LIPID CASE 257 CCTA and Lipids

A 59 year old woman, smoker (1/2-1 pack a day) and recently diagnosed vitamin D deficiency presents with an abnormal lipid studies. There is no family history of CHD in first degree relatives. Four years ago and recently she had minimally positive coronary calcium score in her RCA (was 12 and now is 1).

The lipids were from a basic lipid profile with a repeat done using Atherotech's VAP profile including their calculated apolipoprotein B level

TC = 304 TG = 64 HDL-C = 148 LDL-C = 143 TC/HDL-C = 1.9 Non-HDL-C = 156
VAP Profile: Direct HDL-C = 163 Direct LDL-C = 141 TG = 74 Non-HDL-C = 156
Lp(a)-C = 30
HDL2-C = 74 HDL3-C = 89 LDL phenotype is A Calculated apoB ~ 89

A referring cardiologist suggested that due to high apoB (40th percentile population cutpoint using Framingham Offspring data) and LP(a)-C of 30 she should have her apoB lowered below 80 mg/L (20th percentile). He suggested that one might think the HDLs are dysfunctional but then concluded since the coronary calcium did not worsen over time despite smoking the HDLs must be protective. Nevertheless a coronary CT was recommended to look for soft plaque. It revealed focal (<50%) plaque in the RCA. The radiation exposure was 14.1 mSv.

A word about this (see JAMA. 2009;301(5):500-507) In the **SI** system, a **millisievert** (**mSv**) is defined as *"the average accumulated background radiation dose to an individual for 1 year, exclusive of radon, in the United States. It attempts to reflect them biological effects of radiation.*

Thus this woman was exposed to 14 years of natural radiation. A basic principal of radiation protection is to keep radiation exposure "as low as reasonably achievable." 12mSv for CCTA is currently comparable with other diagnostic procedures (1.2 X the dose of an abdominal CT scan or 600 Chest x-rays). Annual effective doses are defined as low (<3 mSv), moderate (>3 to 20 mSv), high (>20-50 mSv), or very high (> 50 mSv). Healthcare workers are monitored and restricted to doses of 100 mSv every 5 year (i.e. 20 mSv -per year) with a max of 50 mSv in a given year. For a very enlightening read on what our patients are receiving see: Exposure to low dose ionizing radiation from medical imaging procedures: NEJM 2009;361:849-57.

The provider states he chose to begin treatment with Pravachol after her treatment of her Vitamin D deficiency. He asked if her CETP is not working properly?.

DAYSPRING DISCUSSION:

Looking simply at the history and basic lipid profile, this seems to be a low risk woman. The slightly positive calcium score may increase her risk a tad; some would say she is a coronary heart disease equivalent. The VAP advanced cholesterol analysis did not seem

to add anything to the discussion beyond the standard lipoid panel. Certainly there were no lipoprotein particle concentration values that would be useful (LDL-P and HDL-P). The calculated apoB of 89 was declared as too high by the cardiologist. The ADA/ACC issued a consensus statement on patients with cardiometabolic risk established apoB goals (<80 form those with CAD). This woman does not appear to have any cardiometabolic risk. Using the AACC position statement in a high risk patient an apoB of < 80 would be the goal. However the ADA/ACC statement specifically stated: Because apoB appears to be a more sensitive index of residual CVD risk when LDL cholesterol
or non-HDL cholesterol are <130 mg/dl or <160 mg/dl,
respectively, **MEASUREMENT of apoB, USING A STANDARD ASSAY,** is warranted in patients with CMR on pharmacologic treatment. Unfortunately Atherotech does not use any assay for, apoB they calculate it using an in-house formula which I do not believe has been published in a peer reviewed journal. Thus I'd send the blood over to Quest or Labcorp for a real apoB measurement or I'd get the LDL-P using NMR technology. The VAP calculated apoB if true at 89 is concordant with the LDL-C (141) and non-HDL-C (156) when looking at population percentile cutpoints (all around the 40th-50th cutpoints using Framingham Offspring data Pravachol 40 mg, a proven statin, might achieve goal and is worth a try. It would certainly not cost very much. If needed ezetimibe (Zetia) could be added or a more powerful statin like Crestor would surely work. Again I would insist on a real apoB on follow up. I agree with the cardiologist, that the proper treatment for Lp(a) risk is to normalize apoB.

Finally we really have to think about using CCTA - was it really necessary in this woman? She was asymptomatic: data has shown aggressive lipid/lipoproteins is as good as any arterial procedure (like stinting) with respect to outcomes. So even if the CCTA showed something - if she is asymptomatic medical treatment is called for. So why expose her to so much radiation. By the way nuclear stress testing is even worse than CCTA on mSv. If one really had to know is significant obstructive disease present, one could do a simple gene expression blood test called CORUS CAD Please see http://www.cardiodx.com/corus-cad/product-overview/ There would of course be no radiation exposure. Cost might be an issue but this company (with whom I have no association) works with patients to make the test affordable. It is certainly no more costly than a CCTA.

What about the very high HDL-C? Is the card correct that these are functional HDLs? In his note the card correctly stated that we cannot evaluate HDL functionality with available tests. I do think HDL quantification would be of value. The provider asked about abnormal CETP activity - possible but we cannot assay that. Data from IDEAL and EPIC-Norfolk studies showed that persons with high HDL-C who get clinical CVD events have low apoA-I (HDL-P). That is their high HDL-C is explained by low numbers of very large HDL particles: the authors presumes that these HDLs are very dysfunctional and becomes a cholesterol donor (to the macrophage) rather than a cholesterol acceptor. In that study if both HDL-C and apoA-I (HDL-P) were high, there was no CV risk (lots of normal sized HDL particles which presumably act as cholesterol acceptors) J Am Coll Cardiol 2008;51:634–42).