Registrar Education Series

Diabetes

Sharing knowledge, strengthening health systems, saving lives

Diabetes CASES

Seed Global Health

Case 1

Chief Concern

Histories

PE

1 week f/u

2 year f/u

5 year f/u

Seed Global Health

Chief Concern

Maurice, a 43yoM carpenter with a past medical history of obesity and hypertension who presents to the Kanyama hospital with a 1 month history of fatigue, polyuria, polydipsia and discharge from his foreskin.

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Histories

HPI: No other symptoms. Denies chest pain, shortness or breath, numbness/tingling, skin sores, vision changes. Is monogamous.

PMH: RVD-NR, Hypertension. No history of MI, CVA, CKD.

MEDS: none

PSH: none

FH: Diabetes, Hypertension, Hyperlipidemia

Social: Lives with his wife and 3 children. He has grade 9 education. Eats nshima twice a day, wife does all the cooking. Drinks several beers on the weekend and smokes when he goes out to drink. Likes to watch football but is not active himself. Works as a carpenter.

Seed Global Health

Physical Exam

Vitals: T: 37.1, HR: 72, BP: 156/92, RR 16, Weight 100kg

GEN: No acute distress.

Eyes: No abnormalities on fundoscopic exam OS or OD (OU)

CV: S1, S2 present Regular rate and rhythm No murmurs/rubs/gallops. DP 2+ b/l

RESP: CTAB. No wheezes/rhonchi/crackles

ABD: Soft non-tender, nondistended. Bowel sounds present

NEURO: Sensation intact 5/6 on L and 6/6 R foot

SKIN: No redness, sores or callouses on feet b/l

Assessment

Seed Global Health

Assessment

Maurice is a 42yoM with a PMH of HTN and obesity with what appears to be metabolic syndrome and likely has type II diabetes.

There is no reason to hospitalize at this point, can order investigations and medications and have follow up in OPD once labs return.

Labs

Seed Global Health

Glucose	
A1c	
RBS	12.3

Renal
Na
K
Bicarb
Cl
BUN
Cr
Glucose

UA	
LE	Positive
Blood	Negative
Nit	Negative
Glucose	High

Lipids
Cholesterol
LDL
HDL
Trigs

Plan

Seed Global Health

Plan

Maurice is a 43yoM with a PMH of DM, HTN and obesity with uncontrolled sugars.

Uncontrolled newly diagnosed DM
A1c goal <7.0, Goal fasting 4.4 – 7.2, goal PP <10
BP: uncontrolled, Goal <140/90, start nifedipine 20mg
A1C ?, ascvd ?%, GFR ?, Urine protein negative – update labs
Medications: Start metformin titration at 500mg daily increasing every 3 days until at 1g bd. Will likely need more anti-glycemics. Plan to start those when he returns with A1c and is on a therapeutic dose of metformin.
Not indicated: aspirin, will check ASCVD for need for statin
Last eye exam: 11/2022 no DR
Last foot exam: 11/2022 skin, sensation and pulse normal
Diet/Exercise: working on goals, counseled
Needs the following vaccines: HepB#1, PPV23, flu and COVID booster
Return to OPD in 1 week with labs

Seed Global Health

1 week follow up

Vitals: T: 37.1, HR: 72, BP: 128/84, RR 16, Weight 100kg

Started metformin. Is now taking 1g bd without any GI issues.
Was not able to get vaccines.
Brought lab results with him.
Has not started to exercise but is willing to cut down on the number of beers he has.

Labs

Seed Global Health

Glucose	
A1c	9.6
RBS	12.3

Renal	
Na	137
K	4.1
Bicarb	23
Cl	110
BUN	9
Cr	97
Glucose	13.1

UA	
LE	Positive
Blood	Negative
Nit	Negative
Glucose	High

Lipids	
Cholesterol	7.7
LDL	4.8
HDL	0.91
Trigs	1.1

Plan

Seed Global Health

Plan

Maurice is a 43yoM with a PMH of DM, HTN, Hyperlipidemia and obesity.
Uncontrolled newly diagnosed DM
A1c goal <7.0, Goal fasting 4.4 – 7.2, goal PP <10
BP: controlled – goal <140/90, continue nifedipine 20mg
A1C 9.6, ascvd 21.9%, GFR >60, Urine protein negative from 11/2022
Medications: Metformin 1g bid. Add Sitagliptin 100mg and empagliflozin 25mg as well as atorvastatin 20mg.
Not indicated: aspirin
Last eye exam: 11/2022 no DR, repeat in 2 years if glucose is controlled
Last foot exam: 11/2022 skin, sensation and pulse normal, repeat yearly
Diet/Exercise: working on goals, says he can cut down on beer and walk 2 days a week
Needs the following vaccines: HepB#1, PPV23, flu and COVID booster
Return to OPD in 3 months with an A1c prior to the visit

3 month f/u

Seed Global Health

3 month follow up

Vitals: T: 37.1, HR: 72, BP: 128/84, RR 16, Weight 92 kg

Taking triple oral therapy without any issues.
Received the COVID booster and PPSV23.
A1c is 6.8.
Told to continue plan and return in 6 months.

Seed Global Health

2 year follow up

Vitals: T: 37.1, HR: 72, BP: 128/84, RR 16, Weight 110 kg

Did well on triple therapy, A1c has been well controlled every 6 months. Has noticed lately his energy level is down and he has been gaining weight. He currently has an unrestricted diet and stopped walking.

Denies chest pain, shortness of breath. Has had some tingling in his toes and his vision is a little blurry.

Brought latest labs with him.

Seed Global Health

Physical Exam

Vitals: T: 37.1, HR: 72, BP: 147/88, RR 16, Weight 110kg

GEN: No acute distress.

Eyes: cotton wool spots and micro hemes on fundoscopic exam OU

CV: S1, S2 present. Regular rate and rhythm. No murmurs/rubs/gallops. DP 1+ b/l

RESP: CTAB. No wheezes/rhonchi/crackles

ABD: Soft non-tender, nondistended. Bowel sounds present

NEURO: Sensation intact 4/6 on L and 3/6 R foot

SKIN: No redness, sores or callouses on feet b/l

Seed Global Health

Glucose 2024	
A1c	8.3
RBS	10.9

Renal 2024	
Na	137
K	4.1
Bicarb	23
Cl	110
BUN	9
Cr	140
Glucose	11.6

UA 2024	
LE	Negative
Blood	Negative
Nit	Negative
Glucose	Moderate
Protein	3+

Lipids 2022	
Cholesterol	7.7
LDL	4.8
HDL	3.4
Trigs	1.1

Plan

Seed Global Health

Plan

Maurice is a 44yoM with a PMH of DM, HTN, HLD, CKD III, retinopathy, neuropathy and obesity with a history of well controlled DM for the last two years, now uncontrolled on triple oral therapy.
A1c goal <7.0, Goal fasting 4.4 – 7.2, goal PP <10
BP: uncontrolled – goal <140/90, stop nifedipine 20mg and start telmi/H
A1C 8.3, ascvd 18.3%, GFR 55, Urine protein 3+ from 11/24
Medications: Continue Metformin 1g bid, Sitagliptin 100mg, empagliflozin 25mg, atorvastatin 20mg. Add NPH 6u AM, 4uPM
Not indicated: aspirin
Last eye exam: 11/2024 mild DR repeat in 1 year
Last foot exam: 11/2024 neuropathy with decreased pulses repeat in 3 - 6 months
Diet/Exercise: Relapsed, appears precontemplative. Motivational interviewing to have him identify benefits of lifestyle change
Vaccines: UTD with HepB, PPV23, flu and COVID
Return to OPD in 1 week with fasting and pre-dinner values in order to start self titration at home.

1 week f/u

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1 week later

Vitals: T: 37.1, HR: 72, BP: 127/78, RR 16, Weight 110kg

Brought his glucose log

Has been taking the insulin as instructed and only complaints are of a sore L index finger where he checks his sugar and a sore stomach where he injects every time. Is willing to cut the nshima in half and increase the vegetable relish.

Fasting	Post break	pre lunch	Post lunch	Pre Dinner	Post Dinner	Before bed
8.7				11.2		
8.4				10.8		

Plan

Seed Global Health

Plan

Maurice is a 44yoM with a PMH of DM, HTN, HLD, CKD III, retinopathy, neuropathy and obesity with a history of well controlled DM for the last two years, now uncontrolled on triple oral therapy recently started on basal insulin.
A1c goal <7.0, Goal fasting 4.4 – 7.2, goal PP <10
BP: controlled – goal <140/90, continue telmisartan/Hydrochlorothiazide
A1C 8.3, ascvd 18.3%, GFR 55, Urine protein 3+ from 11/24
Medications: Continue Metformin 1g bid, Sitagliptin 100mg, empagliflozin 25mg, atorvastatin 20mg. NPH 6u AM, 4uPM, self titrate 2u QOD until at goal, with a max total daily insulin of 40u prior to starting bolus insulin.
Not indicated: aspirin
Last eye exam: 11/2024 mild DR repeat in 1 year
Last foot exam: 11/2024 neuropathy with decreased pulses repeat in 3 - 6 months
Diet/Exercise: Working on decreasing nshima and increasing vegetables.
Vaccines: Up to date with HepB, PPV23, flu and COVID
Return to OPD in 2 weeks after self titration at home to evaluate numbers.

2 week f/u

Seed Global Health

2 weeks later

Vitals: T: 37.1, HR: 72, BP: 124/80, RR 16, Weight 112 kg

No more pain now that he is alternating injection sites.

Denies chest pain, shortness of breath. Continues with tingling in his toes and his vision has improved.

Currently on 14u AM and 8u PM of NPH

Fasting	Post break	pre lunch	Post lunch	Pre Dinner	Post Dinner	Before bed
6.6				7.1		
5.9				7.4		

Plan

Seed Global Health

Plan

Maurice is a 44yoM with a PMH of DM, HTN, HLD, CKD III, retinopathy, neuropathy and obesity with a history of well controlled DM for the last two years, now with controlled fasting sugars on triple oral therapy and basal insulin.
A1c goal <7.0, Goal fasting 4.4 – 7.2, goal PP <10
BP: controlled – goal <140/90, continue telmisartan/Hydrochlorothiazide
A1C 8.3, ascvd 18.3%, GFR 55, Urine protein 3+ from 11/24
Medications: Continue Metformin 1g bid, Sitagliptin 100mg, empagliflozin 25mg, atorvastatin 20mg. NPH 14uAM, 8uPM
Not indicated: aspirin
Last eye exam: 11/2024 mild DR repeat in 1 year
Last foot exam: 11/2024 neuropathy with decreased pulses repeat in 3 - 6 months
Diet/Exercise: Working on decreasing nshima and increasing vegetables.
Vaccines: Up to date with HepB, PPV23, flu and COVID
Return to OPD in 3 months with an A1c prior to visit, can decrease checks to every other day or when he feels symptoms of hypoglycemia.

3 month A1c

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3 month A1c

A1c: 6.8

Has visit q 6 months

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5 year follow up worsening CKD and ulcer

Doing well on triple therapy, basal insulin and had bolus insulin added a year ago but renal function has slowly been worsening and he developed an ulcer on his foot which he has had to have debrided over the last 2 months.

Denies chest pain, shortness of breath. Does not have sensation in his toes. No vision changes.

Brought latest labs with him.

Labs

Seed Global Health

Glucose 2027	
A1c	7.1
RBS	5.2

Renal 2027	
Na	137
K	4.1
Bicarb	23
Cl	110
BUN	9
Cr	160
Glucose	5.7

UA 2027	
LE	Negative
Blood	Negative
Nit	Negative
Glucose	Moderate
Protein	3+

Lipids 2022	
Cholesterol	7.7
LDL	4.8
HDL	3.4
Trigs	1.1

Seed Global Health

Physical Exam

Vitals: T: 37.1, HR: 72, BP: 127/84, RR 16, Weight 115kg

GEN: No acute distress.

Eyes: cotton wool spots and micro hemes on fundoscopic exam OU

CV: S1, S2 present. Regular rate and rhythm. No murmurs/rubs/gallops. DP absent b/l

RESP: CTAB. No wheezes/rhonchi/crackles

ABD: Soft non-tender, nondistended. Bowel sounds present

NEURO: Sensation intact 1/6 on L and 2/6 R foot

SKIN: No redness, healed ulcer on the L 1st metatarsal head.

Plan

Seed Global Health

Plan

Maurice is a 47yoM with a PMH of DM, HTN, HLD, CKD IIIB, retinopathy, neuropathy and obesity with a history of well controlled DM for the last two years, now with controlled fasting sugars on triple oral therapy and basal insulin.
A1c goal <7.5 due to CKDIIIB and PAD, Goal fasting 5.0 – 7.2, goal PP <10
BP: controlled – goal <140/90, continue telmisartan/Hydrochlorothiazide
A1C 7.1, ascvd 18.3%, GFR 39, Urine protein 3+ from 11/27
Medications: Continue Metformin 1g bid, Sitagliptin 100mg, empagliflozin 25mg, atorvastatin 20mg. Decrease NPH 10AM, 4uPM
Not indicated: aspirin
Last eye exam: 11/2027 moderate DR repeat in 6 months
Last foot exam: 11/2027 neuropathy with decreased pulses and a previous healed wound repeat at every visit and get run off study
Diet/Exercise: At goal.
Vaccines: Up to date with HepB, PPV23, flu and COVID
Send new glucose #s in a week to see if sugars stay in controlled range

1 week f/u

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1 week

Fasting	Post break	pre lunch	Post lunch	Pre Dinner	Post Dinner	Before bed
6.9				7.7		
7.1				8.2		

Has visits every 3 months for CKD and for foot exams. Every 6 months for A1c confirmation.

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Case 2

Chief concern

Histories

PE

6 month f/u

2 year f/u

10 year f/u

Seed Global Health

Chief Concern

Gift, a 52yoF with a past medical history of obesity who presents to Chilenje casualty with chest pain and shortness of breath

Seed Global Health

Histories

HPI: Chest pain is described as pressure and started 6 hours ago while cleaning the house. Associated with SOB, diaphoresis and nausea. Improves a little when she rests. Has been fatigued over the last few months and has unintentional weight loss.

PMH: None, RVD-NR, TB negative

MEDS: none

FH: hypertension, diabetes

Social: Stays in Chilenje with her husband who she has been married to for 30 years. Is a marketeer. Does not drink alcohol or smoke. She has 4 children and 6 grandchildren.

Seed Global Health

Physical Exam

Vitals: T: 37.1, HR: 72, BP: 128/88, RR 20, Weight 70kg

GEN: Appears anxious, skin is clammy.

CV: S1, S2 present Regular rate and rhythm No murmurs/rubs/gallops.

RESP: Clear to auscultation bilaterally. No wheezes/rhonchi/crackles

ABD: Soft non-tender, nondistended. Bowel sounds present

MSK: No tenderness to palpation of chest wall

Assessment

Seed Global Health

Assessment

Gift is a 52yoF with a PMH of obesity who presents with exertional chest pain concerning for acute coronary syndrome.

Needs ECG, A1c, U/Cr/electrolytes, lipids, cardiac enzymes and POCUS echo

Imaging

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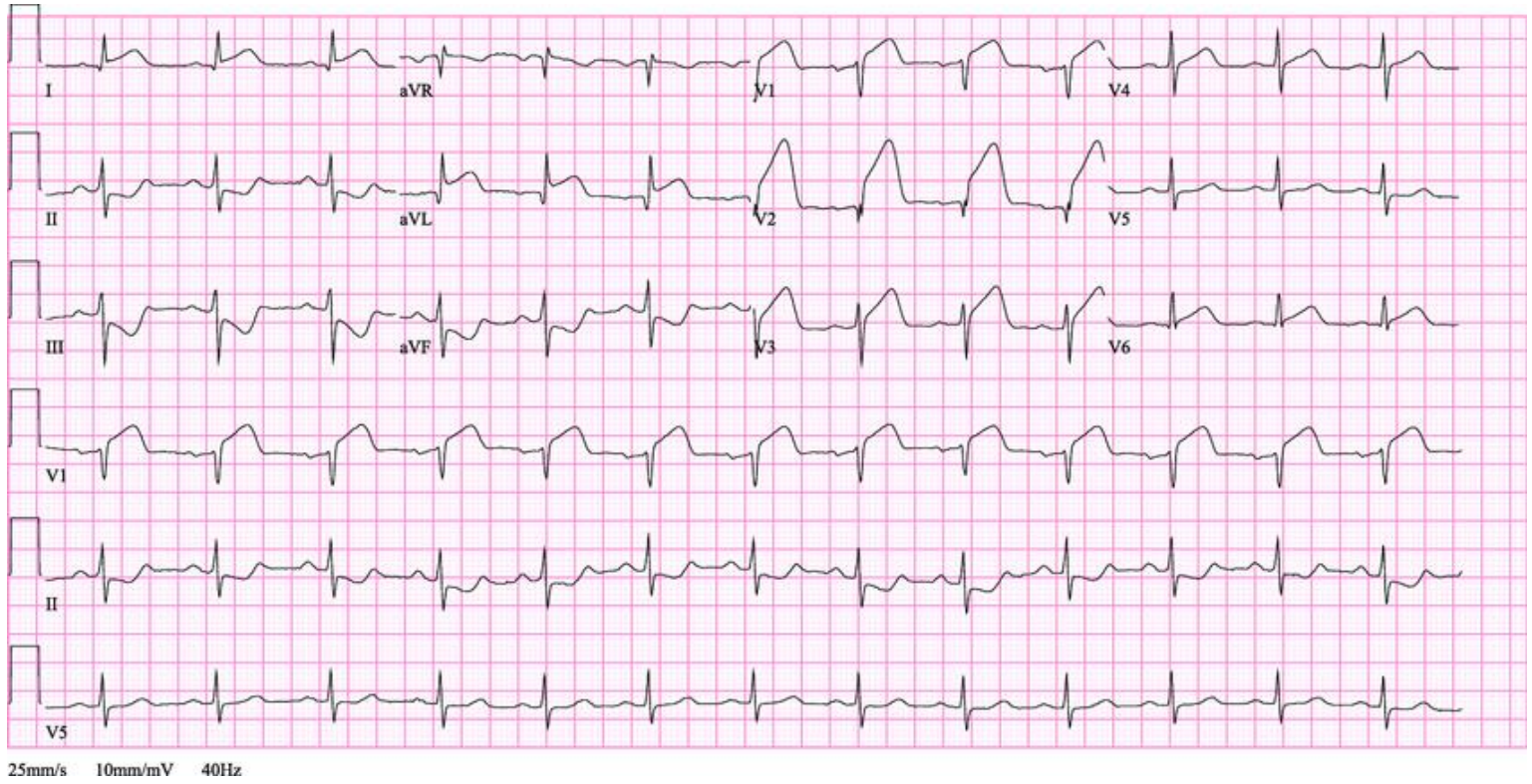
Imaging

ECG



U/S: anterior wall motion abnormalities, hypokinesis with an EF of 39%

Labs

Seed Global Health

Glucose 2022	
A1c	14.5
RBS	22.1

Renal 2022	
Na	135
K	4.2
Bicarb	23
Cl	112
BUN	9
Cr	0.8
Glucose	21.8

Cardio/Pulm 2022	
Trop	2.5
CKMB	37
D-dimer	43

Lipids 2022	
Cholesterol	4.0
LDL	2.8
HDL	1.42
Trigs	3.2

Plan

Seed Global Health

Plan

Gift is a 52yoF with a PMH of DM, acute MI and ischemic cardiomyopathy with uncontrolled newly diagnosed DM
A1c goal <7.5, Goal fasting 5.0 – 7.2, goal PP <10
BP: controlled
A1C 14.5, ascvd 1.9%, GFR >60, Urine protein unknown
Medications: Start metformin titration at 500mg daily increasing every 3 days until at 1g bd. Add liraglutide 0.6mg and empagliflozin 25mg for A1c and cardioprotection. Start NPH 10uAM and 4uPM as well as R 4u with meals.
Start low dose aspirin and atorvastatin 80mg.
Start enalapril 2.5mg and carvedilol 3.125 bd for ischemic cardiomyopathy.
Needs the following vaccines: HepB#1, PPV23, flu and COVID booster
Nurses to check pre and post meal RBS while in the hospital as well as BP bd.

Hospital course

Hospital Course

Gift's chest pain and shortness of breath resolve within 2 days and her sugars become controlled on metformin 1g bd, liraglutide 1.8mg and empagliflozin 25mg with NPH 14uAM and 6uPM and R 4u with meals.
BP could not tolerate target doses so she is discharged on enalapril 5mg and carvedilol 6.25mg bd.
She is continued on aspirin 75mg and atorvastatin 80mg.
She is discharged with f/u in OPD in 1 week.

Seed Global Health

6 month f/u

Vitals: T: 36.9, HR: 62, BP: 96/68, RR 16, Weight 75kg

Takes all medications as prescribed from discharge at the hospital and has not had a recurrence of CP, SOB, edema, orthopnea.
Decreased nshima and walks in the morning.
Her eye exam revealed moderate diabetes retinopathy and her urine protein was elevated.
She recently had labs and a repeat echo which demonstrated a normal EF with no structural abnormalities.
Her only complaint if of occasional dizziness

Fasting	Post break	pre lunch	Post lunch	Pre Dinner	Post Dinner	Before bed
4.8	5.2		5.5	4.4	5.1	
4.6	4.4		4.9	4.8	4.9	

Labs

Seed Global Health

Glucose 2023	
A1c	6.3

Urine 2023	
Protein	1+

Plan

Seed Global Health

Plan

Gift is a 52yoF with a PMH of DM, MI, moderate diabetic retinopathy and resolved ischemic cardiomyopathy with overcontrolled diabetes.
A1c goal <7.5, Goal fasting 5.0 – 7.2, goal PP <10
BP: Overcontrolled, can stop betablocker +/- ACEI depending on symptoms
A1C 6.3, ascvd 1.9%, GFR >60, Urine protein 1+
Medications: Change to combo metformin/empagliflozin 1g/12.5 bd.
Continue liraglutide 1.8mg and NPH 14uAM and 6uPM.
Stop Regular insulin
Last eye exam: 02/2023 moderate DR repeat in 6 months
Last foot exam: 11/2022 skin, sensation and pulse normal
Diet/Exercise: At goal
Vaccines: UTD with HepB#3, PPV23, flu and COVID booster
Return to OPD in 3 months for an A1c, come sooner if sugars spike of regular insulin

Seed Global Health

2 year f/u

Vitals: T: 36.9, HR: 80, BP: 112/70, RR 16, Weight 68kg

Continues to do well with medication adherence and lifestyle.
Her recent eye exam revealed moderate diabetes retinopathy without progression.
Denies numbness or skin changes in feet.

Fasting	Post break	pre lunch	Post lunch	Pre Dinner	Post Dinner	Before bed
4.8				4.4		
4.6				4.8		

Labs

Seed Global Health

Glucose 2024	
A1c	6.6
RBS	

Renal 2024	
Na	138
K	4.4
Bicarb	23
Cl	112
BUN	9
Cr	110
Glucose	5.2

Urine 2024	
Protein	3+
Glucose	mild

Lipids 2022	
Cholesterol	4.0
LDL	2.8
HDL	1.42
Trigs	3.2

Plan

Seed Global Health

Plan

Gift is a 54yoF with a PMH of DM, MI, CKD III, moderate diabetic retinopathy and overcontrolled sugars.
A1c goal <7.5, Goal fasting 5.0 – 7.2, goal PP <10
BP: Controlled, restart enalapril for persistent albuminuria
A1C 6.6, ascvd 1.9%, GFR 51, Urine protein 3+
Medications: Continue combo metformin/empagliflozin 1g/12.5 bd. Continue liraglutide 1.8mg and decrease NPH to 8uAM and 4uPM.
Last eye exam: 02/2024 moderate DR repeat in 6 months
Last foot exam: 11/2024 skin, sensation and pulse normal
Diet/Exercise: At goal
Vaccines: UTD with HepB#3, PPV23, flu and COVID booster
Return to OPD in 3 months for an A1c and monitor kidneys, come sooner if sugars spike with lower dose of NPH

Seed Global Health

10 year f/u

Vitals: T: 36.9, HR: 62, BP: 124/82, RR 16, Weight 62kg

Kidneys continued to decline and she is now on dialysis twice a week. She also had numerous intravitreal hemorrhages and requires laser treatment for her retinopathy.
Her insulin need has remained low even being off metformin and empagliflozin.

Fasting	Post break	pre lunch	Post lunch	Pre Dinner	Post Dinner	Before bed
5.2				5.6		
5.5				6.0		

Labs

Seed Global Health

Glucose 2024	
A1c	6.3
RBS	

Renal 2024	
Na	138
K	5.3
Bicarb	17
Cl	112
BUN	9
Cr	250
Glucose	5.2

Urine 2024	
Protein	3+
Glucose	negative

Lipids 2022	
Cholesterol	4.0
LDL	2.8
HDL	1.42
Trigs	3.2

Plan

Seed Global Health

Plan

Gift is a 62yoF with a PMH of DM, MI, CKD V, severe proliferative diabetic retinopathy with macular edema and overcontrolled sugars.
A1c goal <8.0, Goal fasting 5.0 – 8.3, goal PP <10
BP: Controlled
A1C 6.8, ascvd 1.9%, GFR 13, Urine protein 3+
Medications: Continue liraglutide 1.8mg and Stop NPH.
Last eye exam: 06/2032 severe proliferative DR under treatment
Last foot exam: 06/2032 skin, sensation and pulse normal
Diet/Exercise: At goal
Vaccines: UTD with HepB#3, PPV23, flu and COVID booster
Return to OPD in 3 months for an A1c, if still under 8 can go to every 6 months

Seed Global Health

Diabetes Summary

A1c: personalize the goal

- Educate the patient on fasting, preprandial and postprandial goals if checking insulin

BP: >140/90

- Any first-line anti-hypertensive medication can be used
- Start ACE-I if CKD or proteinuria even in the absence of hypertension

Cholesterol: Calculate ASCVD and if >10% start low-moderate statin

- No need to fast and no need to repeat if on statin, repeat every 5 years if ascvd <10%

Drugs: Prescribe anti-glycemic medications based on A1c and co-morbidities

- Expect ~1 drop per non-insulin anti-glycemic agent
- Know what's on formulary

Eyes: Screen for retinopathy every 2 years if controlled

Feet: Perform foot exam by checking skin, pulses and sensation yearly if normal

Give up smoking

Heart: start aspirin for secondary prevention only if there is a history of clinical CVD

Immunizations: Hepaitis B, pneumonia, COVID, influenza

Kidneys: screen for nephropathy with creatinine and urine protein yearly

Lifestyle Address Diet/Exercise at every visit, encourage small changes that are sustainable