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Fasting is not routinely required for determination of a lipid profile: clinical and laboratory implications including flagging at desirable concentration cutpoints—a joint consensus statement from the European Atherosclerosis Society and European Federation of Clinical Chemistry and Laboratory Medicine

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Guest: Dr. Borge Nordestgaard is Chief Physician in Clinical Biochemistry at Copenhagen University Hospital, and a Clinical Professor at the University of Copenhagen in Denmark.

Bob Barrett: This is a podcast from *Clinical Chemistry*, sponsored by the Department of Laboratory Medicine at Boston Childrens' Hospital. I'm Bob Barrett.

Many individuals consume several meals during the day, as well as some snacks between meals and the postprandial state predominates over the course of a day. But it has been common practice to measure lipids only after a period of fasting and those measurements may not reflect the daily average plasma lipid and lipoprotein concentrations and associated risk of cardiovascular disease.

Interestingly, evidence is lacking that fasting is superior to nonfasting when evaluating the lipid profile for cardiovascular risk assessment. However, there are many advantages to using non-fasting samples for measuring lipid profiles. In addition to inconvenience for patients, laboratories are also burdened by a large volume of patients arriving for the test early in the morning.

Some commonly held limitations regarding non-fasting lipid measurements include that fasting before a lipid profile measurement is believed to provide more standardized measurements. Also, that non-fasting lipid profiles may provide less accurate measurements and may make calculation of LDL cholesterol invalid.

And lastly, that since fasting has been the clinical standard and it's unclear what results should be flagged as abnormal when using non-fasting rather than fasting plasma lipid profiles. The July 2016 issue of *Clinical Chemistry* published a joint consensus statement from the European Atherosclerosis Society and the European Federation of Clinical Chemistry and Laboratory Medicine that fasting is not routinely required for determination of a lipid profile. That paper also was published online by the *European Heart Journal* in April 2016 and is available online at the *Clinical Chemistry* website in May 2016.

We are pleased to have with us the lead author of that report, Dr. Borge Nordestgaard, Chief Physician in Clinical Biochemistry at Copenhagen University Hospital. He's also a Clinical Professor at the University of Copenhagen in Denmark. So doctor, what are the three most important aspects of this joint consensus paper from the European Atherosclerosis Society and the European Federation of Clinical Chemistry and Laboratory Medicine?

Borge Nordestgaard: Well there's three. One -- I think the first one that would really change clinical practices that we advise that you no longer need to fast for most lipid measurements. You can simply take the blood sampling for LDL cholesterol levels anytime you want irrespective of what you have been eating and there's a few exceptions where we advise you could fast, but for the majority, non-fasting, that's the one.

Number two is that we advise, that in all laboratory reports that the laboratory, after they had measure these lipid values, they should flag what is an abnormal level, based on desirable concentration cut points, meaning a certain level. So for example for total cholesterol, these are levels that are above 190 milligram per deciliter or five millimoles per liter.

And then the third thing, which is also a very novel thing, is that the we advise that if you have life threatening values, very high levels, we in the laboratory should give special attention and tell the clinicians that here they might want to do something specific. And this would, for example, be if you have very high triglycerides would have this acute pancreatitis, levels above 880 milligram per deciliter, above 10 millimoles per liter, or if he had very high LDL cholesterol and high risk of what's called heterozygous familial hypercholesterolemia with very high cholesterol risk. This is the LDL above five millimoles per liter or above 190 milligram per deciliter.

Bob Barrett: Well I want to go back to the first thing you mentioned with most lipid profiles being taken now in the nonfasting state. Haven't we been told for a long time that we must fast prior to such testing?

Borge Nordestgaard: I mean, certainly. This has been -- what has been going on in all countries except actually my own country, Denmark, where we changed this procedure in 2009. From then on we use non-fasting sample. And I think this is just an old tradition we used fasting and then we think that's a right way to do but now we advise in this international recommendation that this is no longer needed for the majority of blood sampling for lipid profiles.

Bob Barrett: Why is this consensus paper recommend that abnormal plasma lipid, lipoprotein and apolipoprotein values be flagged in laboratory reports based on desirable concentration cut points rather than the conventional 95% reference interval?

Borge Nordestgaard: It is because it still turns out when you look around the world, then those actually, many laboratories that flag them as reference values, which is just the top 2.5% for a lipid volume will have flexing. It's abnormal and the 2.5% lowest values and this is what we do for most other clinical biochemistry measurements.

But for lipids, it's something very different. It's very much like, for example, people that are overweight and obese. There, we don't flag just the 2.5% with the highest weight and the 2.5% with lowest. We simply have this type of concentration cut point. We say if it's above 30 kilogram per square meter, then you're obese.

And the same we do for lipid, if you're above a certain level because so many people in the population have too high lipid levels. Then we flag the level and that's where the doctor should think whether the doctor, together with the patient, wants to do something to prevent heart disease.

Bob Barrett: You also talked about the group recommending, that life threatening in extremely abnormal concentrations should have completely separate reporting and consequent direct referral to a lipid clinic or to a physician with special interest in lipids. Why is that a part of the recommendations?

Borge Nordestgaard: We have found out in the later years that particular patients with familial hypocalcemia, they are not found in the world. In most countries, they're simply not recognized and this is because people don't think of them as "this is a familial condition." They just think it as normal high cholesterol.

And if we in the laboratory report say that this type of patient should be seen by lipid specialists, then they will sort of like look at the whole family and look at family members to try to see if they had this genetic disease and then treat lipids with them also. So we think this would be a big advantage.

And the other thing is of course also if you have very high triglycerides which is often overlooked then you have this very risk of acute pancreatitis. And we in laboratory medicine could help clinicians and patients throughout the world by simply setting a small note: triglycerides above 10 millimoles per liter, this is very high, consider the high risk acute pancreatitis.

Bob Barrett: Well finally, Dr. Nordestgaard, can you tell us about the process behind such a consensus statement. How do 21 clinicians, scientists and laboratory professionals from all around the globe reach a consensus on a topic where there are a lot of preconceived ideas?

Borge Nordestgaard: Well that's actually a very interesting process. We invited those experts that have written about these topics from around the world. Actually there's a lot from Europe but there's also several experts from the US and from Australia. And then we meet and we get different assignments to review the literature. So we have two days meeting where we review the literature and see based on that, can we get to some consensus about how to advise in this controversial topic?

And then after that, we went back and we had a draft for a new manuscript and then we met at a second meeting. The first one was in Glasgow, the second one in Paris. And then we scrutinized the evidence again and decided what could we actually agree on to advise, and this was the three things. And then finally, we wrote up a paper and submitted it to different journals. It is being published both in the *European Heart Journal* and in *Clinical Chemistry* to get as wide as possible recognition, both among clinicians and among clinical biochemists. So it's a long process. It took, I think, a year and a half.

Bob Barrett: That was Dr. Borge Nordestgaard, Chief Physician in Clinical Biochemistry at the Copenhagen University Hospital and Clinical Professor at the University of Copenhagen in Denmark. He's been our guest in this podcast from *Clinical Chemistry* on the latest recommendations on nonfasting lipid profiles.

I'm Bob Barrett, thanks for listening!