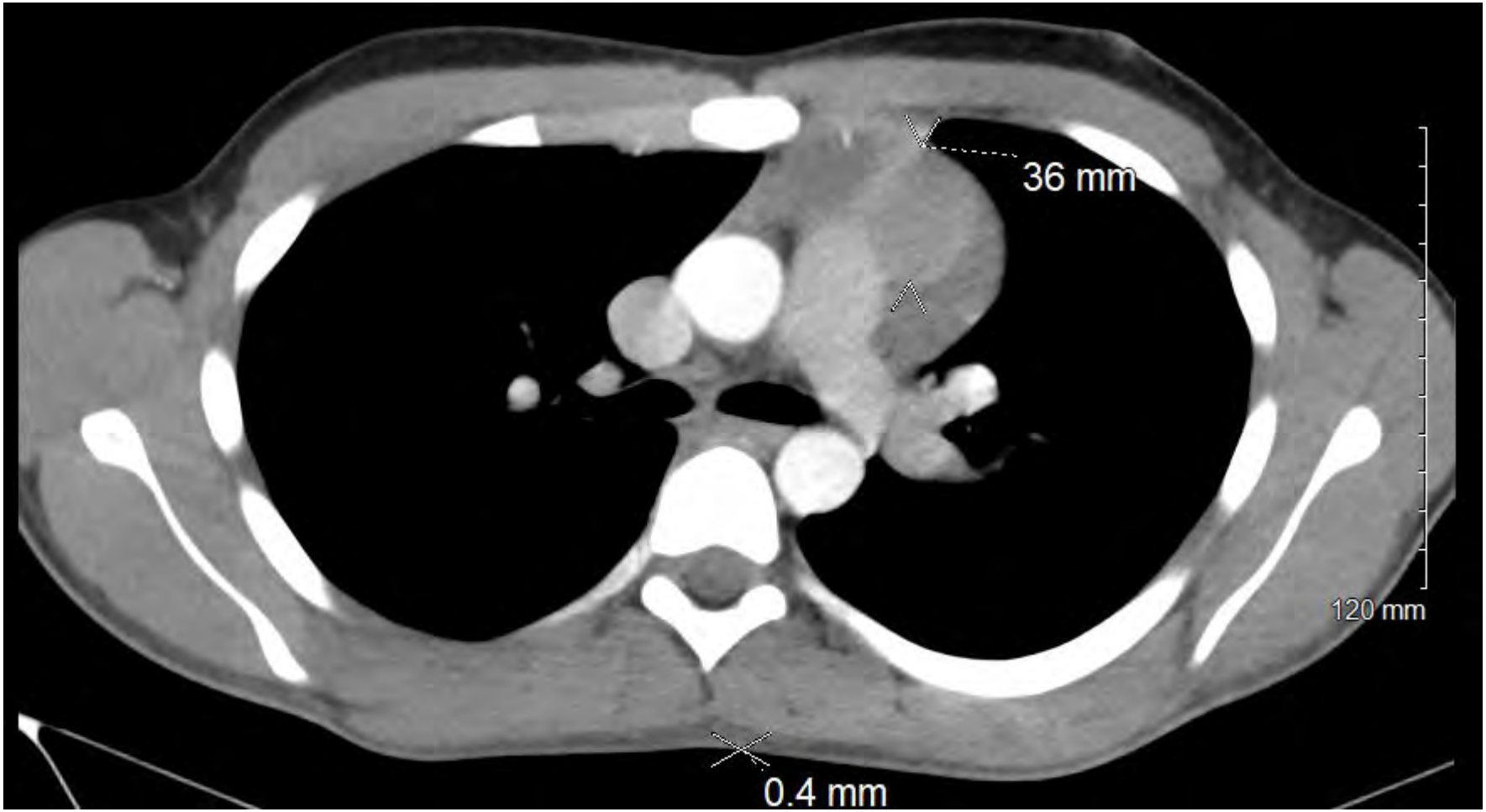

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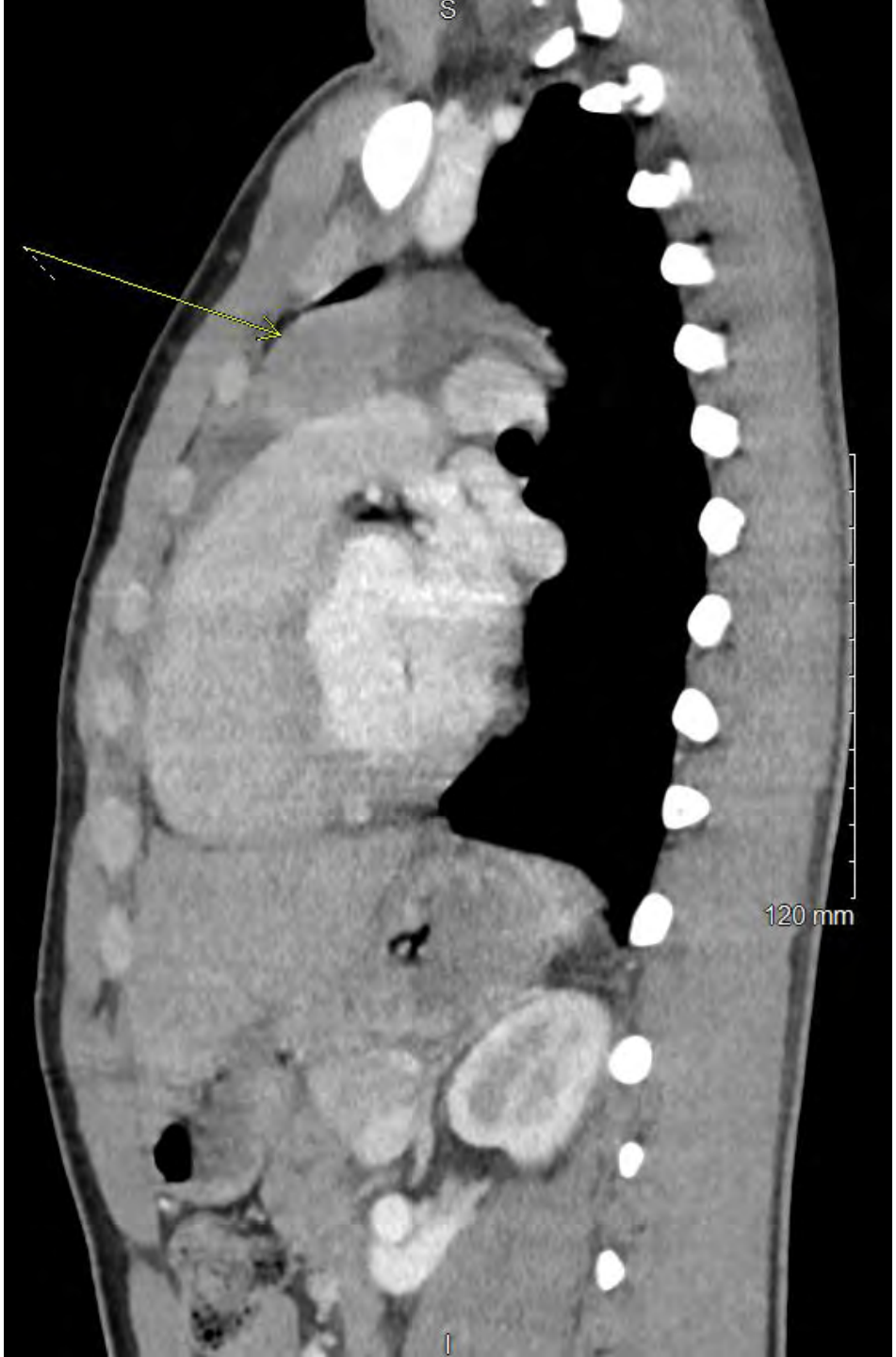
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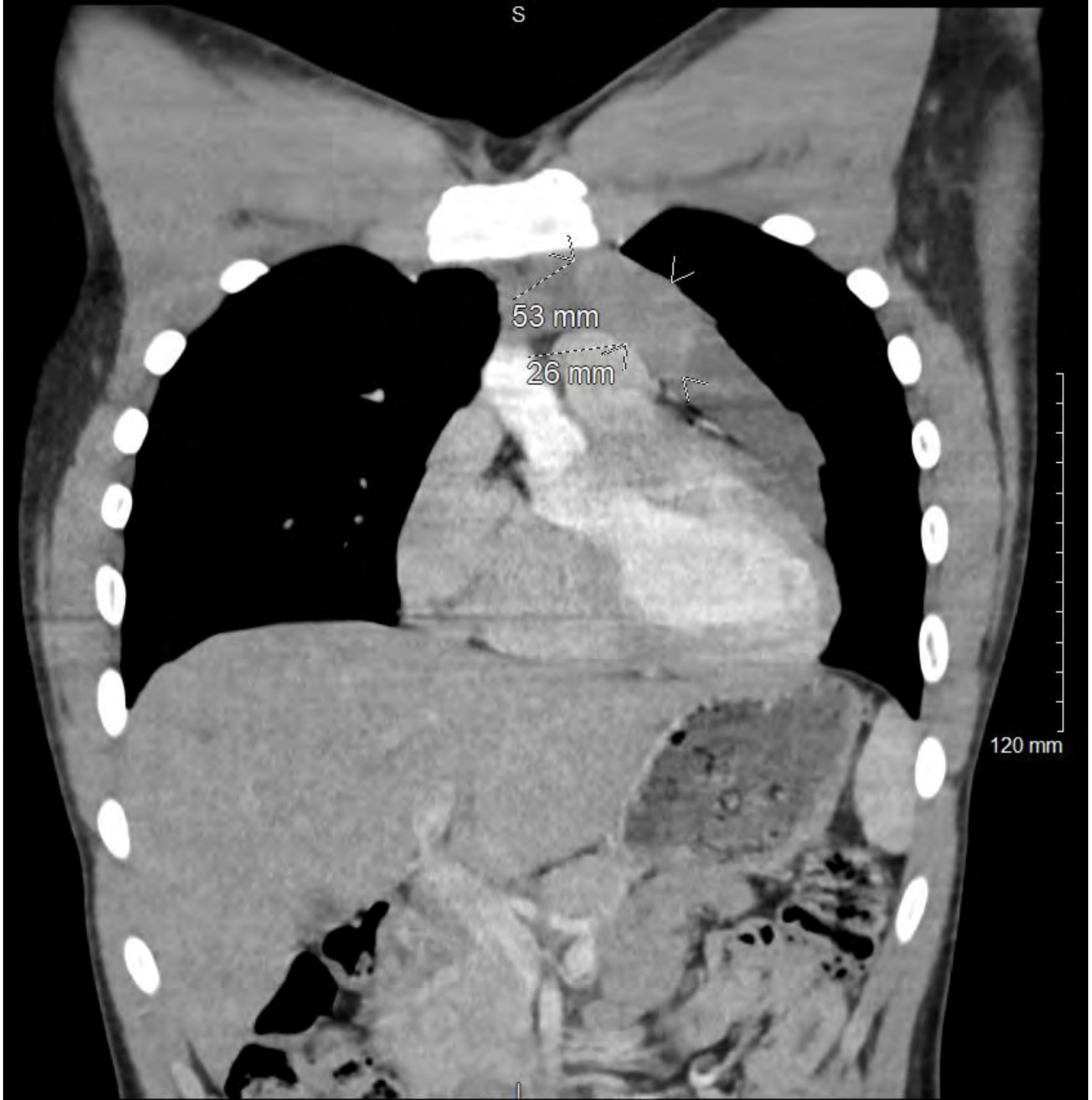
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Patient Follow Up

10/29/19

- Patient evaluated by Pediatric Thoracic Surgery and underwent thymectomy
- Surgical Pathology
  - Thymoma type B2
  - Transcapsular invasion
  - No lymph node involvement

  Immunohistochemistry
  - Diffuse cytokeratin + framework with occ. clustered epithelial
  - CD1a, Tdt, CD3, CD45: Diffuse positive immature cortical thymocytes
  - CD20, PAX5 BCL-2 positive
  - Ki-67 100% proliferative index in immature cortical thymocytes

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Patient Follow Up

- 12/13/18: Neurology Follow Up
  - Pyridostigmine increased to 360 mg extended release in the morning and 180 mg in the afternoon
- 3/19/19: Neurology Follow UP
  - Continuing to increase Pyridostigmine
  - Considering CellCept (mycophenylate mofetil) or Imuran (azathioprine)
  - Eventually may add Solaris (Eculizumab)

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Myasthenia Gravis Crash Course

Etiology

- Autoimmune disorder of the postsynaptic neuromuscular junction
- Annual incidence of 0.25 – 20 per 1,000,000
- Mortality <1/1,000,000
- Average age of onset between 20 – 40, about 60% women in this age range

Signs and Symptoms

- Ocular: ptosis & or diploplia
- Bulbar: dysarthria, dysphagia, fatigable chewing
- Muscular: limb or generalized weakness

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Myasthenia Gravis Crash Course

Treatment options

- Symptomatic treatment with anti-acetylcholinesterase medications (**pyridostigmine**)
- Chronic immunosuppressant therapies
  - **Steroids**
  - Nonsteroidal immunosuppressive medications
- Rescue/bridge treatments (**crisis**)
  - **Plasma exchange**
  - **IVIG**
- Surgical intervention
  - **Thymectomy**

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Sources

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Questions?