Case Study : CVS Risk Assessment

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History

A 41 year old male, K/C/O **Hypertension,** on oral medication came to us with the symptoms of:

1. No significant symptoms
2. Body Pain
3. Recently diagnosed with High cholesterol

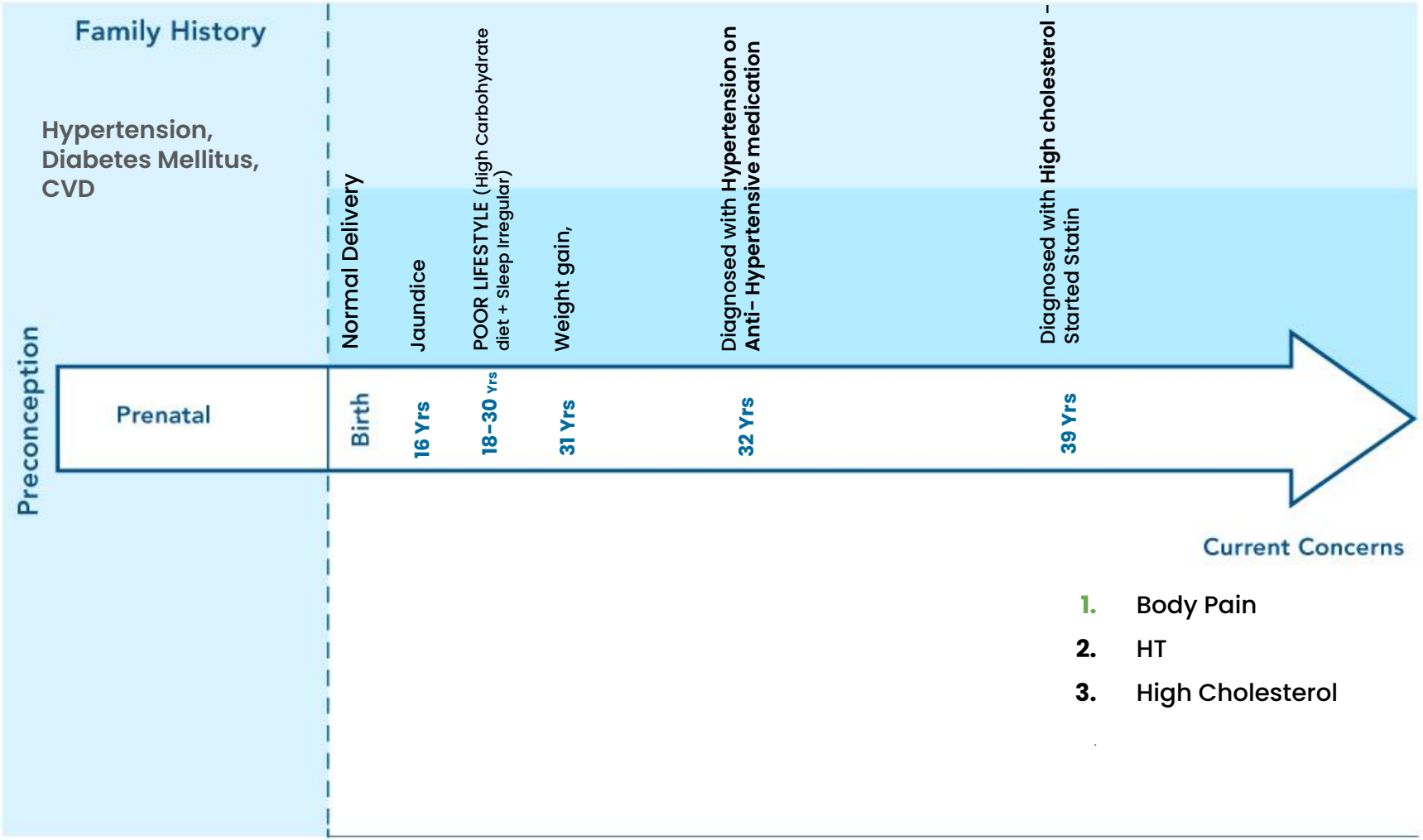
Medications:

Amlodipine 5mg OD

Atorvastatin 10mg (0-0-1)

Functional Medicine Timeline

Name: _____ Date: _____



Functional Medicine Matrix

Name: _____ Date: _____

Retelling the Patient's Story

Antecedents
F/H DM, HTN and CVD

Triggering Events
Stress

Mediators
Nutritional Def, Stress, High Sugar and high Carb Diet

Physiology and Function: Organizing the Patient's Clinical Imbalances

Assimilation

Defense & Repair

Structural Integrity

Mental — Emotional — Spiritual

Energy
Fatigue and Mood

Communication
Insulin Resistance

Transport

Biotransformation
Methylation defect (elevated homocysteine)

Modifiable Personal Lifestyle Factors

Sleep	Exercise	Diet	Stress	Relationships
Sometime disturbed because of Work Stress	Sedentary	Deficiency High Omega 6 and Oxidative stress	Stress ++	

Understand Blood Lipid

Cholesterol is a Fat and insoluble in Water. So it needs a carrier to travel in the Blood. Cholesterol is Carried by 3 types of Protein called Lipoprotein.

01	**VLDL**	• is synthesized in the liver, from excess dietary carbohydrates.
02	**LDL**	• VLDL remodeled by liver as LDL
03	**HDL**	• is synthesized and secreted by the liver and small intestine.

LDL

VLDL remodeled by liver as LDL.The function of LDL is to deliver cholesterol to cells, where it is used as a cell membranes and synthesis of steroid hormones. Such an important LDL is named as Bad cholesterol! If there's no LDL, your body cells can't make cell membranes and steroid hormones. In other words, LDL carries "fresh" cholesterol from liver to the cells.

LDL is to deliver cholesterol from Liver to Cells

HDL

is synthesized and secreted by the liver and small intestine. The function of HDL is to remove the excess cholesterol from the cells (Also, when a cell dies, it releases the cholesterol which is also picked up by the HDL) is brought back to the liver by HDL in a process known as **Reverse Cholesterol Transport**. Then in the liver the excess cholesterol is converted into bile salts.

HDL is to remove the excess cholesterol from the cells & bring back to Liver

Absolute risk vs Relative Risk

Absolute risk refers to the actual probability of an outcome occurring in a specific group regardless of any other factors.

Relative risk on the other hand, compares the risk of an outcome between exposed and unexposed groups.

Statin Calculator:

Age 53 Female

Total Cholesterol 233

HDL: 23

LDL: 164

TG: 248

https://statindecisionaid.mayoclinic.org

Statin Aid

https://statindecisionaid.mayoclinic.org

Age	Sex	Smoker	DM	Treated BP	Total Cholesterol	HDL	Triglyceride	LDL	BP reading	Risk%-	Risk %: Reduction
53	F	NO	YES	No	233	32	248	163	120/80	6%	5%
56	M	YES	YES	No	178	38	311	100	120/80	20%	15%
50	F	NO	NO	NO	233	70	80	150	120/80	1%	1%

Mr. Vijay's CVS Risk Analysis

Non Modifiable Risk factors	Risk	References
Age	51	People older than 60 years are at greater risk of developing cardiovascular disease.
Family history	NO	There is a genetic element to cardiovascular disease, meaning a family history of the condition is considered to be a risk factor. Generally, this applies if a person's first - degree relative developed CVD at what may be considered a relatively young age.
Ethnicity	South Asian	Statistics suggest that people of South Asian, African or Caribbean descent have a greater risk of developing cardiovascular disease.
Sex	Male	Male has higher risk of developing Heart disease compared to women.
Past history	NO	If patient has already have Heart attack earlier, It impose high risk.
Modifiable Risk factors		
Abdominal Circumference	High	≥102 cm for male and ≥88 cm for Female increases risk
Waist/Hip Ratio	High	≥0.90 for male and ≥0.85 for Female increases risk.
Obesity/BMI	25	More than 25 will be considered overweight and more than 30 will be obesity
Blood Pressure	Yes	
Exercise	Sedentary	Sedentary Lifestyle increase risk
Smoking	No	Smoking tobacco significantly increases the chance of developing cardiovascular disease.
Infection in mouth and teeth	No	Teeth and mouth infection increases risk

Cholesterol is NOT the villain

True causes of Heart diseases are..

So what are the real causes of heart attacks and strokes?

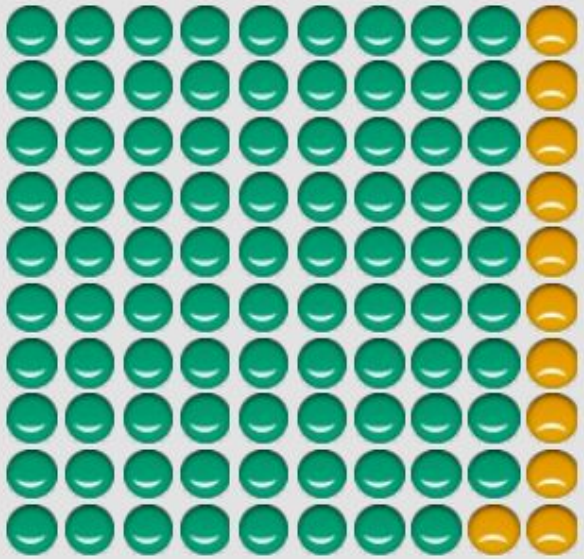
- High triglycerides
- Low HDL cholesterol
- Dietary deficiency of saturated fats and cholesterol.
- Excess dietary polyunsaturated fats from vegetable oils like soybean, corn, sunflower and safflower.
- Excess Dietary carbohydrates (particularly fructose sugar)
- Thyroid insufficiency
- Excess estrogen
- Testosterone insufficiency
- Excess Catecholamines (epinephrine, norepinephrine and dopamine)
- Excess Cortisol
- Excess insulin (Syndrome X)
- Oxidative stress to the heart and arteries
- Excess and rapid growth of cells lining the arteries causing narrowing.
- Excess prostaglandins
- Excess vasoconstriction
  Excess calcium (pushing out magnesium) in the heart, blood vessels and vasomotor nerves
- Trace mineral deficiencies

On basis of his Initial Blood Markers-

Statin Choice
Decision Aid

Current Risk
of having a heart attack

Risk for 100 people like you who **do** take standard dose statins

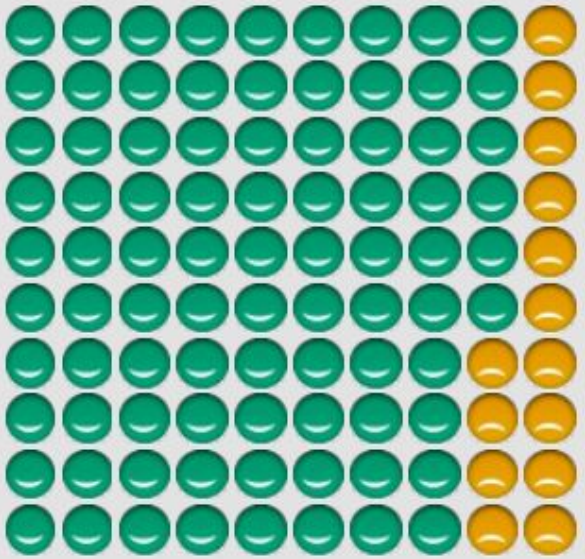


In your current situation you have 89 in 100 chances of no heart attack happening to you in the next 10 years.

Using ACC/AHA ASCVD Risk Calculator

Future Risk
of having a heart attack

Risk for 100 people like you who **do not** medicate for heart problems



By going forward with your decision you now have 86 in 100 chances of no heart attack happening to you in the next 10 years.

no heart attack heart attack heart attack prevented by selected intervention

JAMA Internal Medicine | Original Investigation

Association of Statin Therapy Initiation With Diabetes Progression
A Retrospective Matched-Cohort Study

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IMPORTANCE Statin therapy has been associated with increased insulin resistance; however, its clinical implications for diabetes control among patients with diabetes is unknown.

OBJECTIVE To assess diabetes progression after initiation of statin use in patients with diabetes.

DESIGN, SETTING, AND PARTICIPANTS This was a retrospective matched-cohort study using new-user and active-comparator designs to assess associations between statin initiation and diabetes progression in a national cohort of patients covered by the US Department of Veterans Affairs from fiscal years 2003-2015. Patients included were 30 years or older; had been diagnosed with diabetes during the study period; and were regular users of the Veterans Affairs health system, with records of demographic information, clinical encounters, vital signs, laboratory data, and medication usage.

INTERVENTIONS Treatment initiation with statins (statin users) or with H2-blockers or proton pump inhibitors (active comparators).

MAIN OUTCOMES AND MEASURES Diabetes progression composite outcome comprised the following: new insulin initiation, increase in the number of glucose-lowering medication classes, incidence of 5 or more measurements of blood glucose of 200 mg/dL or greater, or a new diagnosis of ketoacidosis or uncontrolled diabetes.

RESULTS From the 705 774 eligible patients, we matched 83 022 pairs of statin users and active comparators; the matched cohort had a mean (SD) age of 60.1 (11.6) years; 78 712 (94.9%) were men; 1715 (2.1%) were American Indian/Pacific Islander/Alaska Native, 570 (0.8%) were Asian, 17 890 (21.5%) were Black, and 56 633 (68.2 %) were White individuals. Diabetes progression outcome occurred in 55.9% of statin users vs 48.0% of active comparators (odds ratio, 1.37; 95% CI, 1.35-1.40; $P < .001$). Each individual component of the composite outcome was significantly higher among statin users. Secondary analysis demonstrated a dose-response relationship with a higher intensity of low-density lipoprotein-cholesterol lowering associated with greater diabetes progression.

CONCLUSIONS AND RELEVANCE This retrospective matched-cohort study found that statin use was associated with diabetes progression, including greater likelihood of insulin treatment initiation, significant hyperglycemia, acute glycemic complications, and an increased number of prescriptions for glucose-lowering medication classes. The risk-benefit ratio of statin use in patients with diabetes should take into consideration its metabolic effects.

Supplemental content

Conclusions: **This retrospective matched-cohort study found that statin use was associated with diabetes progression, including greater likelihood of insulin treatment initiation, significant hyperglycemia, acute glycemic complications, and an increased number of prescriptions for glucose-lowering medication classes. The risk-benefit ratio of statin use in patients with diabetes should take into consideration its metabolic effects.**

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Lab Results	Risk	References
Triglyceride	High	100.00 mg/dl
HDL	Low	>60 mg/dl
Cholesterol/HDL Ratio		cholesterol. Studies have implicated triglycerides in the progression of
Triglyceride/HDL Ratio		coronary atherosclerosis
Blood Sugar	High	<90 mg/dl
HBAIC	High	This is an important measure of glycated hemoglobin, which can be an early indicator of sugar problems. It measures sugars and proteins combining into glycated proteins called AGES (advanced glycation end products), like the crust on bread, or the crispy top on creme brulee. These create inflammation and oxidative stress throughout the body, and promote heart disease and dementia and accelerating aging. The hemoglobin A1C should ideally be less than 5.5.
Insulin	High	<6 µIU/ml
Insulin Resistance	Yes	Insulin resistance increases risk
C-Peptide	Low	Low and Elevated levels increase risk
HS-CRP	Raised	C-reactive protein is a marker associated with the production of inflammatory cytokines, which represent a threat to cardiovascular health.
Homocysteine	Raised	Men with extremely high homocysteine levels were three times more likely to have a heart attack than others. Homocysteine levels is a measure of folic acid deficiency.
Fibrinogen	-	This measures your risk of clotting, which can cause heart attacks and strokes. It is also a sign of inflammation and is associated with insulin resistance and diabetes. It should be less than 300.

Lp(a)		It is a small, dense, highly inflammatory lipoprotein and its level is strongly influenced by genetics. While Lp(a) is an independent risk factor for heart disease.
ApoB		
ApoA1		
ApoB/ApoA1 Ratio		
Testosterone-Total		Levels of testosterone have been found to offer men greater than fivefold protection against coronary artery disease.
Testosterone- Free		
Carotid wall thickening		(CIMT>0.9 mm) or plaque
Glomerular filtration rate (<60 mL/min/1.73 r		Sign of Renal Disease
Microalbuminuria		Sign of Renal Disease
Peripheral artery disease		PVD incrses risk of CVD
Advanced retinopathy		Diabetic Retinopathy increased risk of CVD
Thyroid Functions	**Normal**	Thyroid Hormone play role for optimal Heart Functions

Functional lab analysis

With the FLR report we can infer that the patient has:

1. Insulin Resistance
2. Methylation defect
3. Nutrition Deficiency

Treatment

The treatment includes changes in four aspects:

1. Dietary changes
2. Nutrition supplements
3. Lifestyle changes
4. Medicines

Low Carbohydrate Diet

- A low carbohydrate diet focuses on reducing the intake of carbohydrates, particularly refined carbs and sugars, and replacing them with healthy fats and proteins.
- Healthy fats and lean proteins are included in this diet in combination with complex carbohydrates and fibres.
- This dietary approach can significantly reduce insulin resistance as well as Triglycerides and will also aid the weight loss process.

Nutrition supplements

The Nutritional parameters of the patient were corrected with the following supplements:

1. Homocysteine Defense
2. VitD+K
3. Ionic Magnesium Powder
4. Omega 3
5. B3

Medications:

1. Atorvastatin 10mg (0-0-1) —- **Stop**
2. **Amlodipine 2.5 mg reduced to half**

Lifestyle

- Anti Gravity exercises for **1-1.5 hours post meals.**
- Mind calming exercises like Meditation and breathing techniques are recommended.
- Tapping can be done to reduce stress.

LIPIDS AND CHOLESTEROL					
Cholesterol Total	173	243 ↑	160.00-180.00	110.00-199.00	mg/dL
Triglycerides	81 ↑	253 ↑ ↑	70.00-80.00	0.00-149.00	mg/dL
LDL Cholesterol	98	155 ↑	80.00-100.00	0.00-100.00	mg/dL
HDL Cholesterol	59	34 ↓ ↓	55.00-70.00	39.00-100.00	mg/dL
VLDL Cholesterol	16 ↑	10	10.00-16.00	5.00-30.00	mg/dL

Progress:

1. Insulin Resistance improved : HbA1c Reduced, Hypertension controlled , Lipid Profile Improved
2. Detoxification Improved : Homocysteine reduced
3. Fatigue, Body pain and low grade fever better

After 10 months ,

Normal BMI
Continue with maintenance dose of B vitamins and Magnesium
Not taking Antihypertensive and Statins
Continue with 80% dietary and Lifestyle changes

Thank You