

The Bloodline with Blood Cancer United Podcast

A Podcast for Patients and Caregivers

Episode: ‘Cutaneous T-Cell Lymphoma (CTCL): Illuminating a Brighter Path Forward’

Description:

Cutaneous T-cell lymphoma (CTCL) is a rare condition that often raises important questions for patients and families.

In this episode, we sit down with Dr. Stefan Barta, of the University of Pennsylvania, to bring clarity to what CTCL is, how it’s diagnosed, and what patients can expect from staging and treatment. Dr. Barta breaks down the differences between CTCL subtypes, explains why diagnosing someone can take time, and shares the most up-to-date therapies, including skin directed treatments, immunotherapies, and emerging clinical trial options. Most importantly, he offers reassurance for those newly diagnosed: “The future is absolutely bright... there is a lot of hope for our patients with CTCL.”

Transcript:

Elissa: Welcome to The Bloodline with Blood Cancer United. I’m Elissa.

Lizette: And I’m Lizette. Thank you so much for joining us on this episode.

Elissa: Today, we are speaking to Dr. Stefan Barta, a hematologist-oncologist and lead of the T-Cell Lymphoma Program at the University of Pennsylvania. He also serves on the National Comprehensive Cancer Network panels for T-cell and

cutaneous lymphomas and the Board of Directors of the US Cutaneous Lymphoma Consortium. Dr. Barta's research focuses on early phase clinical trials, novel therapeutic targets, immunotherapies, cellular therapies, and predictive biomarkers for T-cell malignancies, including cutaneous T-cell lymphomas. Welcome, Dr. Barta.

Stefan Barta, MD, MS: Thank you so much for having me today.

Elissa: Thank you. So, our episode today is on cutaneous T-cell lymphoma or CTCL. Could you tell our listeners what that is?

Dr. Barta: Of course. CTCL is a hodgepodge of different cutaneous T-cell lymphomas. So, cutaneous means that these T-cell lymphomas mainly affect the skin or come originally from the skin. However, that does not mean that they're limited to the skin. The most common cutaneous T-cell lymphoma here in the United States is mycosis fungoides and followed by Sézary syndrome; and they're often lumped together because sometimes they can be difficult to tell apart, and so we often call it mycosis fungoides/Sézary syndrome. And about two-thirds of all cutaneous T-cell lymphomas fall into that category of mycosis fungoides or Sézary syndrome.

And then there are other less common ones, and that includes, for example, primary cutaneous gamma-delta T-cell lymphoma. It includes lymphomatoid papulosis. It includes subcutaneous panniculitis-like T-cell lymphoma, and there are a few other ones that are usually exceedingly rare and uncommon.

Elissa: So, is CTCL a type of non-Hodgkin lymphoma?

Dr. Barta: You're correct. CTCL is a type of non-Hodgkin lymphoma (NHL) and of T-cell non-Hodgkin lymphoma. These non-Hodgkin lymphomas are very heterogeneous, as I mentioned. They're very complex and we have multiple subtypes. T-cell lymphomas, already, are much less common than B-cell non-Hodgkin lymphomas. And T-cell non-Hodgkin lymphoma itself can be further subdivided in well over 25 different subgroups. And to get a better handle on it, we look at them as to where really is most of the disease burden. And that's how we came up with that term cutaneous T-cell lymphoma. So, T-cell lymphomas that mainly affect the skin.

Lizette: So, that's what makes it different from other non-Hodgkin lymphomas that it's cutaneous. It manifests all the time in the skin.

Dr. Barta: Correct. So, that is the main differentiating factor. So, the main factor that sets them apart, most commonly, it is manifested as a skin disease, so as a rash, for example. However, it does not mean that in every patient it presents with a rash. Some patients, for example, itching, and we call it pruritus, is the first symptom that they experience; and it takes quite some time until they develop a rash or the rash is so minimal, patients might not even notice them or pay much attention to that rash. Very rarely, patients also can have no significant rash, but we do find abnormal cells in the blood; and we do call them Sézary cells. And then just going back, really digging very hard through the history and on physical exam we do find a rash.

Elissa: Okay.

Dr. Barta: So, that brings us to another point with cutaneous T-cell lymphomas that although they may just be affecting the skin as the main symptom, they do affect other parts of the body as well; and that can sometimes be very confusing for patients when we use these terms, cutaneous T-cell lymphoma, and then we talk about the abnormal lymphocytes in the blood and in the lymph nodes; and then it's like, "Hang on, do I have a skin lymphoma, or what is this?"

Lizette: Right, right, because we've heard a lot of patients say that they went to a dermatologist, but this is lymphoma. This is a blood cancer. So, do a lot of patients actually get diagnosed if they go to a dermatologist?

Dr. Barta: Correct. The most common diagnosis is made on a skin biopsy from a dermatologist. And you're also right, it is a blood cancer. And the reason we call it a blood cancer or a liquid cancer is because the abnormal cells, the cancer cells are lymphocytes; and lymphocytes are white blood cells. And their job, is to fight cancers, fight infections, and so they need to get everywhere. They need to get into the skin if you have a skin cut. If that gets infected or needs to be repaired, that's where the lymphocytes come in. And to get there, they go through the blood. So, when we do a blood count, part of the white blood cells we see are lymphocytes. You can see that in the differential count that breaks down what type of blood cells there are in the blood.

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I usually call them the police force of the body, the lymphocytes. Blood is more or less the roads they travel. And then they get to wherever they need to be and that can be the skin, but it could be other organs. And where they process, the offender is likely infectious agents, bacteria, or similar is in the lymph nodes. And that's why often when patients have infections, we do notice an enlarged or tender lymph node; and that's because that's where all the action happens. That's where the lymphocytes really get trained to fight specific infections, and then they go back out there; and they're well-equipped to handle that one specific infection. And that's why we call it a blood cancer, because, when we do a blood test, we often can see small traces of the lymphoma. But the main burden in cutaneous T-cell lymphoma is in the skin.

Lizette: Okay. And you mentioned that there's different types of cutaneous T-cell lymphoma.

Dr. Barta: Correct.

Lizette: So, do the different types have different treatments?

Dr. Barta: Absolutely. So it's really important when we talk about a cutaneous T-cell lymphoma to specify and find out which exactly of the cutaneous T-cell lymphomas we are dealing with. That is usually done through a skin biopsy; and that will give us a good idea. Oftentimes, we need other studies because, unfortunately, for the pathologist, it can be sometimes very difficult to tell the abnormal lymphocytes apart

from normal lymphocytes or from lymphocytes that are just reacting to an infection or another insult, for example.

And that's where we have other ancillary studies that help us make the diagnosis; and that usually includes a blood count, for example, or other technologies to look at the lymphocytes in the blood. One of these technologies is called flow cytometry. Flow cytometry helps us better identify what type of lymphocyte we are dealing with. And then oftentimes people also get staging imaging. Commonly, we use PET scans; and these PET scans also can tell us whether other parts of the body are affected, not only the skin, but it could be, as I mentioned before, lymph nodes, for example, or other organs.

Sometimes, the abnormal T-lymphocytes in cutaneous lymphoma can look like the T-lymphocyte in other lymphomas like a peripheral T-cell lymphoma, which is another common type of lymphoma. And it is the clinical picture in taking all of these staging exams together that we'll give the diagnosis away.

It's a lot harder than it looks. When I went into oncology, I just thought, okay, so a patient comes in with a diagnosis; and I just have to treat. But, unfortunately, oftentimes is, patient comes with a symptom and has a biopsy that shows something abnormal; and now we have to figure out actually what type of lymphoma the patient has. And that can be sometimes a lot of detective work.

The diagnosis can also be sometimes very difficult; and I'm sure many have reported that, as well, to you or to others, that it took several biopsies or actually even several years to get the diagnosis of a cutaneous T-cell lymphoma. And patients often get diagnosed with other skin conditions that can look very similar and have similar symptoms, as I mentioned, itching is a very common symptom that patients experience and a relatively nonspecific rash that can look like eczema, it can look like psoriasis, for example. And the skin biopsies sometimes can be difficult to interpret, and you just find some lymphocyte infiltration. Could be a reaction. Could be dermatitis. Don't really know, and then patients often get in treatment with steroids. The rash goes away or they get oral steroids. The rash goes away, and then they take some time to come back; and they might need a second biopsy or third to really make the diagnosis.

Elissa: Okay. So, could you explain how staging works with CTCL and if that affects prognosis?

Dr. Barta: Absolutely. That's a very good question. Staging is very important for cutaneous T-cell lymphoma. As I mentioned, we call it a multicompartiment disease. So, it's not just limited to the skin; and we really do need to find out which other organs are affected because as you mentioned, it can affect prognosis, so outcome. How will patients do? And it also will affect treatment. The reason is that some treatments are just more effective in some compartments than others. And furthermore, we divide

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treatment for cutaneous lymphoma into skin-directed therapy, so therapies that are really just aimed at the skin and systemic therapies, so therapies that affect all of your body. And staging is important to tell us which therapy is the best next step and best next therapy for the patient. And oftentimes, we combine different therapies to hit all these compartments and all the symptoms that can arise from whichever part of the body is affected most by the lymphoma.

And staging includes, number one, a really good physical exam where we have to determine how much of the body is affected by the lymphoma, how much of the skin. We look at the type of rash. So, we usually separate that out into patches which are often just red and irritated and slightly raised. Lesions often can have a lot of scaling, as opposed to plaques. This is when these lesions get thicker. Or tumors, so it could even be skin nodules. Sometimes they can be ulcerated; so we call them patches or plaque disease and sometimes tumor-stage disease. And then we also assess how much of the body surface area is affected. And as a rule of thumb, the whole palm and the fingers of a patient constitutes 1% of the body surface area. And that's what we use roughly to say, "Well, is it just a few percent that are affected, and is it mainly patches, for example?" And then we call it T1-disease. Or is it up to 80% of the body surface that's affected. That is T2. Or is it the whole body? Sometimes people can look very red, and the skin can be thickened and harder and scaling and itching nearly in all of the skin. And that would be then T4, or more than 80%, and we call it

erythroderma, which is just the Latin name for red skin, essentially. And tumors get a T3.

So, you can see the staging is great, but it is often not very intuitive. So, you have the T1, T2, and then T3 is tumor; however, much of the body surface is affected. And then the other one all takes into account how much is affected. So, it gets a little complicated, but we use that. That's the T-staging.

And we also want to see whether the lymph nodes are affected. That is then called N-staging, and how do we get that information? Well, physical exam, of course, but also CAT scans and preferably PET scans. These PET scans can be much more sensitive in picking up disease that a CAT scan may miss. And there we look at the lymph nodes to see whether they're enlarged or whether they have increased uptake or they're more active. When we use a PET scan, we inject radioactively labeled glucose; and lymph nodes that are affected by lymphoma often will light up on the PET scan. That gives us the nodal staging.

However, again, that can be a little complicated because you can imagine if you have a rash that is very itchy and one scratches, then there might be a little bit of an infection or irritation; and that, in turn, can lead to the lymph node being swollen without lymphoma being there. And that's called reactive lymphadenopathy.

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So, we sometimes see enlarged, slightly enlarged or active lymph nodes; but when we get a sample or a biopsy from that lymph node, we actually don't see any lymphoma or very limited lymphoma there; and we called it reactive lymphadenopathy and dermatopathic changes. So, dermatopathic means changes secondary to the pathology in the skin and not in the lymph node.

And that gives us then an N1 stage. If a lymph node shows up on the PET scan or an exam, but when we biopsy, there's no lymphoma in there, gives as an N1 stage. And then we have N2 and N3, and that tells us if there is lymphoma, how much of the lymph node is affected by the lymphoma? And that's a pathologist and will look under the microscope and tell us is this a normal looking lymph node with just a few abnormal T-lymphocytes, or is most of the abnormal lymph node secondary to replacement by these abnormal T-lymphocytes that, for example, would then be N3? So, that's the end stage, and we have N0, N1, N2, and N3.

We also talked about how the blood can be affected, which is why we have to do blood tests in all of our patients and particularly use blood flow cytometry to assess whether there are these T-cell lymphoma cells in the blood. And for the most common cutaneous T-cell lymphoma, we call them Sézary cells; and we have ways of defining them because they express certain markers that other cells don't express.

And we measure how many of these Sézary cells we find in the blood. And that gives us then either B0, so if there's none or a very limited amount of abnormal cells, because

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our tests are extremely sensitive; and they can find 1 in 1,000 abnormal cells. And that may not be really meaningful, or B1 or B2. So, B2 is more than a thousand Sézary cells per microliter, and B1 is less than a thousand but more than 200 in the current classification. So, then we get to B0, B1, B2.

And last, but not least, we have to see whether other organs are affected, so nonskin, non lymph node, nonblood. So, for example, liver or lung. We call them visceral organs or metastasis. We also get that information from our PET scan. That gives us then the M staging, so then it becomes M1 is there are lesions outside of the skin, blood, or nose where M0, there are not.

Most patients present with earlier stages and, thankfully, don't have significant node involvement or blood involvement. Having metastasis is also quite uncommon, thankfully. But you do have to look; and if you don't look, one doesn't know. So, that's one thing we always discuss with physicians who don't see a lot of this lymphoma, that it is very important to do these staging exams early on in the disease course.

And based on that T, M, and B system, we then get a Stage 1, 2, 3, and 4. And then to make it again more complicated, we have Stage 1A and 1B, 2A, 2B, etc.

Elissa: Yeah, that is complicated. Now, I do want to ask, so patients will hear Stage 4 and think about solid tumor Stage 4, which is generally very, very severe disease and

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usually, oftentimes, not as good of a prognosis. But we found that it's a little different in blood cancers. Could you explain what Stage 4 means for patient outcomes?

Dr. Barta: Yeah, that is, again, a very good point you're bringing up because I discussed it very often with patients. And I know Stage 4 sounds, sounds terrible; but, it has much different implications and meaning for patients with a blood cancer, which is important and this is a blood cancer in the end. And as I mentioned before, these blood cells are, from the get-go, all over the place.

Elissa: Yes.

Dr. Barta: So, that means you can find them, if you look hard enough, in many other organs. And the difference to what we call solid tumors, as you had mentioned, is that these, in solid tumors, they have usually a name of the organ next to them. So, lung cancer, breast cancer, prostate cancer; and that's because usually these cells are purely confined to that one organ. So, breast cancer cell comes from the breast. And treatment and cure for patients with these solid organ cancers is usually best achieved by removing it surgically or radiation. And chemotherapy doesn't work as well as it works for example, blood cancer or other systemic therapies. So, the chance of cure is really if you have an early stage, and once you have a later stage, then it is more about treating and controlling the disease rather than curing for solid cancers.

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Now for lymphoma, and that's where the staging really lets us down a little bit, it's not as important. It's one part of the whole story, but it's not the entire part. And while the higher the stage, often the treatment can be more complex. It doesn't mean necessarily that patients with Stage 4 disease do much differently than as patients with Stage 3 disease. And oftentimes what we see is a patient who gets maybe diagnosed with Stage 2 disease and then develops Stage 3 or develops Stage 4, so, you can have a shift in stage. And it also goes the other way around with some of the therapies where we, initially, for example, Sézary disease presents with a lot of blood involvement. And we have now really good drugs to treat that blood involvement; and after a few months of therapy, often patients do not have any more blood involvement and then they're no longer Stage 4. So, stage is important, but it's not the whole story. And, I will definitely say that Stage 4 is something we can treat very well for cutaneous T-cell lymphomas.

Elissa: Very good.

Lizette: That's good to know, yes. So, let's discuss the current treatment options for cutaneous T-cell lymphoma. Can you tell us what the treatments are and if they're dependent, on the subtype or the staging that we just spoke about?

Dr. Barta: Yeah. So, the treatment varies by subtype; and as I mentioned, some of these subtypes are super, super rare, so I'll focus mainly on the common subtypes like mycosis fungoides and Sézary syndrome, as well as lymphomatoid papulosis.

There, as I mentioned, the treatments depend on what we would like to achieve, what organ is affected the most, and also the symptoms by the patient. So, unfortunately, for the majority of patients, cutaneous T-cell lymphomas are an incurable disease.

That means that patients will have to live with their disease. The only curative treatment is a stem cell transplant. However, patients can do extremely well with cutaneous T-cell lymphomas, and the disease can be managed and can be managed like a chronic disease for the majority of patients.

So, I also have that conversation very often; and it's always, a pause after I say this is an incurable disease; and then it's the 'but.' But what actually in medicine is curable? Diabetes is not curable. Live with it. Hypertension is incurable. Cardiovascular disease isn't curable, so a lot of conditions are not curable; and every cancer is different, so cutaneous T-cell lymphoma is a cancer that, in most cases, is not curable but is very manageable. And, for example, patients with early stage disease can expect to live just as long as somebody who doesn't have any cancer at all. So, it's a very manageable disease for most of the patients.

And the treatment is usually focused on the skin, so we have skin-directed therapy, at least that's where most of the disease is for many of the patients. And there we start off with topical therapies, so topical therapies are usually steroid creams for many patients or other topical therapies like topical retinoids is another therapy.

Sometimes, even topical chemotherapy that patients really just apply to the affected

areas. Light therapy can be helpful in many patients; and there we have PUVA or psoralen UVA light therapy or narrow band UVB therapy. And that's essentially a light box where patients go several times a week to have, oftentimes, narrow band UVB therapy. So, this light therapy for, depending on the skin type, the darker we are, the less our skin gets burned. So, if people are very fair, then they can only be a few seconds in that light box, for example, but that can be very effective for many patients. So, light therapy is another skin-directed therapy.

Last but not least, we also have radiation that can be used, for example, for skin lesions that just don't really want to go away with any of the topical therapies that we have or for large lesions or lesions that, for example, have ulcerated and they can often be very effectively treated by radiation. And we have something called total skin electron beam therapy, and that is a therapy where we can give radiation to really all of the skin. And that can be also very, very effective in controlling the disease for some time. And given that we use much lower doses now than we used in the past, these can be given several times and even to the same area several times.

Now, these are usually the main skin-directed therapies we use. Other patients may need systemic therapies, so systemic therapies is something that we give mainly intravenously. They can also be given under the skin as a subcutaneous injection or as tablets. What we know is that if you use very aggressive therapies and chemotherapy that we use, for example, for many other lymphomas, we may get a quick response.

But usually, the response doesn't last very long; and it's short-limited, and we get to the same point with less aggressive therapies.

But also, these last therapies have thankfully less toxicities, so, therefore, we often use just one or combine two or three drugs at lower doses to avoid these side effects and get there maybe a little slower but get to the same point. And particularly what we like to avoid are infections, and patients with cutaneous lymphoma are at a high risk of infection. So, we really don't want to make things worse with a treatment that we're giving. So, we often use immunotherapies that spare the normal immune cells.

So, one of these is interferons, something we commonly use here at the University of Pennsylvania and other centers. We use retinoids. So those are vitamin A pills that we commonly use. Targretin or bexarotene is the most commonly used, but we have isotretinoin as well. So, there are several forms that can be used.

And these are commonly used treatments that we often use in patients with early-stage disease or even with more advanced staged disease if skin therapy alone isn't helpful. But also, it can work in patients who have some blood involvement and even nodal involvement.

And then we have more aggressive therapies that we give intravenously; and that, again, depends what we are giving on where most of the disease is. There is, for example, a drug called mogamulizumab, which is, the mAb stands for a monoclonal

antibody. And that's a drug that targets a protein particularly on the Sézary cells called CCR4 and marks it to the normal immune system and that can then kill these Sézary cells. And that is particularly helpful in patients who have some blood involvement and works really well in the blood. It works also in the skin and in the lymph nodes but maybe not quite as good as in the blood. So, oftentimes, you may combine, for example, the mogamulizumab or similar drugs with other therapies, skin-directed therapies.

And there are many other immunotherapies, pembrolizumab, for example. We have antibody drug conjugates, that is very targeted therapies. It targets a protein called CD30 that we often see. So, there's brentuximab vedotin is one of the drugs that can be very active in patients with cutaneous T-cell lymphoma. Then we sometimes also use chemotherapy, although not that commonly. And then we often use lower doses that can be well-tolerated. Pralatrexate is a drug that has been approved for the treatment of cutaneous T-cell lymphoma. We use epigenetic modifiers, so these are drugs that change how the DNA of cancer cells is being read; and we think they work by activating what's called tumor suppressor genes, so genes that are supposed to control the tumor that the cancer has somehow has managed to switch off. And we can kind of switch them on again. There's a drug called romidepsin that we give intravenously. There's an oral drug called vorinostat that works similarly; and one of

the drugs that can be given as a pill. It's called methotrexate. It's something we also use, not infrequently, especially in early disease.

So, there's really a whole range of different drugs; and it's very hard, especially when you look at guidelines or when writing guidelines to say, "Well, this is the drug you should always use first, and this is the drug you should use second" because every patient is so different; and there is really not a straightforward answer where one treatment fits all and it has to be very individualized. And that's why it's so important, also, for patients with cutaneous T-cell lymphomas to have a multidisciplinary team. So, to have a dermatologist that is involved; and oftentimes they also have a radiation oncologist that is involved in addition to a medical oncologist or hematologist.

Lizette: So, are there any emerging therapies or those in clinical trials that you're particularly excited about?

Dr. Barta: What's really a good story in cutaneous lymphoma is that we didn't have a lot of drugs or drugs that have been used in other diseases that kind of have been reutilized for CTCL. But over the last decade, we really had a whole lot of new drugs that are being looked at and have been approved for cutaneous T-cell lymphoma, which is fantastic. And that includes, for example, mogamulizumab that was approved within the last ten years, brentuximab that was approved for CTCL in the last ten years, and we just had a new drug called denileukin diftitox that has been reapproved for cutaneous T-cell lymphoma; and these are all immune or targeted

therapies. And they have really changed how people with CTCL can be treated and people do a lot better since we have those drugs available.

And there are new drugs in the pipeline. For example, there is an exciting drug for Sézary syndrome particularly that is called lacutamab that is, again, a monoclonal antibody that is targeting KIR3DL2, which is a protein expressed mainly on the abnormal T-lymphocytes. And that as shown in a Phase 2 clinical trial to be very active. So, trials to gain approval by the European and the American agencies, meaning the FDA (Food & Drug Administration) and EMA (European Medicines Agency), are currently ongoing; and hopefully we will have lacutamab available, next year.

It will be great. And then we have other new therapies that have shown to be very active in other lymphomas, and that includes bispecific antibodies and that includes CAR T-cell therapy. But they are still very experimental at this point.

Elissa: Well, that is exciting that you're getting out some new treatments; and hopefully we'll see what happens with bispecifics and CAR T-cell therapy, if that might be a possibility in the future.

So, a little bit earlier you mentioned some side effects, particularly with kind of more aggressive treatments versus less aggressive treatments. Could you tell us a little bit more about the common side effects of treatment and then if they can be managed?

Dr. Barta: Absolutely. So, the side effects, of course, depend somewhat on the treatment itself and each specific agent has different side effects. But some common themes are, with some of the medications – low blood counts that can be seen and that usually gets managed with adjusting the dose of the medication, or taking a treatment break, or giving what’s called growth factors. They can help with the blood counts.

Interestingly, some of the drugs have a skin rash as a side effect, and that can be particularly challenging. It’s sometimes very difficult to tell apart what is the lymphoma and what we think is a healthy immune reaction to the drug. And in some cases, patients who get a rash do actually better than if we don’t see the rash. So, that can be sometimes challenging; and often patients need skin biopsies to tell these apart.

They usually get managed again with topical treatment, sometimes steroids. With any immune therapy, you could see autoimmune complications or complications where the immune system all of a sudden recognizes healthy cells and attacks them. That could be inflammation of the liver or the lung and again of the skin or the bowel, and again, are managed with either holding the dose. Sometimes the steroids, prednisone can often help. Nausea and vomiting can be, for some treatments, side effects; but we have, again, much better anti-nausea medications that can be used and can be very effective in managing those side effects.

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Fatigue is something we commonly see, and there I wish we had great therapies; but the best therapy is probably staying active and trying to do things and not let the fatigue get to you. And the more active patients are, often, the less the fatigue is as well. Other things like yoga can help similarly, and cancer centers will have some support services that can help with managing these side effects.

Elissa: Oh, that's great to know.

So, our final question today, on our patient podcast home page, we have a quote that says, "After diagnosis comes hope." What would you say to patients and their loved ones to give them hope after a diagnosis of cutaneous T-cell lymphoma?

Dr. Barta: Well, I think for many patients, it is important to get the diagnosis and finally understand what is going on with them because you can't do much about something if you don't know what it is you're dealing with.

Elissa: Yes.

Dr. Barta: And getting that diagnosis and finding somebody who understands the disease and knows how to treat this can give a lot of hope because, as I mentioned, we've had a lot of progress in treating cutaneous T-cell lymphomas. And we have really good medications that often are very well-tolerated and can manage the symptoms that we see and really allow patients to go back to hopefully normal or

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fairly normal life and enjoy time with their family and loved ones and do what they enjoy doing.

Elissa: Wonderful. That is great to know.

Well, thank you, so much, Dr. Barta for joining us today and talking all about cutaneous T-cell lymphoma. We know this is a very rare disease, but it still matters so much to the patients and their loved ones who are affected by it; and so, it's great to hear all these latest advances and treatments and potential for the future. And again, we really appreciate you joining us.

Dr. Barta: Well, thank you so much for having me; and the future is absolutely bright. It's exciting times we're living in; and there is a lot of hope for our patients with CTCL.

Elissa: And thank you to everyone listening today. *The Bloodline with Blood Cancer United* is one part of our mission to improve the quality of lives of patients and their families.

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