Diagnosing and Managing AML: Understanding Disease Presentation

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Andrew Schorr:
Dr. Borate, let's go back to the basics just for a second because we have people who are trying to understand what went wrong. I'm a leukemia patient too, but with chronic lymphocytic leukemia, but I know that our bone marrow often in our hips and bones is the blood factory. What went wrong in that blood factory, and how does it show up in AML?

Dr. Borate:
So, thank you, Andrew. I think that's the so-called million dollar question is we know that there's a combination of factors that can cause what we call these genetic mutations that then go on to lead to the actual disease.

So whether it be CLL, which you alluded to, or AML, age is a big factor. So as all of us grow older the unfortunate reality is as our cells divide they accumulate genetic changes that they can't repair, so that's one thing that happens to all of us. Environmental and genetic factors play a big role, and I think the new emerging field in this is what patients would ask us, why did I get this? We would say, well, you were unlucky. You had this mutation. Something happened.

But now we know about 10 to 15 percent of leukemias actually have a genetic or what we call an inherited component. So if you talk to patients they would have--some patients have a very strong family history, not just of leukemias or lymphomas, which are blood cancers, but other cancers. And I think it's really important to nail that down and explore the inherited aspects because for patients like you or Don, if you have kids and grandchildren, you know, those have far-reaching implications down the road.

However, 85 percent of these leukemias are what we call sporadic, meaning they just came about because of environmental and genetic factors that sort of played a role in one or two cells developing the mutation and then there is a competitive advantage for these cells. They start growing, you know, without any checks and balances, and

once that happens they start crowding out the healthy cells in your marrow and they sort of replace, as you said, the nice, healthy cells in your bone marrow that should be making your red blood cells, white blood cells and platelets.

And sometimes the analogy that's given is you see these weeks on a lawn and once the weeds start growing they kind of take over all the healthy grass because they compete for nutrients and water, and then all you get is a lawn full of weeds.

Andrew Schorr:
Okay. So somebody comes to the emergency room, like Don looked sick. Is it fatigue? Is it bleeding? Is it just what--how do people present, as you doctors say?

Dr. Borate:
So typically patients present with this feeling that they're not--they just don't feel well. Typically it's fatigue. Sometimes they'll notice bruising or spots all over their bodies. They'll notice that their gums are bleeding easily when they brush their teeth or they have nosebleeds when they've never had them before.

A fair number of patients actually present with an infection, so a sore throat that doesn't seem to go away. They get swabbed for mono, and the practitioner sees these weird cells in their blood, and they think, well, maybe this is mono because they've had fatigue, sore throat and some lymph nodes, and so that's the way people present.

Sometimes people present really sick, with a pneumonia or another infection, and then that's when you go to the ER and you come into the hospital and it's like, oh, wow something else is going on.

Andrew Schorr:
Okay. So they get to you, let's say, at Oregon Health and Science in Portland, a major university center, and you run this genetic panel. Now, it's seven days. So, first, what's going to happen while you're trying to figure out what version of AML they have and whether you have a therapy.

Dr. Borate:
Yes.

Andrew Schorr:
So let's just talk about that. What happens first, and then based on the information what happens then?

Dr. Borate:
So it really depends on what you said before is how sick you are and what subtype of AML that you have. So I would say even now about 30 percent of our patients don't come through the ER and are not that sick. They come through an outpatient clinic appointment where they've had low blood counts, they've been tested, there's some testing that is done which indicates they may have leukemia, and they actually come to my clinic.

And if they come to my clinic and they're relatively what we call stable we will perform all this workup, as we call it, as an outpatient. So we'll to the bone marrow biopsy as an outpatient. We will let them be at home for those seven days so they can sort of start preparing for, hey, maybe there's something going on and this will need some length of treatment in the hospital or multiple visits to the physician, in which case if you're working you need to start thinking about time off and preparing, and if you have kids how to they get to their activities. So all the different things that people are struggling with when they get this diagnosis. So that is about 30 percent of patients.

And in those seven days while they're waiting, sometimes it's longer, we keep a really close eye on their blood work. So if they live close to a hospital or a clinic we make sure they go to the clinic at least two or three times a week

to see what their white blood cells, platelets and red blood cells are doing, and then we get those results. So we monitor them before they come back to get the final diagnosis and what their position is.

If it's somebody like Don who ended up in the hospital really sick, then they stay in the hospital while we're doing this testing. Typically they will get blood. They will get platelets. They would get what we call a workup, meaning we will check their heart, their kidneys, their liver. We would put what we call a central line, meaning a line or an IV that can stay in their bodies for a longer length of time that can allow them to get treatment and allow them to get blood work and transfusions. So all this is happening in the background while we are figuring out the subtype of AML.

The other thing that we also do at that time is we collect what we call HLA typing, and this is to figure out what the tissue type of the patient is. So like Don, when he went on to the transplant it's really important for us to know this beforehand. So while the patients are getting treatment in the hospital we can see if they have matches. So does your brother or sister, can they be a match for you to donate bone marrow, or does it have to be somebody through Be the Match, as Don said, would that--would it be what we call an unrelated but matched donor that would then be an option for you in the future.

Andrew Schorr:
Okay. So let's go back to what leads to AML for a minute. So Don, you worked on golf courses your whole life and eventually became the superintendent of one of the more famous PGA golf courses. Colonial, is that right?

Don Armstrong:
Correct, yes.

Andrew Schorr:
In Fort Worth. But over your years devoted to golf you sprayed a lot of pesticide, right?

Don Armstrong:
I did. I did. From the time I was 15 years old I get my first job on a golf course and the superintendent knew I wanted to be in the industry, and so he let me do a lot of things that probably somebody else wouldn't. And one of them was spray the pesticides, pray the fungicides, herbicides. You name it, I got to spray everything. And back in that time frame the pesticides were a lot more potent. We had a lot of mercury-based, lead-based products in those time frames that the EPA had not stopped in terms of use.

And so I think back about whether that may have had an impact on where I ended up with the leukemia. It's hard to say. I'm sure Dr. Borate would probably agree with that, but it seems to me there could be some correlation, yes.