

Bone Cancer: Success of the Multidisciplinary Approach

Webcast

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Alan Yasko, M.D.

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Introduction

Andrew Schorr:

Hello. This is Andrew Schorr. Welcome once again to Patient Power, sponsored by Northwestern Memorial Hospital. Every two weeks we introduce you to another Northwestern expert and discuss a significant health concern. In the area of cancer, bone cancer is not common. But fortunately when you get to the right team, and as you'll hear they have that at the Robert H. Lurie Cancer Center at Northwestern University, then there is hope, certainly. And also what brings that together is having a multidisciplinary team, doctors of various sizes and shapes and areas of expertise who really specialize in that. So today you're going to meet one of the leaders in that. That's Dr. Alan Yasko. Dr. Yasko is an orthopedic surgeon on the medical staff at Northwestern Memorial. He's chief the musculoskeletal oncology, that's all he does, at the Robert H. Lurie Comprehensive Cancer Center of Northwestern University, and he's also a professor of orthopedic surgery at Northwestern's Feinberg School of Medicine.

Dr. Yasko, thank you so much for joining us. I know these cancers are less common. When we talk about bone cancers, how many new cases are we talking about? I know it can have a significant mortality so help us understand the landscape.

Dr. Yasko:

Well, Andrew, it's a pleasure to be with you to talk about the subject since it represents a very rare component of what is a major medical problem for citizens of the United States. Bone cancers are extremely rare. Comparing them to some of the more commonly talked about cancers, whether it be on radio shows or on television shows, there are maybe 2,000 to 2,500 new cases of bone cancer a year in the United States. That compares to the cancers of the breast, cancers of the prostate, which are in the more than a 100-200,000 new cases per year. So indeed, very rare, and it encompasses a number of different types of cancers. So bone cancer is not just a single diagnosis.

Diagnosis and Symptoms

Andrew Schorr:

Right. And some of the names I hear, let's see if I get them right. Osteosarcoma, chondrosarcoma. So it seemed to me if this is suspected it's really important to get an accurate diagnosis.

Dr. Yasko:

That's very true, Andrew. The major concern that we have with any disease that is rare is that it be accurately diagnosed in a timely fashion. It's not so uncommon that patients will come to me or others within our field after having had months of symptoms and subsequently a number of tests and/or no tests performed because the diagnosis has not been made and it is attributable to some other more common musculoskeletal complaint but clearly not a cancer diagnosis. It doesn't come up in the differential in a physician's mind, whether it be a pediatrician or a primary care physician for adults, that cancer is one of the rarer diagnosis. Common diagnoses or common conditions happen frequently so they're more apt to make that diagnosis or consider those diagnoses before they would consider a cancer. And that leads to potential problems for the patient.

Andrew Schorr:

We have a friend's daughter who was diagnosed and later unfortunately died of use Ewing's Sarcoma, which I know would be one of these types, and I bet her pediatrician had never seen that. So as the last thing, as you say the differential, what else could it be? Maybe they were never thinking that? Now, ultimately she got good care, and that's what we'll be talking about today, but I know it's important to get the right diagnosis. What are some of the symptoms of some of these bone cancers?

Dr. Yasko:

The universal symptom for almost all of these cancers is some localized pain. So these cancers can involve any bone in the body. They do have some predilection for certain sites, but in general the patients will, whether it be a child or an adult, will complain of pain. Now, that pain can be very low-grade at first. It may not really be alarming either to the patient or in the case of a child, the parents, until several months pass and the patient starts to limp (if it's in the lower extremities) or starts to show some favoring of the upper extremity (if it happened to be in the shoulder) or they don't use it, they're not as active. They may actually start to verbalize the complaint that they have of pain. So, it's not unusual for pediatricians or in the adult population to ascribe the symptoms to muscle pulls or muscle strains. In children, growing pains is a common diagnosis that the children have initially. But the astute clinician, the aware patient or the aware patient's parents needs to conclude that if pain persists, then it needs to be evaluated.

Andrew Schorr:

All right. When we talk about evaluation, though, I know that at centers such as yours where people may eventually get, hopefully sooner than later, sometimes some things could be done that aggravated the situation, if you will, beforehand. So, what are the sort of safe diagnostic tests that might be done to say what are

we dealing with, and what are things where as it's beginning to look a little bit like maybe a sarcoma you want to get pretty quickly to a sarcoma specialist such as yourself?

Dr. Yasko:

Well, it's interesting, Andrew, that oftentimes physicians now will go to the most complex or most sophisticated test hoping that that test will in fact cover all potential diagnoses and will give us the most information, biggest bang for your buck. But in fact, for bone tumors, whether they be benign or malignant, the most common, commonly performed diagnostic test that is necessary for the diagnosis is a plain x-ray, and it's also the cheapest, so if we have a plain x-ray oftentimes we can see the changes that occur in the bone which will give us an indication or give the physician the information that's necessary to make either, one, further diagnostic tests or to refer that patient on, depending on the state the patient is in at the time that he's diagnosed. So the easiest test to get an a plain x-ray of the bone that is affected by the symptoms, in this case, pain.

Not uncommonly because infection is in the differential diagnosis for particularly children, then certain basic blood studies will be obtained, a blood count. They'll get some special studies to look for possible source of infection. But in general that's not necessarily high on the differential for adults. If there's an irregularity on that x-ray, then subsequent studies can be performed either by the primary physician or if there's some obvious irregularities that alert the physician that there's a process here that they don't feel comfortable with, then they can at that point make the referral to a center that they know is comfortable with and expert in the care of patients who have bone cancer.

Andrew Schorr:

That brings up a few questions for me. So sometimes like in cancer one of the tests that's done and is minimally invasive is a biopsy. Why would that not be such a good idea with these bone cancers right off the bat?

Dr. Yasko:

One of the problems over the years that we've seen is that there is a rush to make the diagnosis. Although, we clearly don't advocate a delay for the patients in getting their diagnosis it's clear that we don't want to get ahead of ourselves and go right to a biopsy until we have the information that's necessary. In the case of bone cancers that usually would not only include the plain x-ray, upon which further tests would be made or performed, but CT scan and MRI may also be used to better define the local extent of the disease. Once that's been established then a biopsy could be considered.

Over the years, the biopsy has in many cases been relegated to some of the least experienced surgeons, and yet it's one of the most important components of the diagnostic evaluation of these patients. If the biopsy is performed incorrectly or the

sampling adequate, then a misdiagnosis can be made, and the delay in the diagnosis and subsequent treatment or the wrong treatment can be performed which could further compromise the patient's outcome. So the biopsy is a very critical part of the diagnostic evaluation and really starts the process off in the treatment of these rare diseases.

The problem and the major limitations that we see is that if you're doing the biopsy it's not uncommon to do it in a place where you don't have adequate pathology support. Typically, what we will do in the surgery, if we do a surgical biopsy we'll sample the tumor while the patient is still in the operating room and get a sample to the pathologist to test for the adequacy of the biopsy. Do we have the abnormal tissue? Everybody makes the assumption that the tissue is going to look obviously abnormal, but to someone who maybe doesn't do a lot of tumor work or maybe only does one or two in their entire career, it's not such a far reach to assume that they may well not know what is abnormal versus what is normal, and it's not that uncommon that we have biopsies that are performed of normal fat or normal muscle or some of the inflammation around the tumor without actually getting tumor tissue. So, the surgical biopsy is critical not only for obtaining the tissue but also in how the biopsy is performed because we are actually cutting into the tumor and we want to minimize the potential contamination of the tissues around the tumor so that when we do the definitive surgical removal, that we do so with the confidence that we've removed all the tumor.

Care from a Team of Experts

Andrew Schorr:

Right. You know, it's funny. I think patients, me included, you know, let's say somebody looks for an eminent surgeon, but I don't think you think about all of the team that goes with it, and you were really speaking about pathology and also radiology, at the Lurie Cancer Center and its multidisciplinary team. So, now a rare bone cancer is suspected. You have a team devoted to it. That's what you do, but you have others, radiologists, pathologists, oncologists who work with you. Tell us how all that comes together today at the Lurie Cancer Center so that somebody gets the best shot at beating one of these bone cancers.

Dr. Yasko:

Well, Andrew, the surgeon or the medical oncologist or any component of the team cannot operate in a vacuum. Clearly, we need a team approach for these rare diseases as well as other rare diseases. The method by which or the mode by which patients come to the Lurie Cancer Center may be through the orthopedic surgery referral, it may be through a medical oncologist. It rarely would come through another avenue, either a primary care physician or an orthopedic surgeon who has evaluated the patient, hopefully done the appropriate preliminary tests, will send the patients to us. We have a dedicated musculoskeletal radiology team that is an expert in the diagnostic evaluation of bone tumors. We have dedicated

pathologists as well that are expert in the evaluation of the biopsy material. We have an individual, well, individuals who are designated to do the biopsies in interventional radiology under either the guidance of an ultrasound or the guidance of a CT scanner or under x-ray guidance to sample the tissue. So, we have specific experts in those three areas that provide us with the best opportunity to obtain not only the appropriate studies, the radiological studies, but also in increasing the yield of getting diagnostic tissue that will lead to the diagnosis.

Once that has been performed and the diagnosis has been made, then the patient is referred to the medical oncologist who is dedicated to treating patients with sarcoma and those patients are evaluated in the cancer center in a center where all the patients that are being treated are for cancer.

Treatment Decision

Andrew Schorr:

Right. And it's not at all a one size fits all. So my understanding is, as you mentioned earlier, is that there are a lot of different types and sub types of bone cancer, each ever more rare, and what might be the right approach for one would be the wrong approach for another. So that's why looking at what you're dealing with is so critical.

Dr. Yasko:

It is. Some of these tumors are sensitive to chemotherapy. Some of them are not sensitive to chemotherapy or don't need chemotherapy. Others are sensitive to radiation and others are not. They all are amenable to surgical removal with some potential functional deficit that may come with it or limitation that may come with it depending on where the tumor has arisen. But in general the point of having a multidisciplinary team of experts is that you tailor the consultations, you tailor the therapy to the specific diagnosis, and you do so with the confidence that the diagnostic work-up or the evaluation for the patient and their biopsy diagnosis is right on in terms of the accuracy that is necessary to treat the patients appropriately.

Andrew Schorr:

Dr. Yasko, it used to be that, well, you definitely do surgical approach and you cut out as best you could the cancer, but you've mentioned medical oncology and radiation oncology. How does this come together today related to treatment and how do you decide in what order?

Dr. Yasko:

In general, irrespective of how the patient comes to us at the Lurie Cancer Center, we have a multidisciplinary conference where we present the patients and we discuss the radiologic findings, the pathology, we discuss the treatment approach for that individual patient. For certain tumors such as osteosarcoma and Ewing's

sarcoma, those patients will receive chemotherapy before they undergo surgery so that we know that from the history of treating those two diagnoses in particular that chemotherapy up front before surgery can be extremely valuable and give us a lot of important information about the effectiveness of the treatment before the tumor is actually removed. Some other tumors that are low-grade that don't require chemotherapy would go right to surgery and others that may be sensitive to radiation or be in sites of the body where surgery is not particularly amenable to address the tumor in its entirety, radiation may be first employed to try to reduce the tumor to make it resectable so that we can perhaps save an extremity as opposed to amputating it.

So that is all discussed in a multidisciplinary conference, but there's a lot of one-on-one exchange as well. There's a lot of communication. Since we're in one center we do have an opportunity very freely to communicate amongst ourselves regarding the status of the patient, whether it be in the diagnostic work-up stage or whether it be in the treatment stage or in that transition between treatments where we're transitioning from chemotherapy or radiation to surgery and then back again.

Reconstructive Surgery

Andrew Schorr:

One other point about that. When it comes to surgery for someone you want to cut out the cancer and hopefully go on with a high quality of life, where does reconstruction come in, and do you have a member of your team who does that as well?

Dr. Yasko:

Well, I'm the one who does the reconstruction surgery when it comes to the skeletal reconstructions. Oftentimes there is a soft tissue reconstruction that's also critical, and we engage our plastic surgeons in that. So not to exclude them from that multidisciplinary team, but there are other subspecialists in the surgical field who also play a critical role in the overall outcomes for these patients.

Probably the major advance at least on the surgery side is this migration away from doing amputations for these patients. Not that long ago amputation was the treatment of choice for definitive treatment of the primary site, where the tumor has actually arisen. Now it's probably less than 10 percent of the patients that actually are recommended to have an amputation. So if we're not going to be amputating limbs and yet we have to remove large segments, large pieces of an individual's skeleton, there has to be a reconstructive alternative to amputation if we're going to realize any meaningful function. It's one thing to spare an extremity, but to have an extremity that's not able to function is less than optimal for our patients. So not only is the diagnostic team so critical to start the process

but also the exchange of information regarding the response of the treatment that the patients get before surgery is critical to us in our decision-making regarding the way in which we may reconstruct the bone.

Sometimes those tumors are away from the ends of the bones, near the joints, where we can spare the joints, but when we have--and most of the tumors do have involvement near the ends of the bones, it necessitates we remove the adjacent joint, and that's where the functional limitations can arise unless you have the expertise to reconstruct the patients in a way that not only will remove the tumor but also will reconstruct them so that they can optimize their function.

Progress for the Future

Andrew Schorr:

Now, people ask you probably ten times a day, what's my outlook for the future? And I know it's hard to talk about that generally. We talk about all the variations among people and cancer types and sub types. But when you look about moving the ball forward, if you will, making progress in bone cancers or specific examples of bone cancers, what would you say that would illustrate the changes? One was, you said, many fewer amputations. Are there other examples, or taking chemotherapy and radiation and surgery working together where you're really seeing progress?

Dr. Yasko:

Well, I think this is where the value of a multidisciplinary team has been so critical. It wasn't that long ago that patients, as I said, were diagnosed and underwent immediate amputation. It then evolved so that the patients had immediate amputation and then received chemotherapy because the overwhelming majority of patients subsequently died of their disease. Approximately 80 to 85 percent of the patients who came in to be evaluated, had the diagnosis of the tumor, had the limb amputated, went on to succumb to their disease. With the involvement of chemotherapy, which is the primary therapy for these patients that have tumors that are sensitive to it, the survival at five years is now consistently above 60 to 65 percent and in many cases can be greater than 70 to 75 percent. So the major advance that has occurred in terms of patients' overall survival has been identifying effective regimens of chemotherapy, multiagent chemotherapy. These are not a single agent, these are very aggressive chemotherapy regimens that have really made the major impact in terms of patient survival.

Survival is obviously a critical factor, but once we know that we're able to consistently maintain the patients disease-free, the question then in the patient's mind shortly thereafter is, "Well, if I'm going to be able to live out a normal life with a higher probability than perhaps historically was the case, I also now want to have good quality function." So we're very sensitive to the fact that although survival is paramount we want a cured patient but we want a cured, intact patient as much as

possible. So a lot of the efforts over the years has been evaluating and applying new technologies to try to minimize other complications that can really adversely affect the quality of patients' lives irrespective of having a successful outcome with respect to their disease.

Andrew Schorr:

Right. What is life all about? Now, it's wonderful to hear the progress. Now, some people may need drug therapy, after you cut out and you kill all the cancer you can and hopefully as you said preserve function or restore function, some people may need medicine after all that, right?

Dr. Yasko:

Yes, the normal paradigm for the treatment of these patients is that they get chemotherapy before surgery. Some people use the term induction chemotherapy. Others use the term preoperative chemotherapy or neoadjuvant chemotherapy. They get a period of time where they have the chemotherapy. Then they come to us to discuss surgery to assess how they responded to that treatment, and we use the radiographic studies that we discussed earlier to help us. We then plan the surgical procedure and the reconstruction. After the patient has recovered from that then the patient will be reevaluated by the medical oncologist and be reinitiated on chemotherapy for a prescribed period of time. That will be determined depending on whether they're on a clinical protocol or whether they're on a specific regimen for that particular center. They will be on that treatment for a number of weeks thereafter. For Ewing's sarcoma, one of the common tumors that we see in children, the total time that the patients undergo chemotherapy is 36 weeks. So it is a very, very intensive and very long treatment course for these extremely, extremely aggressive tumors.

Andrew Schorr:

Are you hopeful? You're involved in research as well. You mentioned clinical trials or clinical protocols. So as people continue to be diagnosed with these can the road be easier, more successful, when you use your crystal ball and talk to your medical students, what's the outlook for the future?

Dr. Yasko:

Well, we've enjoyed some great success and our patients clearly are here to tell us that they're extremely grateful for the progress that's been made to date. But in order to make progress in the treatment of this disease or these diseases we really need to achieve in my opinion two main objectives. One is that we continue to do research to identify these tumors at more of a molecular level. Right now we diagnose them on the basis of how they look on radiographs and how they look under the microscope, the typical laboratory microscope. But clearly there are more secrets that need to be revealed with these tumors because some patients do

extremely well and in that circumstance may not need as harsh a treatment or as long a duration of treatment, and others will not be cured with current modalities and therefore novel treatments need to be considered for those patients.

And, secondarily, those patients who have advanced disease, many of those we can salvage, but in general when patients have disease that is detectable outside of the primary site their prognosis has been poor, and we need to address that patient population as well so that we can bump that number from 60 to 70 to 75 percent up to 85 or 90 percent and hopefully ultimately cure everyone with these diseases.

Andrew Schorr:

Well, I'm going to go on my soapbox for a minute. I've done some programs, a number in bone cancer, and when I talk to a specialist like you it's abundantly clear to me that patients within the sound of our voice, family members, would do well to consult with a team such as yours at the Lurie Cancer Center because we're talking about rare cancers, we're talking about understanding all the different sub types, getting the diagnosis right, individualized treatment plan. And, as you say, now looking into the future more of a molecular understanding of what you're dealing with and a very targeted approach. That's the kind of work I know that you all are involved in. You must be very encouraged as you do this because you've seen change already in your career that's made a big difference.

Dr. Yasko:

I'm very encouraged, Andrew. If the patients and the families who have gone through this could have an opportunity to talk to or your listening audience could interview or talk to the survivors or talk to the family members of the survivors, I'm so impressed with the commitment that the families have to these patients, that the patients have. Their attitudes are so unbelievably impressive that each day that passes it's clear that efforts need to be continued to try to increase that survival statistic so that we can rid ourselves of these rare but very difficult cancers.

Andrew Schorr:

Well, I know there are a lot of people I'm sure around Chicago who want to thank you and your team. I want to thank you today, Dr. Alan Yasko, who is a specialist in musculoskeletal oncology at the Robert H. Lurie Comprehensive Cancer Center at Northwestern University. Thank you for all you do, Dr. Yasko.

Dr. Yasko:

You're welcome, Andrew.

Andrew Schorr:

I wish you all the best. I want to just mention to our listeners, if you would like to have more information about Northwestern Memorial Hospital's physicians and services just look on the website, nmh.org. This is what we do, is help you have

knowledge so that you can get the best medicine of all. And, as you heard, related to these bone cancers, the multidisciplinary team and the research can make a tremendous difference for you or someone you care about.

Our next program will be July 29th when we'll be discussing sports injuries of the foot and ankle. I'm Andrew Schorr. You've been listening to Patient Power on IHealth, brought to you by Northwestern Memorial Hospital.

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