Dear Member,

Thank you for inviting me to be part of your care, and welcome to you and to your treating physicians who requested this consultation for a comprehensive neurological consultation. I have carefully reviewed the records provided and our discussion. My goal is to synthesize your clinical history and test results, answer your key questions, and outline a safe plan that can be implemented in close coordination with your care team. The recommendations that follow are intended to support (not replace) your ongoing treatment; please review them with your clinicians so we remain fully aligned on next steps.

Virtual Comprehensive Neurology Consultation

Consultation Date:

Member Name:

DOB / Age:

Gender:

Case Number:

Referring Physician (if any):

Provider: Dr. Nizar Souayah, MD, FAAN, FAANEM, FANA

Visit Type: Virtual Neurological Examination (Telemedicine)

Platform Used: [☐ Zoom ☐ Doxy.me ☐ Other: _____]

Location of Member: _____

Location of Physician: _____

1. Reason for Consultation

Progressive imbalance/ataxia and sensory symptoms with confirmed genetic diagnosis of Friedreich ataxia (FRDA); second opinion on diagnostic synthesis, risk stratification, and management options including omaveloxolone (Skyclarys), rehabilitation, cardiometabolic surveillance, and trial eligibility.

2. Records Reviewed

- Neurology consult and electrodiagnostic report ([Date Redacted], [Physician Redacted]) documenting finger-to-nose/heel-to-shin ataxia, wide-based gait, positive Romberg; electrodiagnostic evidence consistent with sensory ganglionopathy.
- Laboratory panels ([Date Redacted]): Lyme, HIV, syphilis, B12, CRP, ALT/AST—reported normal/negative.
- MRI brain ([Date Redacted]): unremarkable.
- MRI cervical spine ([Date Redacted]): C7–T1 degenerative disc disease with severe left foraminal narrowing. Repeat MRI ([Date Redacted]): mild increased cord signal mid-cervical with canal stenosis/cord flattening (C4–7) compatible with compressive myelopathy.
- MRI thoracic spine ([Date Redacted]): no abnormalities.
- MRI lumbosacral spine ([Date Redacted]): normal.
- Genetic testing ([Date Redacted]): FXN GAA repeat expansion **homozygous >100** on both alleles—diagnostic of FRDA.

3. History of Present Illness (HPI)

The member is an [Age Redacted] right-handed individual with a past medical history notable for resected colitis. Around [Date Redacted] they developed burning urethral pain, worse with bladder fullness; empiric antibiotics for presumed prostatitis were ineffective. In parallel he noted progressive gait unsteadiness, thigh tightness, and imbalance. By [Date Redacted he reported mild tingling localized to the testicular region; they denied distal limb numbness or paresthesias at that time.

Neurologic consultation on [Date Redacted] showed limb dysmetria (finger-to-nose, heel-to-shin), wide-based unsteady gait, and positive Romberg suggesting sensory ataxia. Electrodiagnostics demonstrated a sensory ganglionopathy pattern. Systemic and infectious screens were unrevealing. Brain MRI ([Date Redacted]) was normal. Multi-level cervical spondylosis with canal and foraminal compromise (C4–7) and faint cord signal change was later identified, raising the possibility of a partial compressive myelopathy contribution to imbalance.

In [Date Redacted], genetic testing confirmed Friedreich ataxia with **homozygous FXN GAA expansions (>100)**, establishing the unifying diagnosis for progressive ataxia/sensory neuropathy. His age at onset is within the **late-onset FRDA** spectrum, generally associated with fewer repeats, lower progression, and comparatively better prognosis than early-onset cohorts. He denies dysphagia, overt cardiopulmonary symptoms, or diabetes to date. No clear visual/hearing complaints reported. Bladder discomfort/urgency has been intermittent since symptom onset.

4. Past Medical, Surgical, Family, and Social History

A. Past Medical History:

Resected colitis (details/date not provided). Late-onset Friedreich ataxia (genetically confirmed). Possible cervical spondylotic myelopathy (radiographic).

B. Past Surgical History:

Colitis-related resection (details not provided). No neurosurgical procedures reported.

C. Family History:

Limited; negative for known heritable ataxias by report; further pedigree/genetic counseling recommended.

D. Social History:

Residence: [Redacted]. Non-smoker; denies alcohol or illicit drug use. Independent in activities but limited by imbalance. Occupation/education not specified. No reported cardiometabolic risk behaviors.

5. Medications and Allergies

Medications: Not on disease-modifying therapy for FRDA. Analgesics/neuropathic agents: none reported.
Allergies: Not documented.

6. Review of Systems (ROS)

General:

☐ No fevers ☐ No chills ☐ No weight loss ☐ Fatigue ☐ Night sweats

Comments: _____

Neurological:

☐ Headaches ☐ Dizziness ☐ Seizures ☐ Memory loss ☐ Numbness/tingling ☐ Weakness ☐ Tremor ☐ Falls ☐ Imbalance ☐ Speech difficulty ☐ Vision changes ☐ Hearing changes ☐ Swallowing difficulty

Comments: _lower extremity numbness, paresthesias, foot drop, and gait imbalance_____

Psychiatric / Cognitive:

☐ Normal mood ☐ Depression ☐ Anxiety ☐ Sleep disturbance ☐ Hallucinations ☐ Cognitive decline

Comments: _____

HEENT:

☐ Vision loss ☐ Blurred vision ☐ Diplopia ☐ Hearing loss ☐ Tinnitus ☐ Vertigo ☐ Sinus pain ☐ Sore throat ☐ Dysphonia

Comments: _____

Cardiovascular:

☐ Chest pain ☐ Palpitations ☐ Syncope ☐ Orthopnea ☐ Dyspnea on exertion ☐ Leg swelling

Comments: _____

Respiratory:

☐ Cough ☐ Shortness of breath ☐ Wheezing ☐ Sleep apnea ☐ Orthopnea ☐ Ventilator/CPAP use

Comments: _____

Gastrointestinal:

☐ Nausea ☐ Vomiting ☐ Abdominal pain ☐ Constipation ☐ Diarrhea ☐ Dysphagia ☐ GERD ☐ GI bleeding

Comments: _____

Genitourinary:

☐ Dysuria ☐ Frequency ☐ Urgency ☐ Retention ☐ Incontinence ☐ Sexual dysfunction

Comments: _____

Musculoskeletal:

☐ Myalgia ☐ Arthralgia ☐ Joint swelling ☐ Muscle cramps ☐ Stiffness ☐ Limited mobility

Comments: _____

Skin:

☐ Rash ☐ Ulcers ☐ Photosensitivity ☐ Skin changes ☐ Bruising

Comments: _____

Endocrine / Metabolic:

☐ Heat intolerance ☐ Cold intolerance ☐ Polyuria ☐ Polydipsia ☐ Weight changes ☐ Thyroid disorder ☐ Diabetes

Comments: _____

Hematologic / Immunologic:

☐ Easy bruising ☐ Bleeding ☐ Anemia ☐ Frequent infections ☐ Autoimmune disease

Comments: _____

7. Virtual Neurological Examination

I. General & Technical Information

Consent obtained: [☐ Yes ☐ No]

Audio/Video Quality: [☐ Excellent ☐ Good ☐ Fair ☐ Poor]

Chaperone present: [☐ Yes ☐ No]

Limitations due to virtual format: [☐ Reflexes ☐ Tone ☐ Fundoscopy ☐ Detailed sensory testing ☐ Other: _____]

II. General Observation / Mental Status

Level of consciousness: [☐ Alert ☐ Drowsy ☐ Confused ☐ Unresponsive]

Orientation: [☐ Person ☐ Place ☐ Time ☐ Situation]

Appearance: [☐ Normal ☐ Disheveled ☐ Neglected hygiene ☐ Other: _____]

Speech: [☐ Normal fluency ☐ Dysarthric ☐ Aphasic ☐ Slurred]

Language comprehension: [☐ Intact ☐ Impaired]

Attention: [☐ Normal ☐ Reduced]

Memory: [☐ Intact ☐ Impaired immediate recall ☐ Impaired delayed recall]

III. Cranial Nerves

CN I (Olfactory): [☐ Not tested ☐ Reports anosmia ☐ Normal]

CN II: [☐ Visual fields intact ☐ Visual field defect ☐ Reduced acuity]

CN III, IV, VI: [☐ Full EOM ☐ Nystagmus ☐ Ptosis ☐ Limited movement]

CN V: [☐ Symmetric ☐ Numbness ☐ Masseter intact]

CN VII: [☐ Symmetric ☐ R weakness ☐ L weakness]

CN VIII: [☐ Intact ☐ Reduced hearing ☐ Tinnitus ☐ Balance symptoms]

CN IX, X: [☐ Voice normal ☐ Dysarthria ☐ Dysphonia ☐ Swallow difficulty]

CN XI: [☐ Symmetric ☐ Weakness present]

CN XII: [☐ Midline ☐ Deviates ☐ Fasciculations]

IV. Motor Examination (Expanded for Virtual Evaluation)

Bulk:

[☐ Normal ☐ Atrophy noted (site: _____) ☐ Fasciculations observed ☐ Asymmetry present]

Tone:

[☐ Appears normal (visual inspection and passive movement via patient self-demonstration) ☐ Cannot be fully assessed due to virtual limitations]

Strength (Functional Assessment via Tasks):

Upper Extremities

Shoulder abduction: [☐ Normal ☐ Weakness R ☐ Weakness L]

Elbow flexion/extension: [☐ Normal ☐ Weakness R ☐ Weakness L]

Wrist extension/flexion: [☐ Normal ☐ Weakness R ☐ Weakness L]

Grip strength (squeeze object, e.g., water bottle): [☐ Normal ☐ Weakness R ☐ Weakness L]

Lower Extremities

Hip flexion: [☐ Normal ☐ Weakness R ☐ Weakness L]

Knee extension/flexion: [☐ Normal ☐ Weakness R ☐ Weakness L]

Ankle dorsiflexion/plantarflexion: [☐ Normal ☐ Weakness R ☐ Weakness L]

Drift (Barre/Raimiste test):

[☐ No drift ☐ Right drift ☐ Left drift ☐ Pronator drift with downward drift/pronation]

Fine Motor Movements:

Finger tapping: [☐ Normal ☐ Slowed ☐ Irregular ☐ Asymmetric]

Rapid alternating movements (RAMs): [☐ Normal ☐ Bradykinetic ☐ Irregular]

Toe tapping: [☐ Normal ☐ Slowed ☐ Asymmetric]

Functional Observations:

Ability to rise from chair without hands: [☐ Yes ☐ Requires hands ☐ Unable]

Ability to stand from squatting: [☐ Yes ☐ No ☐ With difficulty]

Arm swing during gait: [☐ Symmetric ☐ Reduced R ☐ Reduced L ☐ Absent]

Endurance/fatigability: [☐ No early fatigue ☐ Fatigue on repeated effort ☐ Unable to sustain posture (site: _____)]

V. Coordination

Finger-to-nose: [☐ Normal ☐ Dysmetria R ☐ Dysmetria L]

RAMs: [☐ Normal ☐ Bradykinetic ☐ Irregular]

Heel-to-shin: [☐ Normal ☐ Ataxic R ☐ Ataxic L]

VI. Gait & Station

Gait: [☐ Normal ☐ Antalgic ☐ Ataxic ☐ Spastic ☐ Parkinsonian ☐ Wide-based]

Heel/Toe walk: [☐ Normal ☐ Unable ☐ Unsteady]

Tandem gait: [☐ Normal ☐ Abnormal]

Romberg: [☐ Negative ☐ Positive]

VII. Sensory Examination

Light touch: [☐ Symmetric ☐ Numbness R ☐ Numbness L]

Pain: [☐ Symmetric ☐ Reduced R ☐ Reduced L]

Proprioception/Vibration (by history): [☐ Intact ☐ Difficulty reported]

VIII. Reflexes

Deferred (virtual limitation). Documented: [☐ Yes]

IX. Special Tests (if applicable — Neuromuscular Expanded)

Stroke / Cerebrovascular Screen:

Facial symmetry: [☐ Symmetric ☐ Right droop ☐ Left droop]

Arm strength/drift: [☐ No drift ☐ Right ☐ Left]

Speech: [☐ Normal ☐ Dysarthric ☐ Aphasic ☐ Slurred]

Tremor / Movement Disorders:

Tremor: [☐ None ☐ Resting ☐ Postural ☐ Action ☐ Intention]

Bradykinesia: [☐ Absent ☐ Present]

Freezing of gait: [☐ Absent ☐ Present]

Myasthenia Gravis:

Sustained upgaze: [☐ Normal ☐ Ptosis after ___ sec]

Speech endurance: [☐ Stable ☐ Dysarthria with fatigue]

Counting on single breath: [☐ >20 ☐ 10–20 ☐ <10]

Lambert-Eaton Myasthenic Syndrome:

Sit-to-stand endurance: [☐ Normal ☐ Strength improves ☐ Strength declines]

Autonomic features: [☐ Dry mouth ☐ Constipation]

ALS / Motor Neuron Disease:

Fasciculations: [☐ None ☐ Present (site: ___)]

Atrophy: [☐ Absent ☐ Present (location: ___)]

Bulbar signs: [☐ Dysarthria ☐ Dysphagia]

Peripheral Neuropathies (CIDP/GBS/hereditary):

Distal weakness: [☐ None ☐ Foot drop ☐ Hand weakness]

Sensory loss: [☐ Stocking ☐ Glove ☐ Asymmetric]

Romberg: [☐ Negative ☐ Positive]

Muscular Dystrophies / Myopathies:

Scapular winging: [☐ Absent ☐ Present]

Facial weakness: [☐ Absent ☐ Present]

Gowers' sign: [☐ Absent ☐ Present]

Myotonia: [☐ Absent ☐ Present]

Metabolic / Mitochondrial Myopathies:

Exercise intolerance: [☐ Absent ☐ Present]

Ocular involvement: [☐ None ☐ Ptosis ☐ Ophthalmoplegia]

Inflammatory Myopathies (PM/DM/IBM):

Proximal weakness: [☐ Absent ☐ Present]

Skin rash: [☐ None ☐ Heliotrope ☐ Gottron's papules]

Asymmetry (IBM): [☐ Absent ☐ Present]

Channelopathies:

Periodic paralysis episodes: [☐ Absent ☐ HypoK ☐ HyperK]

Cold-induced myotonia: [☐ Absent ☐ Present]

Autonomic Dysfunction:

Orthostatic intolerance: [☐ Absent ☐ Present]

Bladder dysfunction: [☐ None ☐ Urgency ☐ Retention]

Sweating abnormalities: [☐ None ☐ Reduced ☐ Excessive]

Respiratory Involvement:

Dyspnea: [☐ None ☐ On exertion ☐ At rest ☐ Orthopnea]

Cough strength: [☐ Normal ☐ Weak]

Ventilatory support: [☐ None ☐ CPAP ☐ BiPAP ☐ Ventilator]

In summary:

Virtual exam supports a cerebellar-sensory ataxic syndrome with distal sensory involvement and gait instability; motor power preserved functionally. Findings align with FRDA; cervical myelopathy may contribute.

8. Ancillary Testing:

([Date Redacted])

Core Baseline

- **CBC with indices**
- **Comprehensive Metabolic Panel (CMP)** (renal, hepatic, electrolytes)
- **Fasting Plasma Glucose** ± **OGTT**
- **HbA1c**
- **Fructosamine** (if recent glycemic shift or anemia confounds A1c
- **Lipid Panel**
- **ESR** and **High-Sensitivity CRP (hs-CRP)**
- **TSH** ± **Free T4**
- **Vitamin B12** ± **Methylmalonic Acid (MMA)**
- **Folate** (serum or RBC)
- **25-OH Vitamin D**
- **Serum Protein Electrophoresis (SPEP)** ± **Immunofixation (IFE)**

Nutritional / Micronutrient Expansion

Vitamin B1 (Thiamine, whole blood)

- **Vitamin B6 (Pyridoxal-5-phosphate, plasma)** *(note: deficiency or excess can cause neuropathy)*
- **Vitamin E (alpha-tocopherol)**
- **Copper** ± **Ceruloplasmin**
- **Zinc** *(interpret with copper)*
- **Niacin (Vitamin B3, plasma or urine metabolites)**
- **Magnesium** ± **Phosphate**

Infectious Screen (per risk/phenotype)

- **HIV Ag/Ab (4th gen)**
- **Hepatitis B surface antigen**; **Hepatitis C antibody** ± **HCV RNA** if positive
- **Syphilis** (RPR/VDRL with treponemal confirm)
- **Lyme** (ELISA with reflex immunoblot; geography/phenotype-driven)
- **HTLV-1/2 antibodies** (endemic risk)

- **EBV/CMV serology** (atypical/immune-dysfunction contexts)

Autoimmune / Paraproteinemic Expansion (when immune etiology suspected)

- **ANA with reflex ENA** (SSA/SSB, RNP, Smith)
- **Rheumatoid Factor** ± **Anti-CCP**
- **Thyroid antibodies** (Anti-TPO, Anti-Tg)
- **Celiac screen** (tTG-IgA + total IgA)
- **Immunoglobulins (IgG/IgA/IgM) ± subclasses**
- **Complement** (C3, C4, CH50)
- **Anti-MAG antibody** (IgM paraprotein context)
- **Ganglioside Abs** (GM1, GD1a/GD1b; neurofascin/contactin in select immune neuropathies)
- **Antiphospholipid panel** (aCL IgG/IgM, β2-glycoprotein I, lupus anticoagulant) if ischemic features

Diabetes-Specific Add-Ons (for diabetic neuropathy programs)

- **Repeat HbA1c** or **CGM metrics** if discordant with symptoms
- **Urine albumin-to-creatinine ratio** (microvascular risk)
- **B12/MMA** recheck if on metformin or PPI chronically

Oncologic/Monoclonal Concern (when red flags present)

- **SPEP/IFE** (already above; repeat if evolving)
- **Serum Free Light Chains** (κ/λ ratio)
- **Cryoglobulins** ± **Complement** (cryovasculitis work-up)

Advanced / Neurowellness & Research-Grade (use selectively)

- **Homocysteine**
- **Cytokines** (TNF-α, IL-6, IL-1β ± IL-17/IL-10)
- **Oxidative stress markers: 8-OHdG**, **F2-isoprostanes**, **Malondialdehyde (MDA)**
- **Neurofilament Light Chain (NfL, serum)**
- **IGF-1**
- **BDNF** *(specialty send-out)*
- **Nerve Growth Factor (NGF)** *(specialty send-out)*

Mitochondrial / Energetics (exercise intolerance, chemo-induced, or elite athletes)

- **Lactate**, **Pyruvate**
- **Carnitine (total/free) & Acylcarnitine profile**

Program-Specific (choose per phenotype)

- **Small Fiber / Dysautonomia tilt:** add autoimmune panel above; consider ganglionic AChR, TS-HDS, FGFR3 (send-outs).
- **Chemo-Induced Neuropathy:** emphasize **Mg/Phos**, oxidative stress markers, **NfL**, **IGF-1**.
- **Neuro-PASC:** add **Ferritin/Iron studies**, **Antiphospholipid panel**, **SARS-CoV-2 N/S IgG** (documentation), cytokines.
- **MG work-up prior to immunotherapy:** ensure **HBV/HCV/HIV/TB** screening is complete.

9. Assessment / Differential Diagnosis

1. **Friedreich ataxia (FRDA, late-onset)** – genetically confirmed with homozygous GAA repeat expansions in the FXN gene. Clinical phenotype consistent with cerebellar and sensory ataxia, progressive gait instability, and sensory neuropathy.

2. **Cervical spondylotic myelopathy** – MRI evidence of canal stenosis and cord signal changes; possible contributor to gait difficulties though not the primary etiology.

3. **Neuropathic pain and dysesthesias** – intermittent burning urethral pain and distal sensory symptoms, likely neuropathic.

4. **Bladder dysfunction** – possible neurogenic bladder related to FRDA versus primary urologic etiology; further evaluation warranted.

10. Recommendations

Below is the point-by-point response incorporating functional medicine strategies alongside conventional recommendations. It addresses the member's request for education, treatment review, and additional options to discuss with local providers:

1. Understanding the Diagnosis and Associated Symptoms and Establishing Complex Case Management Strategies

- **Confirmed late-onset Friedreich's ataxia (FRDA)** with homozygous GAA repeat expansions, explaining progressive imbalance, sensory neuropathy, and gait disturbance.

- Prognosis: slower progression compared to early-onset FRDA, but with risks of cardiomyopathy, diabetes, skeletal deformities, and neurologic disability.

- **Multisystem surveillance** is critical: neurologic, cardiac, endocrine, orthopedic, and rehabilitative domains should all be coordinated.

- Establish baseline objective measures: modified Friedreich Ataxia Rating Scale (mFARS), SARA, 25-foot walk test, 9-hole peg test, PROMIS patient-reported outcomes.

2. Review of Current Treatment Regimen

- Currently not on disease-modifying therapy.
- **No active cardiac or diabetic management** documented; baseline assessments required.
- No regular neuropathic pain medications in use; gabapentinoids or topical strategies could be introduced if symptoms become limiting.
- **Functional deficits** (imbalance, limb dysmetria, thigh tightness) currently managed without structured rehabilitation program—this should be initiated.

3. Ancillary Testing to Guide Care:

4. • **Core Baseline Panels (now, then yearly or as indicated):** CBC, CMP (renal/hepatic/electrolytes), fasting glucose, **HbA1c**; **lipid panel**; **TSH ± Free T4**; **B12 ± MMA**, folate, **25-OH vitamin D**.
5. • **Cardiac Surveillance (now; then annually, or sooner if symptomatic): ECG** and **transthoracic echocardiogram**; baseline **BNP**. Consider Holter/patch monitoring if palpitations, syncope, or unexplained falls.
6. • **Glycemic/Endocrine (every 6–12 months; sooner if borderline):** Fasting glucose, **HbA1c**; **OGTT** if values are equivocal or if symptoms suggest dysglycemia.
7. • **Bone & Musculoskeletal (baseline; repeat q2–3y if normal, earlier if osteopenia): DEXA**; calcium, phosphate, magnesium; consider **PTH** if abnormalities.
8. • **Neurologic & Functional Tracking (each visit or q6–12 months):** mFARS, SARA, timed 25-foot walk, 9-hole peg, gait/falls log; **EMG/NCS** if neuropathic symptoms progress; **repeat cervical MRI** only with new/worsening myelopathic signs.
9. • **Nutritional & Oxidative Stress (targeted/optional; repeat based on results): Thiamine (B1)**, **B6** (avoid excess), **vitamin E**, **copper/ceruloplasmin**, **zinc**; consider **CoQ10/ubiquinol**, **carnitine**, **homocysteine**, and oxidative stress markers (8-OHdG, F2-isoprostanes) where available to personalize supplementation.
10. • **Infectious/Autoimmune (if atypical features or red flags):** HIV, HBV, HCV, syphilis; **ANA** with reflex panel; **anti-MAG** in paraproteinemic contexts; **celiac serologies** if malabsorption or neuropathy pattern suggests.
11. • **Specialty Evaluations (baseline, then as indicated): Ophthalmology** and **audiology**; **speech/swallow** if dysarthria/dysphagia symptoms; **urology** for LUTS (urinalysis, post-void residual, urodynamics PRN); **sleep study** if excessive daytime sleepiness, snoring, or nonrestorative sleep.
12. • **Documentation & Education:** Maintain a consolidated results dashboard shared across specialties to support timely decisions and minimize redundant testing.

13. Additional Treatment Options

Conventional Approaches

.• **Omaveloxolone (Skyclarys):** FDA-approved for FRDA; modest mFARS improvements and potential long-term slowing of progression. Requires monitoring of LFTs, BNP, and lipids. Not yet approved in Canada; explore trial/expanded access.

- **Physical & Occupational Therapy:** Core program for balance, gait, and strength; ADL optimization; fall-prevention strategies.

- **Speech & Swallow Therapy:** Introduce early if dysarthria or dysphagia develop.

- **Cardiac Management:** Initiate cardiology follow-up; treat arrhythmias or hypertrophic cardiomyopathy with guideline-based therapy (β-blockers, ACEi/ARB).

- **Diabetes Management:** Early endocrinology involvement if glucose intolerance develops.

- **Symptomatic Neuropathy Management:** Gabapentin/pregabalin, topical lidocaine, or duloxetine for pain.

- **Orthotics/Assistive Devices:** Ankle-foot orthoses, canes, trekking poles; home safety audit.

Functional Medicine Approaches

- .**Exercise:** Low-impact aerobic (swimming, cycling), balance training, core strengthening 3–5×/week. Avoid overexertion; emphasize consistency.
- **Nutrition:** Mediterranean-style diet emphasizing antioxidant-rich foods (berries, leafy greens, nuts), omega-3s (fish, walnuts), whole grains; minimize processed foods.
- **Supplements:**
    - Coenzyme Q10 (ubiquinol)
    - Alpha-lipoic acid
    - Vitamin E
    - B-complex (avoid B6 excess)
    - Magnesium glycinate (muscle cramps, sleep support)
    - All supplementation aligned with labs and physician oversight.
- **Sleep & Mental Health:** Optimize sleep hygiene; screen for sleep apnea and fatigue; counseling or CBT for adjustment stress.
- **Community Support:** Engagement with Friedreich's Ataxia Research Alliance (FARA), National Ataxia Foundation, and peer networks.

14. Next Steps to Discuss with Local Providers

.• Arrange baseline cardiology evaluation and establish surveillance plan.

- Begin structured PT/OT program with gait and fall-prevention focus.
- Order lab panel and DEXA scan; correct deficiencies.
- Discuss eligibility for **Skyclarys clinical trials or expanded access** in the member's home country; consider cross-border care or import pathways.
- Refer to urology for persistent bladder/urethral pain.
- Establish quarterly neurology follow-up with standardized outcome tracking.
- Consider genetic counseling for family planning discussions.

9. Member Questions & Answers:

Question 1: I have been diagnosed with Friedreich ataxia. Can you explain in detail what this condition is, how it develops, and what it means for me?
Answer: Friedreich ataxia (FRDA) is a rare, inherited disorder that falls under the category of **autosomal recessive neurodegenerative conditions**. It arises because of mutations in a gene called **FXN**, located on chromosome 9. This gene normally produces a protein known as **frataxin**, which is crucial for healthy mitochondrial function. Mitochondria are the "power plants" of cells, and frataxin helps them regulate iron balance, build enzyme cofactors called **iron–sulfur clusters**, and protect against oxidative stress. When frataxin is deficient, mitochondria accumulate excess iron, cells generate harmful free radicals, and energy production becomes impaired. Over time, tissues that need high amounts of energy—such as the nervous system, the heart, and the pancreas—suffer progressive damage.
Most people with FRDA have an abnormal expansion of **GAA DNA repeats** in the FXN gene. Normally, the gene contains fewer than 33 repeats, but in FRDA, individuals may carry hundreds to over a thousand. The larger the repeat size, the earlier and more severe the disease tends to be. However, variability is large—some people develop symptoms in early childhood, while others do not until mid- or even late adulthood. FRDA usually begins with problems of balance and coordination, known as **ataxia**, and later includes **loss of vibration and position sense**, **muscle weakness**, **difficulty speaking (dysarthria)**, **difficulty swallowing (dysphagia)**, and in many cases **heart involvement** such as hypertrophic cardiomyopathy.
The natural history has been studied extensively: about one-third of patients present before age 7, another large group between 8–14, others in young adulthood, and a small but important

proportion after age 25, known as **late-onset FRDA**. The late-onset group generally progresses more slowly and has fewer repeats on average. Additional features that may develop over time include **scoliosis, foot deformities (pes cavus), bladder dysfunction, visual and hearing changes, and a predisposition to diabetes**.
In summary, FRDA is a progressive condition, but the age of onset and the specific genetic profile strongly influence the tempo. The underlying defect in frataxin production is currently not curable, but advances in therapy are beginning to provide meaningful disease-modifying options.

Question 2: Based on my current work-up, what further evaluations or imaging studies are recommended to assess the status of my Friedreich ataxia?
Answer: Because FRDA is multisystem, evaluation must go beyond neurological testing. Additional useful assessments include:

- **Cardiac testing:** Baseline **electrocardiogram (ECG)** and **echocardiogram**, with yearly follow-up. These can detect hypertrophic cardiomyopathy and arrhythmias, which are among the most serious complications of FRDA.
- **Metabolic screening: Fasting glucose** and **HbA1c** are needed to assess risk for diabetes, as FRDA predisposes to pancreatic dysfunction.
- **Bone health:** A **DEXA scan** (bone density study) is recommended, as reduced mobility contributes to osteoporosis risk.
- **Neurological follow-up:** Tools such as the **modified Friedreich Ataxia Rating Scale (mFARS)** and the **Scale for the Assessment and Rating of Ataxia (SARA)** provide objective ways to measure progression.
- **Speech and swallow evaluations:** These help identify problems early, allowing therapy to prevent aspiration and nutritional complications.
- **ENT/ophthalmology evaluations:** To track subtle changes in vision and hearing.
- **Urology assessments:** Given the frequency of bladder involvement, urodynamic testing may be helpful if symptoms appear.
- **Sleep evaluations:** Because sleep disorders can worsen fatigue, screening with a sleep study may be appropriate if symptoms arise.
- **Genetic counseling:** To explain inheritance patterns, reproductive implications, and testing for family members.
  In short, while your diagnostic work-up has already been extensive, FRDA care benefits from ongoing surveillance and multidisciplinary input.

Question 3: What treatment and management options exist for FRDA, and what role does omaveloxolone (Skyclarys) play? What are the risks and benefits of these treatments short- and long-term?
Answer: Treatment of FRDA involves both **symptomatic management** and **disease-modifying strategies**.

- **Omaveloxolone (Skyclarys):** This is the first FDA-approved drug for FRDA. It works by activating a pathway known as **Nrf2**, which boosts antioxidant defenses and supports mitochondrial metabolism. Clinical studies have shown that patients treated with omaveloxolone had **slower progression of neurological symptoms** compared to

placebo, with effects persisting in extension trials. **Risks:** The main adverse events include **liver enzyme elevations**, **gastrointestinal symptoms (nausea, diarrhea)**, and changes in **BNP and lipid levels**. Thus, patients require regular monitoring of liver function and cardiac markers. **Benefits:** In the short term, modest functional improvement; in the long term, potential slowing of disease progression, which may preserve mobility and independence.

- **Physical and occupational therapy:** Maintain flexibility, coordination, and function. Short-term benefit: better balance and fewer falls; long-term benefit: prolonged independence. Minimal risks aside from overexertion.
- **Cardiac surveillance and treatment:** Essential to detect early cardiomyopathy. Medications such as beta-blockers or ACE inhibitors can improve outcomes. Long-term, this reduces risk of heart failure.
- **Speech/swallow therapy:** Helps maintain safe swallowing and communication.
- **Pain management:** Neuropathic pain is common; medications such as gabapentin or pregabalin are often used. Risks include sedation and dizziness.
- **Diabetes care:** Regular monitoring and early intervention with lifestyle modification or medications when necessary.
- **Experimental therapies:** Clinical trials are ongoing for gene therapy, frataxin replacement, and other disease-modifying approaches.

  Overall, FRDA requires **individualized, team-based care**, combining lifestyle measures, rehabilitation, pharmacologic support, and when possible, targeted therapies like omaveloxolone.

Question 4: Since I live in [Country Redacted] where omaveloxolone is not yet available, is there a way for me to access this treatment through a clinical trial or other channels? Am I a suitable candidate?

Answer: Yes, there are potential avenues:

- **Clinical trials:** Ongoing studies of omaveloxolone and newer therapies may be recruiting. Websites like **ClinicalTrials.gov** and organizations such as the **Friedreich's Ataxia Research Alliance (FARA)** list opportunities.
- **Expanded access/compassionate use programs:** Sometimes offered by the manufacturer to patients in countries where approval is pending. Your neurologist can inquire directly.
- **Out-of-country prescription/importation:** Some patients seek access abroad under special medical importation rules. This requires careful coordination with your treating physicians and regulators.

  Regarding eligibility: Based on your **confirmed genetic diagnosis**, **late-onset phenotype**, and absence of prohibitive comorbidities, you would likely meet many trial criteria. Exclusions may still apply depending on trial age ranges, cardiac status, or other factors.

  In summary, you appear to be a strong candidate, but final eligibility must be confirmed by the specific trial's inclusion criteria and a specialist's review.

Question 5: What are the risks and benefits of enrolling in a clinical trial for FRDA therapies such as omaveloxolone?

Answer:
Benefits:

- Access to promising therapies before they are commercially available.
- Intensive medical monitoring that may detect complications early.
- Contribution to advancing research that benefits others with FRDA.

Risks:

- Possible assignment to a **placebo arm**, delaying access to the active drug.
- **Side effects** of investigational treatments, some of which may not be fully known.
- **Time and travel burdens** for trial visits.
- **Uncertain outcomes:** The drug may not work as expected.
  Informed consent in any trial will clearly outline these points. Participation is a highly personal decision balancing access, risk, and personal circumstances.

Question 6: What lifestyle and functional medicine strategies (diet, nutrition, supplements, exercise, mental health) can support me in slowing progression and maintaining quality of life?
Answer: Evidence for lifestyle interventions in FRDA is emerging but promising. Recommendations include:

- **Diet:** Adopt a Mediterranean-style diet rich in fresh vegetables, fruits, legumes, nuts, whole grains, and fish. Limit processed foods, refined sugar, and excessive red meat.
- **Supplements:** Under physician supervision, consider **CoQ10/ubiquinol**, **alpha-lipoic acid**, **vitamin E**, **omega-3 fatty acids**, and **B-complex vitamins**.
- **Exercise:** Engage in low-impact activities such as swimming, cycling, or elliptical training. Combine aerobic, balance, and strength training, adjusted for fatigue levels.
- **Sleep hygiene:** Establish regular routines; evaluate for sleep apnea if fatigue is excessive.
- **Mental health:** Regular counseling, peer support groups, and mindfulness strategies are invaluable.
- **Safety planning:** Home modifications to reduce fall risk; mobility aids such as trekking poles, canes, or orthotics when indicated.
  These strategies complement conventional therapy, improve resilience, and may reduce secondary complications.

Question 7: Are there other aspects of care or additional questions I should bring to my medical team's attention now?
Answer: Yes. Suggested topics to raise include:

- **Cardiac health:** How often should I repeat echocardiograms and ECGs?
- **Diabetes risk:** What is my schedule for ongoing glucose screening?
- **Speech/swallow function:** When should I proactively start therapy?
- **Genetic counseling:** What are my family planning options?
- **Support networks:** Are there regional or international support groups for FRDA I should join?

- **Advanced planning:** When should I prepare for mobility aids or adaptive devices? By asking these questions early, you can anticipate changes and work with your team to create a proactive, integrated plan.

10. Closing Statement

Thank you for seeking a consultation and for sharing such detailed records—your engagement made this review precise and actionable.

Key takeaways

- **Late-onset Friedreich ataxia confirmed:** This subtype typically progresses more slowly than early-onset forms, but still requires vigilant, structured monitoring given its multisystem impact (neurologic, cardiac, endocrine, musculoskeletal).

- **Systematic surveillance is critical:** Establish a personalized schedule for cardiology (ECG/echo), endocrinology (glucose/HbA1c), bone density scans, and repeat neurological functional metrics (mFARS, SARA, timed walk tests). Surveillance should also extend to ophthalmology, audiology, and urology as clinically indicated.

- **Immediate action items:** Begin cardiometabolic screening, initiate tailored rehabilitation programs (PT/OT with fall-prevention focus), and implement home safety adaptations to reduce fall risk and preserve independence.

- **Disease-modifying strategies:** Explore access to omaveloxolone (Skyclarys) where possible, while simultaneously reviewing eligibility for clinical trials or expanded-access programs. Careful monitoring of liver enzymes, cardiac biomarkers, and lipid profile is essential if initiating therapy.

- **Lifestyle and functional medicine integration:** Adopt an anti-inflammatory, antioxidant-rich diet (Mediterranean-based), supplement judiciously with evidence-aligned agents (CoQ10, ALA, vitamin E, magnesium), and prioritize consistent aerobic + balance exercise tailored to tolerance. Emphasize restorative sleep, stress management, and psychosocial support.

- **Education and care coordination:** Ensure the member and family receive clear education on disease trajectory, red-flag symptoms (dysphagia, new weakness, palpitations, syncope), and escalation protocols. Multidisciplinary communication is vital for long-term stability.

Please share this report

Please share this report with your treating clinicians so your team can align on execution.

Collaborative care & implementation

We will coordinate follow-up at 3 months (earlier if new neurologic or cardiopulmonary symptoms). A shared care plan and metric dashboard can be provided to your local team upon request.

Electronically Signed:

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