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## To Manage LDH or Not— Is That the Key Marker?

### Announcer:

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### Dr. de Castro:

Hi, this is Dr. Carlos de Castro. I'm a professor of medicine at Duke University and I'm joined by Dr. Catherine Broome from Georgetown University, who's also a professor of medicine. Today we're going to be talking about the topic of using LDH as a biomarker in PNH. So let me just start Catherine as saying, how do you use your LDH when you're treating patients with PNH?

### Dr. Broome:

Well, you know, I use it as I think a general guide as to how much hemolysis may be going on. I think we have to always remember that there are a variety of reasons why the LDH may be elevated, and even if we are controlling hemolysis, LDH may still be slightly elevated for a variety of reasons. It is a good reason or a good indicator for me to sometimes think about how well hemolysis is being controlled and whether there may be any type of tick over or extravascular hemolysis associated with the patient's current therapies.

### Dr. de Castro:

That's excellent and I certainly agree with all those points. Do you see there being any shortcomings to using LDH as a biomarker in PNH?

### Dr. Broome:

Well you know, as I mentioned, I think that we have to remember that there are other reasons besides hemolysis that can cause an elevation in LDH and so we can oftentimes I think get overzealous in thinking that we're not controlling hemolysis when the LDH may be related to some other abnormality that's going on within the patient.

### Dr. de Castro:

So what else do you use to measure hemolysis?

### Dr. Broome:

So I think reticulocyte count is always a good one. Bilirubin is always a good one as well. And then of course if you know we're concerned or we're evaluating for evidence of extravascular hemolysis looking for evidence of deposition of C3 on the surface of those red blood cells that might indicate some type of extravascular versus intravascular mediated hemolysis.

### Dr. de Castro:

Great. And the LDH level itself, does that tell you anything? I mean there are big differences in say intravascular and extravascular hemolysis that we see in LDH.

### Dr. Broome:

Absolutely. So remember that intravascular hemolysis is going to be a much brisker process, and so very marked elevations in the LDH

are often most often associated with intravascular hemolysis, modest or minimal elevations in the LDH that are persistent perhaps with therapeutic intervention may be an indication of some tick over or extravascular hemolysis.

**Dr. de Castro:**

And I guess the last question is if the LDH is elevated obviously we have to think about other things because it's so nonspecific, how do you use it I guess if a PNH patient is complicated, if they have something else going on, what do we do there is my question.

**Dr. Broome:**

Well, you know, it's a good question. I mean PNH patients can be very complicated. Many of them can have portal vein thrombosis, they can have secondary liver abnormalities. They can have other sites of thrombotic events that may relate to tissue damage and release of LDH. So you know, I think that an old fashioned, you know thing that we used to do of course is to try to fractionate the LDH and really determine what the origin might be and then sort of think about what could be going on in our PNH patients. So you know, when I think about hemolysis and the PNH patient, I think for me it's not about one specific laboratory value, but it's more about a total impression. What's the hemoglobin level? What's the reticulocyte count? What's the bilirubin? And then certainly what's the degree of elevation of the LDH and have I really looked closely at the fractionation of that LDH? Where is it coming from? How about you Dr. de Castro?

**Dr. de Castro:**

Thank you for pointing that back to me. I thought your answer was excellent. I think LDH is a very nonspecific marker but certainly has utility in monitoring PNH patients just to summarize what you just said. It is certainly a marker of hemolysis but has to be taken in the context of what is going on. Are there other markers of hemolysis with it such as an elevated retic count, such as a slightly elevated bilirubin or elevated bilirubin et cetera, is the patient anemic? Are there reasons they're anemic? All of that has to be considered. So it has to be a whole picture, but the LDH can be very useful in monitoring disease in terms of how well is the treatment working? Have we brought the LDH down? Does the patient need to think about switching therapies? All of these have to be considered for a patient when we're looking at them and the LDH is a useful tool for that. Well I'd like to thank you all for attending this session on LDH and its use as a biomarker in monitoring and treating PNH. I'd like to thank Dr. Broome for her input and we will see you at the next session.

**Announcer:**

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