[MUSIC PLAYING]

PETER S. ROSE: Sarcomas are a family of cancers, which are relatively rare.

STEVEN I. ROBINSON: We'll only diagnose 15,000 cases of sarcoma in the United States this year, of which there are more than 50 subtypes.

SCOTT H. OKUNO: A busy cancer practice might see one or two sarcomas a year. Mayo Clinic sees over 350 in one site alone of new sarcomas. Our treatment approach for each of those different sarcomas is going to be tailor made for each of the different histologies. So it's very critical for us to make sure we have the correct diagnosis, and more importantly, the correct subtype.

PETER S. ROSE: We have a series of molecular tests which are used, which can be very helpful in pinning down an exact diagnosis. Those specialized tests for a rare condition are only available to a small number of institutions.

STEVEN I. ROBINSON: The treatment of sarcoma is complex. It's complex because it really depends on the subtype of sarcoma, how it presents. Does the patient present with localized disease or metastatic disease? And it often requires a multi-disciplinary team with experience in managing sarcomas.

SCOTT H. OKUNO: All of our pathologist here specialize in bone and soft tissue, and because of that, they have not only internal cases that they have, but they also have a lot of external cases. And because of those external cases, they can see a lot of opportunities for the different types of sarcomas that are being done all across the United States, as well as internationally. And because of that, they develop an international expertise and not only are those tough cases sent to them to review, but because of that, they are allowing us to see those patients as well because of the expertise that we are developing in our service line for sarcomas.

PETER S. ROSE: Most of the bone sarcomas, particularly the osteosarcoma and Ewing sarcoma, patients are children and young adults. Some soft tissue sarcomas tend to affect young adults. More soft tissue sarcomas tend to affect older adults. Chondrosarcoma, another one of our primary bone sarcomas, that's usually a disease that affects people in middle or older age. Someone who's had colon cancer or gynecologic cancer and has been treated with radiation to their pelvis, a woman who's had breast cancer treated with radiation to the chest, or a man with prostate cancer. The risk, thankfully, is very small, but a small number of those patients, in a delayed fashion, can go on to develop a post-radiation sarcoma, which is a pretty aggressive cancer that arises in the years following radiation.

Imaging is critical in knowing where something is, and in addition, knowing where it isn't, because when establishing the extent of a sarcoma in a person, you need to know the full extent of the primary tumor, where it's arisen. You also need to know if there's any evidence that it's spread elsewhere in the body. We've started using 3D printing to print one to one absolute anatomic models, which are individualized for a particular patient, that demonstrated the extent of their tumor and its relationship to all of the critical structures around it. The treatment varies depending upon the type it is. So having an accurate diagnosis is pretty critical in treating properly. Almost all of them require surgery as a part of the treatment, many require radiation, and some require chemotherapy as a part of the treatment.

STEVEN I. ROBINSON: The patients with large high-grade tumors, where the margin over section will be close, often require radiation, in addition to that experienced surgeon to give them the chance for cure. Cases where there is a risk for functional compromise or in patients that we think have a very high risk of relapse we'll often incorporate chemotherapy into their management.

PETER S. ROSE: Sometimes, maybe in a situation where you consider chemotherapy, but the patient's not up for chemotherapy. So you have to modify the treatment plan based around that.

SCOTT H. OKUNO: There might be times when the tumor is a little bit larger or deeper and there's a risk for recurrent disease, where we do need our multidisciplinary team to come in and talk about the value of adding radiation therapy, either before the surgery, after the surgery, or actually at the time of surgery. We also then, from our multidisciplinary team, have to discuss the role of chemotherapy with its potential benefits and side effects before or after surgery as well.

PETER S. ROSE: Intraoperative radiation is something we employ here very frequently. The classic scenario is a soft tissue sarcoma, which is in the arm or the leg or in the trunk or the pelvis, that abuts up against a major nerve or other critical structure. That nerve's not involved, but if we just take the cancer out, we've got a pretty close margin there and a higher risk of the cancer coming back. At the same time, if you resect one of the major nerves, it has a lasting and permanent deficits and disability for the patient. So in surgery, we can remove the cancer with a wide margin in every domain but recognizing that we have a clean but close margin up against the nerve. We need to do something to try to sterilize that margin, and so we have an operating with the linear accelerator in it that we can target directly at the at-risk areas of the nerve itself. So we can give a boosted dose to the critical interface, where we're clean but close, but at the same time, not expose the other surrounding normal tissue.

STEVEN I. ROBINSON: Clinical trials are very important for the care of cancer patients.

SCOTT H. OKUNO: The clinical trials are the reason why we can do something here that other places cannot do. These are usually new drugs or a new combination of drugs that can't be done in a routine clinical setting in a community. They have to go to an academic center that has expertise, has a multidisciplinary group to have these clinical trials.

STEVEN I. ROBINSON: Upon completion of treatment, for example for patients with localized disease, there are still a number who will be at risk for relapse. Those patients will require scans for surveillance. Many of our patients are doing these scans at home with their home providers or their radiation oncologist. And either the patient or their physician will reach out to us if there are concerning findings on the scan that need to be addressed.

SCOTT H. OKUNO: We think that the outlook for patients with sarcoma is going to continue to improve. We're developing newer strategies to approach treatment with radiation, better treatment options for imaging. We have better treatments for chemotherapy and better options for surgical techniques.