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Low-Density Lipoprotein Cholesterol versus Lipoprotein (a) in Determining Cardiovascular Disease Risk

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Abbreviation

- ACC /AHA: American College of Cardiology/American Heart Association
- ASCVD: Atherosclerotic cardiovascular disease
- CVD: Cardiovascular disease
- HDL: High-density lipoprotein
- IDL: Intermediate-density lipoprotein
- LDL-C: Low-density lipoprotein cholesterol
- Lp(a): Lipoprotein (a)
- PCSK9: Proprotein convertase subtilisin/kexin type 9
- TC: Total Cholesterol
- TGs: Triglycerides
- WHO: World Health Organization
- VLDL: Very low-density lipoprotein



Objectives

- Review CVD and types of cholesterol
- Classify the difference between LDL-C and Lp(a)
- Review the most current guideline treatments for hyperlipidemia
- Evaluate the importance of monitor Lp(a) in determining Lp(a)-associated CVD risk
- Review available treatment for elevated Lp(a)



Cardiovascular Disease (CVD)

Heart and blood
vessel disease

- Coronary heart disease
- Cerebrovascular disease
- Peripheral arterial disease

According to
WHO

- 17.9 million deaths per year
 - 85% were due to heart attack and stroke
- 38% of premature deaths (under the age of 70) due to CVD



CVD Risk Factors

Modifiable

Blood pressure

Cholesterol

Diabetes

Weight

Smoking

Lifestyle

Non-modifiable

Race and ethnicity

Family history

Biological sex



Types of cholesterols

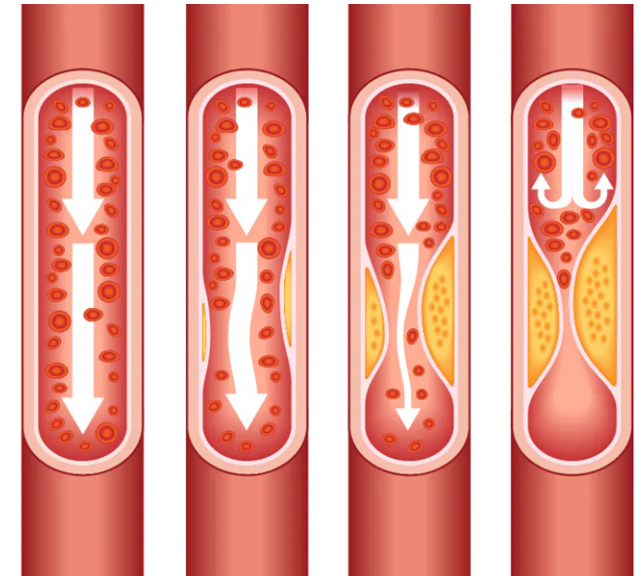
Good Cholesterol	Bad Cholesterol
HDL	LDL
	IDL
	VLDL

Why are they good or bad?



What is LDL?

- “Bad cholesterol”
- Major cholesterol transport lipoprotein
- Carries cholesterol from liver to cells
- Can lead to plaque buildup in arteries
- Modifiable with:
 - Medications
 - Lifestyle changes

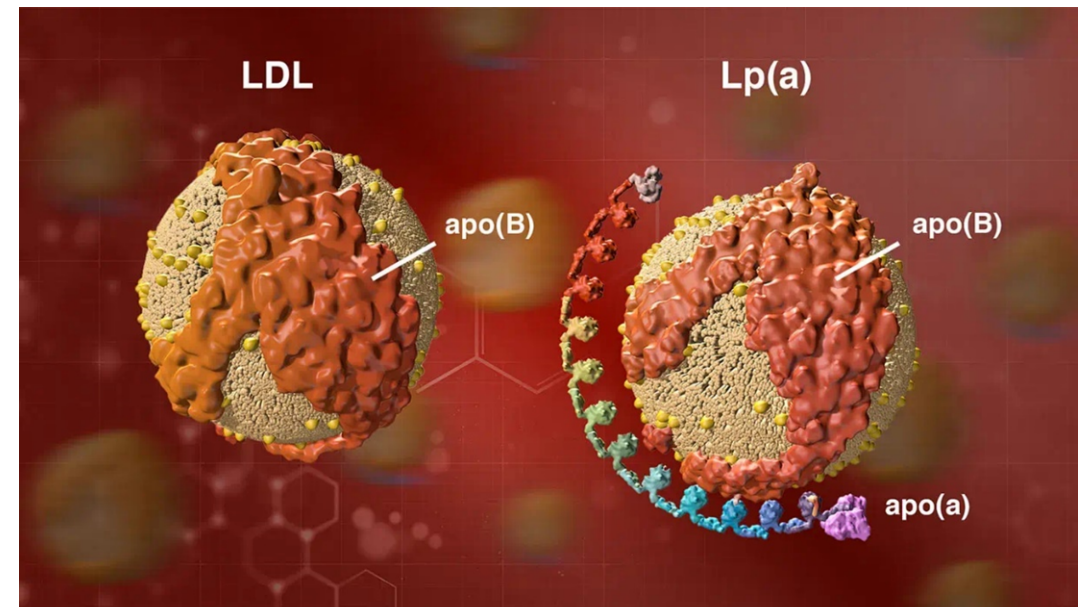


(N.d.). <https://www.cdc.gov/heart-disease/data-research/facts-stats/index.htm>



What is Lp(a)?

- Similar structure to LDL-C with an additional of apolipoprotein(a) (apo(a))
- Reduces fibrinolysis
- Produced in the liver
- Carries fat and lipids around in the body
- Primarily regulated by genetics
- Unclear benefit
- Highly non-modifiable



<https://www.amgen.com/stories/2023/02/8-things-to-know-about-lipoproteina>



Lipid Panel

LDL

- Serum blood test
- Unit: mg/dL
- Friedewald equation
 - $\text{LDL-C} = (\text{Total Cholesterol}) - (\text{HDL-C}) - (\text{TGs}/5)$

LDL cholesterol, mg/dL	
Less than 100	Optimal
100 to 129	Near optimal/above optimal
130 to 159	Borderline high
160 to 189	High
190 or more	Very high

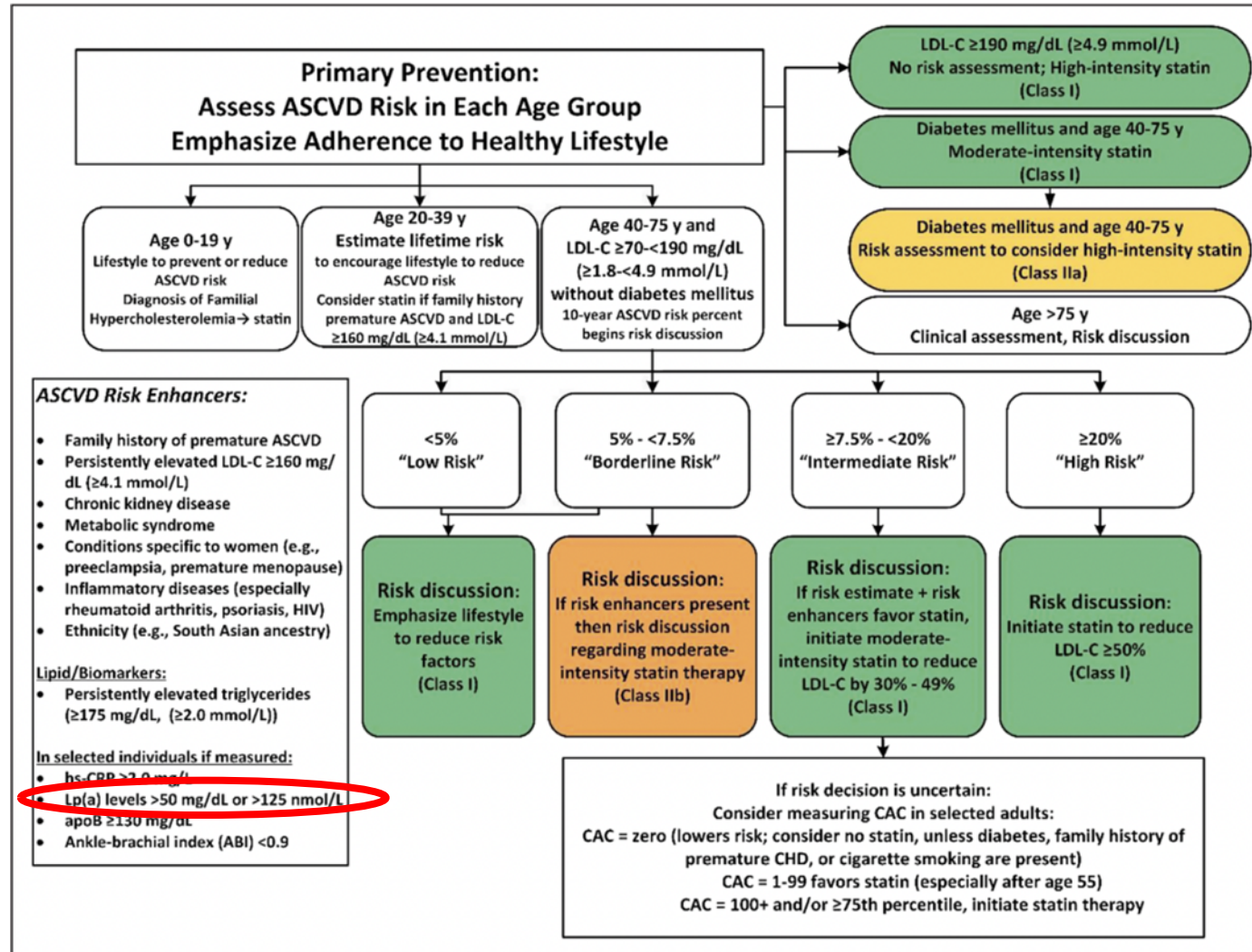


Lipid panel (cont.)

Lp(a)

- Serum blood test
- Unit: (nmol/L or mg/dL)
- High when Lp(a) ≥ 50 mg/dL or ≥ 125 nmol/L
- Not in routine lipid panel

2018 AHA/ACC Guideline on the Management of Blood Cholesterol: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines



ASCVD Risk Calculator

Current Age ⓘ *

Age must be between 20-79

Sex *

Male

Female

Race *

White

African American

Other

Systolic Blood Pressure (mm Hg) *

Value must be between 90-200

Diastolic Blood Pressure (mm Hg) *

Value must be between 60-130

Total Cholesterol (mg/dL) *

Value must be between 130 - 320

HDL Cholesterol (mg/dL) *

Value must be between 20 - 100

LDL Cholesterol (mg/dL) ⓘ ○

Value must be between 30-300

History of Diabetes? *

Yes

No

Smoker? ⓘ *

Current ⓘ

Former ⓘ

Never ⓘ

On Hypertension Treatment? *

Yes

No

On a Statin? ⓘ ○

Yes

No

On Aspirin Therapy? ⓘ ○

Yes

No

Do you want to refine current risk estimation using data from a previous visit? ⓘ ○

Yes

No

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The Importance of Screening Lp(a)

- Higher level of Lp(a) associates with higher ASCVD risk
- Independent risk factor for ASCVD
- Statin therapy – current 1st line treatment for primary and secondary prevention – does not lower Lp(a) level
- Not significantly improving through lifestyle changes

Lp(a): To Screen or Not to Screen

2018 AHA/ACC guidelines

- Does not recommend screening for general population
- May recommend for high-risk individuals:
 - Family history of premature ASCVD (males, age <55 y; females, age <65 y)
 - Personal history of ASCVD not explained by major risk factors
 - Women with hypercholesterolemia

Available Treatment

- No FDA approved treatment
- PCSK9 inhibitors have showed a reduction in 20-30% of Lp(a) level in the FOURIER Trial
 - Still require more data
- Niacin
- Lipid Apheresis
- Antisense Oligonucleotides

References

ASCVD Risk Estimator Plus. American College of Cardiology. (n.d.). <https://tools.acc.org/ascvd-risk-estimator-plus/#!/calculate/estimate/>

Birtcher, Kim K, and Christie M Ballantyne. "Cardiology patient page. Measurement of cholesterol: a patient perspective." *Circulation* vol. 110,11 (2004): e296-7. doi:10.1161/01.CIR.0000141564.89465.4E

Grundy, Scott M et al. "2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA Guideline on the Management of Blood Cholesterol: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines." *Journal of the American College of Cardiology* vol. 73,24 (2019): 3168-3209. doi:10.1016/j.jacc.2018.11.002

Farzam, Khashayar, et al. "Lipoprotein A." *StatPearls*, StatPearls Publishing, 27 February 2024.

O'Donoghue, Michelle L et al. "Lipoprotein(a), PCSK9 Inhibition, and Cardiovascular Risk." *Circulation* vol. 139,12 (2019): 1483-1492. doi:10.1161/CIRCULATIONAHA.118.037184

Reyes-Soffer, Gisette et al. "Lipoprotein(a): A Genetically Determined, Causal, and Prevalent Risk Factor for Atherosclerotic Cardiovascular Disease: A Scientific Statement From the American Heart Association." *Arteriosclerosis, thrombosis, and vascular biology* vol. 42,1 (2022): e48-e60. doi:10.1161/ATV.0000000000000147

Tsimikas, Sotirios et al. "Lipoprotein(a) Reduction in Persons with Cardiovascular Disease." *The New England journal of medicine* vol. 382,3 (2020): 244-255. doi:10.1056/NEJMoa1905239

World Health Organization. (2021, June 11). *Cardiovascular diseases (cvds)*. World Health Organization. [https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-\(cvds\)](https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds))



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Questions?

