# Case Study

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NUR580-Beginning Level Family Clinical

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**MEDICINE**
**is a science of**
**UNCERTAINTY**
**and an art of**
**PROBABILTY**

*William Osler*

*“I’ve been so tired lately”*

# History of Present Illness

- 47-year-old white female, presents for annual well exam
- During ROS patient reveals that she has been “dragging” for the “past couple of weeks”. She states this fatigue has started gradually, is not interfering in her daily activities, and that she thinks it is likely due to covering for a co-worker who has been out on pregnancy leave at work. She notices that it is particularly after lunchtime when she teaches her afternoon classes. Otherwise, she states she is sleeping and eating well and rates her health as a 9 or 10/10.
- Height: 5’4  Weight 128 lbs.
- BMI: 22.0

# Past health history

**Past Medical History**

- Mononucleosis age 23
- 2 past uncomplicated pregnancies ending in live births 2001, 2003
- Menorrhagia onset age 41
- Hashimoto's thyroiditis, age 44, takes synthroid

**Past Surgical History**

- ORIF L wrist for sports injury age 21
- Cesarean sections for both births
- Laparoscopic Hysterectomy 2016 for menorrhagia
- No other traumas/hospitalizations/transfusions

# Family History/Social History

- Patient is a college graduate, married, lives in own home with spouse of 20 years, and 2 male children ages 16 and 18.  Describes family as close, well adjusted.
- Patient denies religious affiliation, Volunteers and community teaching fitness techniques to children
- Patient works approximately 40 to 50 hours per week at local women's fitness center as a fitness and yoga instructor. Runs outdoors when not working.
- Patient normally teaches four classes per day, is currently teaching 5 to 7
- patient denies tobacco use, illicit drug use, social alcohol use 2 to 3 glasses of wine per week, one coffee each morning otherwise avoids caffeine

# Family/social history (continued)

- Family history significant for coronary artery disease, father died of MI at age 58.  Mother currently alive and well, living independently, with no significant medical events at current age of 72.
- Patient has two siblings, a brother age 40,  and a sister age 42 both are alive and healthy with no significant medical or psychological  histories
- Patient denies family history of cancer, endocrine, hematologic disorders, obesity, mental health issues
- Husband and sons with no significant medical history, low economic stress
- patient has good health insurance coverage through husband’s employer

# Medications/ allergies /Immunizations /nutrition

- **Allergies:** no known drug, ,supplement or environmental allergies
- **Medications**: Synthroid 100 MCG PO daily, women‘s multi vitamin PO daily
- **Immunizations**: flu vaccines yearly, last October 2019, States no other vaccines received since childhood
- **Nutrition**: patient states she eats very healthy high protein “lowish” carbohydrate diet to sustain physical demands of employment and that her diet is high in consumption fruits and vegetables. Patient states she does not pay much attention to caloric intake because she has high caloric output. Patient drinks approximately 100 ounces of water daily, and is an avid tea drinker.

# Review of Symptoms

**General**: Patient denies fevers, chills, night sweats, changes in appetite. States she has felt fatigued for the past two weeks and has lost a couple of pounds in that time, which she attributes to “working more”. Patient regularly sleeps 7 to 8 hours a night uninterrupted.

**Skin:** Patient denies history of rashes, urticaria, changes in growth or texture in hair or nails, or areas of hyperpigmentation.

**HEENT:** Denies any history of head trauma, headaches, dizziness, mouth, throat, nose or ear issues. Patient denies allergies, States she infrequently gets colds. States vision is 20/20 uncorrected.

# Review of symptoms (continued)

**Breasts:** Patient denies breast changes, pain or tenderness, discharge or lumps performs self exam monthly

**Respiratory:** Patient denies cough, wheezing, DOE, orthopnea, history of asthma, bronchitis TB or chest X Rays

**Cardiac/PV:** Patient denies history of hypertension, heart murmur, palpitations, peripheral edema, DVT, previous cardiac issues or testing, states she has no difficulty exercising for long periods of time

**GI:Patient denies nausea, vomiting, abdominal pain, food intolerance, constipation or diarrhea**

# review of symptoms (continued)

**GU:** Patient denies polyurea, nocturia, burning or pain on urination, hematuria, urgency, history of UTI, kidney stones or flank pain

**OB/GYN:** Patient amenorrhagic since hysterectomy in 2016. Patient denies menopausal symptoms patient is sexually active with husband denies STD‘s. Last pap smear January 2020. Patient with two live cesarean births, denies  miscarriage, abortion.

**Musculoskeletal:** Patient denies muscle or joint pain, stiffness, tenderness or swelling, patient denies back pain , history of disc disease, arthritis, or gout

**Neurological:** Patient denies dizziness fainting loss of consciousness , seizures, weakness, numbness, tingling, change in sensation, speech difficulty, and changes in memory.

# Review of symptoms continued

**Hematological:** Patient denies past diagnosis of anemia, easy bruising or bleeding

**Endocrine**: Patient diagnosed with Hashimoto‘s disease in 2017.  Patient denies sensitivity to heat and cold,, excessive sweating, thirst, hunger , or polyurea.

**Psychiatric**: Patient denies mental health history, depression, anxiety. States she Feels well and is generally happy and outgoing.


# Differential Diagnosis: fatigue

# Differential diagnosis: fatigue

- Hypothyroidism
- Bacterial/Viral infection
- Anemia
- Congestive heart failure
- Cancer
- Mononucleosis
- Autoimmune disease
- Lyme disease
- Hepatitis
- Fibromyalgia
- Depression/anxiety
- Overwork exhaustion
- Some medications: such as antihistamines, psychotropics, tranquilizers, anti hypertensives, benzodiazepines
- Obstructive sleep apnea

# Physical exam

**Vitals**: BP: 115/74, **HR:** 64, **RR:** 14 **Temp**: 98.4

**Height:** 5’4 **Weight:** 128 lbs. **BMI:** 22.0

**General:** Patient is a well nourished, physically fit, 47-year-old female , substantially younger appearing than age. Patient is alert and oriented, a good historian, insightful, and presents as knowledgeable on matters of health and nutrition

**Skin:** Warm, dry. Nails smooth, in good condition, good capillary refill without clubbing or cyanosis. changes. Hair on head is full, lustrous. No signs of integumentary trauma, hyperpigmentation, lesions, signs of cancer.

# Physical exam continued

- **HEENT:** Head normocephalic, atraumatic. Patient with full neck ROM. No lymphadenopathy or pain on palpation. Trachea midline, no goiter, carotid pulses palpable. No nasal obstructions, secretions, sinuses without pain to palpation. Oral cavity pink and moist with good dentition. Mouth and tongue pink and moist. No pain or swelling of pinna, tragus, tympanic membranes clear, bony landmarks visualized B/L.
- **Respiratory:** Lung sounds clear throughout bilaterally. No adventitious sounds present. AP diameter 2:1, Breathing unlabored, symmetrical chest excursion. No tactile fremitus, no pain on palpation throughout lung fields.
- **Cardiovascular:** HR Reg, Bradycardic, 58bpm at PMI 5thLICS-MCL, no murmurs, heaves or thrills. S1, S2 intact, no S3, S4. DP/PT palpable B/L, no peripheral edema, good capillary refill all extremities.

# Physical exam continued

- **Breast/Gyn**: Deferred: see specialist report 1/2020
- **GI:** Abdomen is round/symmetrical to inspection. Bowel sounds present in all quadrants. No organomegaly of liver or spleen; pain/tenderness on palpation.
- **Genitourinary:** No costovertebral pain on palpation, kidneys appreciated, genital examination deferred.
- **Musculoskeletal:** Ambulates well, full ROM, well defined musculature, mass symmetrical, strength 5/5 all extremities
- **Neurologic:** Patient A & Ox3 affect appropriate. Behavior, abstract reasoning abilities and information processing within expected parameters. Patient is a good historian with excellent short term and long-term recall. CN I-XII intact. Gait steady, Romberg positive. Patient with plus 2 deep tendon reflexes in biceps, triceps, patella, achilles and positive plantar reflex B/L

# Tests/Labs

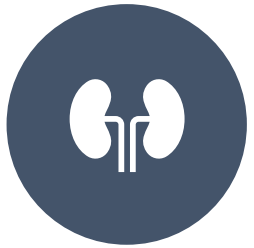
- Last CMP/BMP results from Endocrinology 12/2019 -WNL.
- Thyroid panel:
- TSH: 2.8 ml/Ul
- FT4: 1.4 ng/dl
- T3: 124 ng/dl, (normal)

# What to Order Now?

- CBC/CMP
  - R/O Anemia,
  - R/O Bacterial and Viral etiologies
- Re-check thyroid panel
  - R/O need for synthroid adjustment
- Lyme titer-runs outdoors
- A1c-stated tiredness is post-prandial
- Lipid panel-this is a well screening

# Results

CBC/CMP-normal, except WBG is 121



Re-check thyroid panel-normal

Lyme titer-negative

A1c-5.9 (prediabetic)

# Pre-Diabetic?

- Patient is 47, young for Type II, old for Type I
- Patient has low BMI, is physically fit, good nutrition, no social risk factors
- Patient has lost weight, not gained it
- Patient states only stress is working more
- No familial or gestational diabetic history

# Next Steps

- **Labs:** Fasting glucose
- Result:124 mg/dl
- **Patient:** called to schedule an appointment
- Diabetic teaching
- Prescribe Metformin- 500mg BID
- Refer to Endocrinology

# Three Months Later….

Patient returns for fatigue, polyuria wants to R/O UTI

Follow-up on endocrine status as part of the visit

Patient reports stopping metformin after hypoglycemic episodes

Labs ordered: UA, A1c, CBC/PF1

# Results:

- UA-negative
- A1C 6.3
- WBG-136

# Now You're a Believer

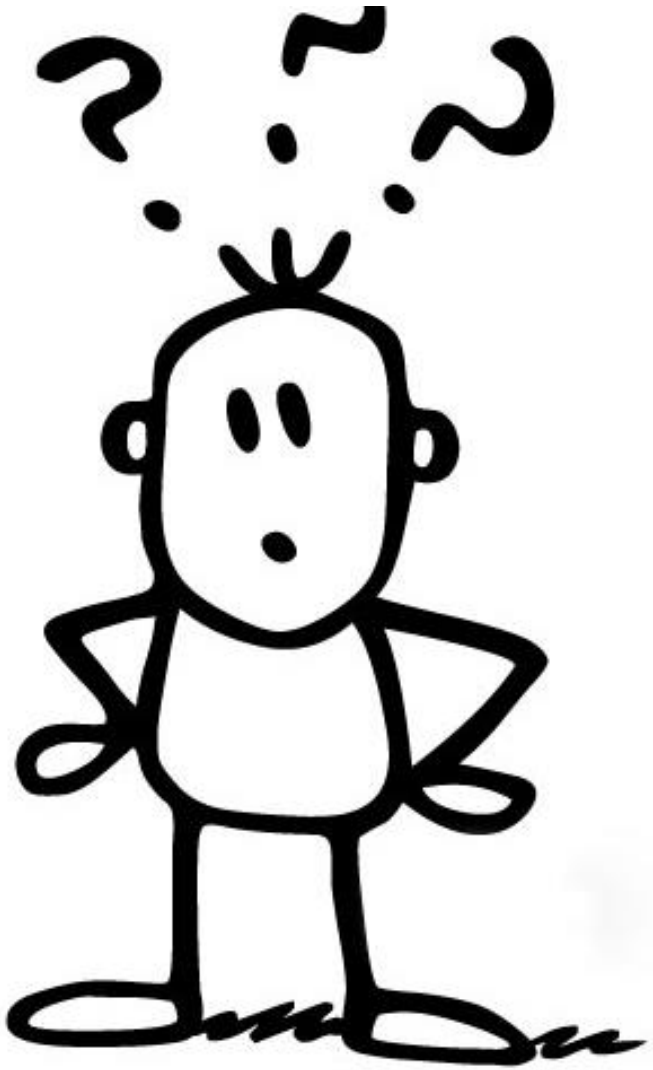
**Treat**
- Treat for diabetes

**Prescribe**
- Reinitiate: Metformin 500mg BID

**Refer**
- Call Endocrinology and schedule earliest appointment

**Initiate**
- at home glucose testing BID

7 months after Initial visit you receive report from patient’s endocrinologist mentioning inpatient hospitalization for uncontrolled diabetes



# What Happened?

# New Diagnosis: LADA (Latent Autoimmune Diabetes in Adults)

- Frequently misdiagnosed: between 10% and 20% of Type II diagnoses may be LADA (O'Neil, Johnson, & Panak, 2016)
- Type of diabetes that exists in between Type I and Type II, so patients may have clinical features of both
  - In common with Type I: Low fasting C-peptide, positive for GAD antibodies
  - In common for type II: Initial control with lifestyle changes, oral medications(Fourlanos et al., 2006)

# Features of LADA continued

- Patients will often have polydipsia, polyurea, lethargy and hunger but often unexplained *weight loss* associated with Type I (Lutgens et al.)
- Autoimmune: the patient's immune system attacks B cells, gradually destroying them to the point where the patient may become insulin dependent by 6 months.
- Clinically suggested when a patient has a BMI<25 and a history of an autoimmune disorder

# Differentiation between types of diabetes

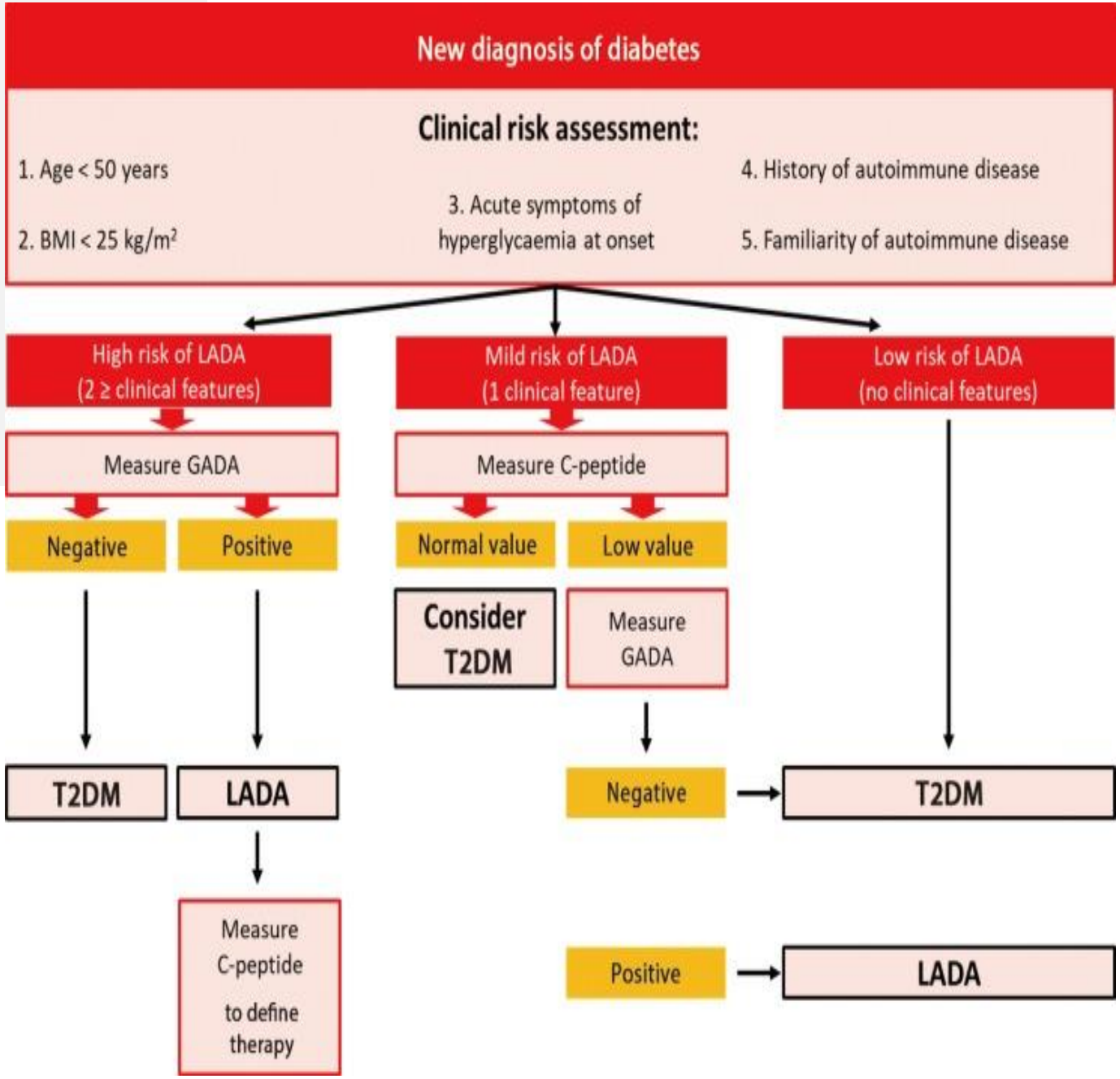
**Table 1**

**Clinical, biochemical, and pathogenetic features of T1DM, LADA, and T2DM**

| | T1DM | LADA | T2DM |
|---|---|---|---|
| Clinical features | | | |
| Age at onset | Childhood/adolescence | 30–50 yr | Adulthood |
| Symptoms of hyperglycemia at onset | Frequently acute | Subclinical (rarely acute) | Silent/subclinical |
| Insulin requirement | At diagnosis | >6 mo after diagnosis | Absent or years after diagnosis |
| Insulin resistance | No change | Increased/no change | Increased |
| BMI | <25 kg/m$^2$ (frequently <18 kg/m$^2$) | >25 kg/m$^2$ (rarely >25 kg/m$^2$) | >25 kg/m$^2$ |
| Risk of long-term complications at diagnosis | Low | Low | High |
| Biochemical features | | | |
| Islet-cell autoantibodies | High titre (rarely low) | High/low titre | Absent |
| C-peptide levels at diagnosis | Non-detectable (rarely decreased) | Decreased but still detectable | Normal/ increased |
| Pathophysiology features | | | |
| MHC association | High risk | High/mild risk | Mild risk |
| Family history of diabetes | Negative/positive | Negative/positive | Frequently positive |
| Family history of autoimmune disease | Frequently positive | Frequently positive | Negative (no correlation) |

(Pieralice & Pozzili, 2018, table 1)

# Differentials And lab testing




(Pieralice & Pozzili, 2018, table Fig 2)

# Diagnostic lab values

- C-peptide (associated with presence of insulin normal is .8 to 3.1 ng/mL ) normal and will decrease
- GADAb test (Glutamic Acid Autoantibodies)-positive above 0.95 u/ml)
- ICA (Islet cell antigens)- positive
- ZNT8A (Zinc transporter autoantibodies)-measures Zn transport into insulin a beta cells-most sensitive, most expensive

(O'Neil, Johnson, & Panak, 2016, p. 459; Chatzianagnostou, Iervesi, & Vassalle, 2016)

# Treatment Considerations

- There is no generally recommended therapy for LADA(Chatzianagnostou, 2016)
- Patients with LADA will progress to insulin dependence much more rapidly than Type II diabetics (Fourlanos et al., 2006)
- Once LADA is confirmed, initiate insulin therapy to attain better glycemic control to prevent long term complications
- Once confirmed, screen for other autoimmune disorders
- Sulfonylureas should be avoided because they increase rate of c-peptide secretion, further decreasing insulin levels (O'Neil, Johnson, & Panak, 2016)

# Back to our patient

In Hospital:

A1C 11.2

Admitting WBG: 510

C-Peptide-0.5 ng/mL (low)

GAD-198 U/ml (positive)

ICA (Islet cell antigens)- positive

# Our patient at 9 months

## Lab Values

A1C: 6.9

WBG: 138

C-Peptide-0.3 ng/mL (low)

GAD-unchanged

ICA (Islet cell antigens)-unchanged

## Medications/Lifestyle

- Continues active lifestyle
- Continues good nutrition-is careful to avoid hypoglycemia
- FS: QID
- Lantus 30 QHS
- 4-8 units lispro before meals depending on FS and meal content

References

Chatzianagnostou, K., Iervesi, G., & Vassalle, C. (2016). Challenges of LADA diagnosis snd treatment: lessons from 2 case reports. *American Journal of Therapeutics*, *23*, 1270-1274. http://dx.doi.org/10.1097/MJT.0000000000000349.

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