Thank you for coming.

I'm happy to introduce two speakers today.

Our first speaker is Doctor Ehud Mendel, who is executive Vice chair professor of neurosurgery here and director of the Spine and I called you program.

He actually joined Yale recently in September of this year where he came from the Wechsler Wexner Medical Center, the Ohio State University, and the James Cancer Hospital.

He received his medal called degree from Louisiana State University.
School of Medicine and further clinical training at the University of South Carolina and the University of Florida School of Medicine. And his team has pioneered new surgical techniques to reconstruct the spine following surgery to remove spinal tumors, including advancing minimally invasive neurological spinal surgery. So it’s a great pleasure to welcome you to Yale and to your first grand rounds here. Thank you, but I appreciate the opportunity to give this talk and I want to thank all of you and Renee too, and make this arrangement for me. So I really wanted to.
Talk about these Sid topic did it?

I’ve been very passionate about over many years and that’s the surgical management of patients with spine tumors. So.

Uhm? Let’s see how well this forward.

Would you rather.

Arrows.

OK, so when we talk about patients with spine tumors,

we’re talking about two kinds of patients.

we’re talking about two kinds of patients.

Population patients with primary spine tumors means the tumor is growing directly from the bone itself within the spine itself.

These are primary bone
00:01:46.688 --> 00:01:48.923 tumors coming from the spine.

NOTE Confidence: 0.892182161

00:01:48.930 --> 00:01:51.602 The most common type of tumors are patients

NOTE Confidence: 0.892182161

00:01:51.602 --> 00:01:54.553 who have ministered disease to the spine,

NOTE Confidence: 0.892182161

00:01:54.553 --> 00:01:56.308 and those are two very

NOTE Confidence: 0.892182161

00:01:56.308 --> 00:01:57.800 different patient population.

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00:01:57.800 --> 00:01:59.455 The primary tumor growing from

NOTE Confidence: 0.892182161

00:01:59.455 --> 00:02:02.030 within the bone of the spine versus

NOTE Confidence: 0.892182161

00:02:02.030 --> 00:02:03.738 the metastatic spine tumors.

NOTE Confidence: 0.892182161

00:02:03.740 --> 00:02:04.984 The goal is different.

NOTE Confidence: 0.892182161

00:02:04.984 --> 00:02:06.850 The adjuvant therapy is different and

NOTE Confidence: 0.892182161

00:02:06.911 --> 00:02:08.987 the surgical options are very different.

NOTE Confidence: 0.892182161

00:02:08.990 --> 00:02:12.020 So the goal for primary tumors are really

NOTE Confidence: 0.892182161

00:02:12.020 --> 00:02:14.130 to try and cure the patient of the disease.

NOTE Confidence: 0.892182161

00:02:14.130 --> 00:02:15.838 The idea is to try and get

NOTE Confidence: 0.892182161

00:02:15.838 --> 00:02:17.170 this tumor out of there.

NOTE Confidence: 0.892182161

00:02:17.170 --> 00:02:19.270 It’s the only side of disease,
and the idea is to get a tumor out without interfering with the tumor capsule. So the idea is that if you take the tumor out in one piece without really breaking into the tumor itself, there is a potential of curing the patient of cancer. And sometimes, even if it’s not feasible, the idea is to at least give him long term survival. When you’re dealing with patients with menist attic disease, which is the most common issue, then you’re really dealing more with palliation and quality of life.
The Advent therapy is different for those two patient populations.

Multiple agile in therapy, options for patient with metastatic disease.

You can come in.

And the primary ones, it’s very limited.

Surgical techniques are also very different to those two patient populations.

And I’m going to talk about both of them.

I’m going to talk first about the metastatic spine tumors.

because these are the most common patient population.

So there is about 1.2 million new cancer cases per year in the United States.

But more than half a million deaths per year.
It’s a major cause of death is complication due to metastatic disease, and if you look at this patient population, the skeletal system, the spine is the third most common site of disease after it spread to the lung and liver. And the spinal column is the most common sites of skeletal metastases. So third of this third patient population, the spine, is a is the most common place for it to end up with and as many as 90% of cancer patients will have spinal metastases at autopsy.
Studies and out of those 90%, ten to 30% of this patient cancer patient will suffer from symptoms. Symptomatic symptom, symptomatic spinal Mets, or whether they have severe pain or whether they’re presenting with their. Significant or logical issues? The primary tumor, the other group that I’ve talked about a very different patient population. These are very unique tumors. They’re growing typically from with the bone itself of the spine, and these are the osteoid osteomas, the osteoblastoma giant cell.
tumor aneurysm bounces, kodamas, chondrosarcoma, Ewing sarcomas, and medical ecology should deal with these type of patients are very familiar with this type of tumors. So when we think about surgeries on this patient population, we have to keep in mind whether this patient population that we’re dealing with, especially the patient with metastatic disease. They are typically immuno compromised. They have decreased white blood cell count so they have higher risk of post op infection,
00:04:59.610 --> 00:05:01.210 high risk of bad infection.
NOTE Confidence: 0.750648214545454
00:05:01.210 --> 00:05:03.508 They have lack of fever response.
NOTE Confidence: 0.750648214545454
00:05:03.510 --> 00:05:05.988 They have lack of appeal cytosis.
NOTE Confidence: 0.750648214545454
00:05:05.990 --> 00:05:07.862 There are sometimes issues with these
NOTE Confidence: 0.750648214545454
00:05:07.862 --> 00:05:09.444 patients get cement injection into
NOTE Confidence: 0.750648214545454
00:05:09.444 --> 00:05:10.879 broken vertebraes those can get.
NOTE Confidence: 0.750648214545454
00:05:10.880 --> 00:05:11.604 Easily infected,
NOTE Confidence: 0.750648214545454
00:05:11.604 --> 00:05:14.500 which turns out to be a big problem.
NOTE Confidence: 0.750648214545454
00:05:14.500 --> 00:05:17.517 Their nutritional status is not that great.
NOTE Confidence: 0.750648214545454
00:05:17.520 --> 00:05:19.858 They lose a lot of weight there.
NOTE Confidence: 0.750648214545454
00:05:19.860 --> 00:05:21.520 They’ve increased catabolic state,
NOTE Confidence: 0.750648214545454
00:05:21.520 --> 00:05:24.479 decrease intake their serum of human is low,
NOTE Confidence: 0.750648214545454
00:05:24.480 --> 00:05:27.427 and so you have to think about
NOTE Confidence: 0.750648214545454
00:05:27.427 --> 00:05:28.690 preoperative nutritional support.
NOTE Confidence: 0.750648214545454
00:05:28.690 --> 00:05:30.986 They are typically on steroids to supplement
NOTE Confidence: 0.750648214545454
00:05:30.986 --> 00:05:33.438 some of the agents that they are on,
which obviously leads to a multitude of side effects related to the steroids that are listed over here and for the sake of time. I’m not going to. And go over it. They are a lot of patients are coagulopathic with Trump cytopenia they may not be ambulatory, so they’ve increased for DVTS. So you have to think if you’re doing surgeries on these patients or sometimes if you don’t about DVD prophylaxis for these patients. And if you end up thinking about
operating in these patients,

some of these tumors are very vascular tumor,

which means significant blood loss during the surgery itself.

If you think about the primary bond tumor,

you know the aneurysmal bone cyst,

the giant cell tumor,

These are known to be super vascular tumors,

and as you get in there and start removing this tumor out,

you encounter significant blood loss.

In essence,

any tumor that has the word him in it you have to worry about a very vascular tumor during surgery.
And these are just the primary tumors. If you talk about the metastatic patients, the renal circle cinemas there, potassium, local cinema, the thyroid, the pheochromocytoma are also highly vascular tumors and you have to anticipate it as you’re planning on getting these out. Sometimes you have to think about wound closure and the reason is because sometimes the tumors is large, which leaves significant defects.
Sometimes there is a risk of just the increase age they altered immune system capsia patients have been radiated on chemotherapy, so their wounds don’t heal as well, and so these are all the issues that gets into, you know, when do you need to start thinking about the wound issues when it comes to home closure and so plastic surgery becomes to be a very good friend of us when it comes to ability to close this wound and
minimize the post op complication related to home closure. And this is just some of the issues we’re dealing with. Here is a patient with sarcoma soft tissue tumor that invaded all the tissues of the spine so we can take this. Out, but clearly we need our plastic care colleagues to be able to deal with these types of tumors. And as we remove him out, it’s not just about how to remove it, but planning on once the tumor is removed, how to be able to close it. So these are a lot of these cases tends...
to be multidisciplinary in nature.

In the with the ability to remove the tumor and then the ability to do some sort of flap to be able to close these wounds.

Sometimes you’re dealing with a very large tumors.

This is a large stake of Chordoma with big reconstruction.

Again, gotta rely and plan on plastic closure to close these wounds,

so I wanted to go over some cases just to kind of give you the.

Run over the meal patient population that eyes,
spine tumor person and deal with in

commonly and let’s just take these

cases and what’s unique about the

cases I’m going to show you is that

they are all presenting the same,

so these are patients are

presenting with back pain.

Here is a patient with multiple myeloma.

Is 57 years old,

has some pain in the back going to the

legs already get maximum pain medications.

Biopsy revealed multiple myeloma already underwent.

Radiation stem cell transplantation

still have progressive disease
and is not logically intact,
so this is very common in
the multiple myeloma ward,
where patients come in and they have
back pain and you can see right here.
Here’s the MRI and you can see
there’s a fracture of the vertebrae
in the lumbar spine here,
so there’s a broken vertebra
related to the multiple myeloma,
and so we get called and said,
can you do something here?
You’re the second case,
presenting the same way, patient.
It can’t be back.
Pain has metastatic renal cell carcinoma and you can see here the MRI kind of look the same. There is a metastatic lesion here. At L1 is a little bit of a fracture here. Maybe even new fracture at T12 here, but the presentation is the same. The location of the tumor is in exactly the same place. The patient has no logical deficit, just back pain. The only difference between those two cases is that the first case was multiple myeloma. The second case was a renal cell carcinoma.
Are we going to treat it the same, or is the tumor biology dictate the treatment option? Here's a third case on a 52 year old again or logically intact. Just having back pain has a diagnosis of chondrosarcoma based on a CT guided biopsy, and you can see right here in other lumbar fracture. The first two cases were lumbar fracture. Multiple myeloma renal cell carcinoma. Here is a chondrosarcoma with a lumbar fracture right here at L4 representing exactly the same with back pain. So should we treat that tumor the same way?
00:10:35.690 --> 00:10:37.760 With reading the multiple myeloma adrenal.

00:10:37.760 --> 00:10:38.690 Tell casino.

00:10:38.690 --> 00:10:42.260 Here is a case 68 year old with thymic carcinoma coming in at the seed.

00:10:42.260 --> 00:10:44.390 Already radiation and you can see right here at T11 and T12.

00:10:44.390 --> 00:10:46.010 There’s lesions right here at those two variables which may be a little bit of a fracture right here again.

00:10:46.010 --> 00:10:48.209 T arako lumbar junction location is about the same, but the different type of cancer.

00:10:48.210 --> 00:10:50.310 So the question that we always asking ourselves all these cases require surgery, does their differences in the tumors or the tumor biology really makes a difference?

00:10:50.310 --> 00:10:52.566 two variables which may be a little bit of a fracture right here again.

00:10:52.566 --> 00:10:54.498 Tarako lumbar junction location is about the same, but the different type of cancer.

00:10:54.498 --> 00:10:56.586 So the question that we always asking ourselves all these cases require surgery, does their differences in the tumors or the tumor biology really makes a difference?
And which approach should we take to treat and help these patient populations?

And when it comes to my job as a surgeon dealing with these patients there, only these are the four options that I have.

I can do what we call an intralesional resection where we enter the tumor with piece meal the tumor out. That’s the intralesional component.

We can do what we call an unblocker section, where in one piece we take the tumor out without interrupting the terminal capsule. We don’t necessarily have to do surgery.

We can do just chemotherapy,
00:11:46.640 --> 00:11:47.520 immunotherapy,
NOTE Confidence: 0.659837787142857
00:11:47.520 --> 00:11:49.280 conventional radiation,
NOTE Confidence: 0.659837787142857
00:11:49.280 --> 00:11:51.920 or stereotactic radiosurgery.
NOTE Confidence: 0.659837787142857
00:11:51.920 --> 00:11:53.528 Or sometimes we can just inject
NOTE Confidence: 0.659837787142857
00:11:53.528 --> 00:11:55.873 some end into the vertebrae just to
NOTE Confidence: 0.659837787142857
00:11:55.873 --> 00:11:57.497 restore some mechanical stability,
NOTE Confidence: 0.659837787142857
00:11:57.500 --> 00:12:01.938 which is minimally invasive.
NOTE Confidence: 0.659837787142857
00:12:01.938 --> 00:12:04.304 So I wanted to show you some specific
NOTE Confidence: 0.659837787142857
00:12:04.304 --> 00:12:06.592 cases because the four cases that I
NOTE Confidence: 0.659837787142857
00:12:06.592 --> 00:12:08.532 showed there are presented with the
NOTE Confidence: 0.659837787142857
00:12:08.540 --> 00:12:12.768 neurological non or logical deficit,
NOTE Confidence: 0.659837787142857
00:12:12.770 --> 00:12:15.206 But when they do have a neurological
NOTE Confidence: 0.659837787142857
00:12:15.206 --> 00:12:16.919 deficit and things becomes even
NOTE Confidence: 0.659837787142857
00:12:16.919 --> 00:12:19.343 more urgent as to what can be done,
here is a 23 year old patient who comes
in stood up complaining of some weakness.
And when you look at the exam, the exam shows a little bit
of weakness in her legs.
Four out of five strength in both of her legs.
And here is an MRI which showed 9 broken.
There is severe tumor compressing the back of the spinal canal.
Pressing this power code and unfortunately here she’s in the emergency
room and there is no diagnosis.
We do not know what this looks like a tumor,
but she presented the emergency room
and this is what the MRI looks like
and the question is what to do, and that’s where we get called. Then.
The unfortunate thing here is that unlike the first four cases where we knew the diagnosis, here we are faced with the situation. With a patient presenting with cord compression with mild weakness in the legs but no diagnosis and so here is some of the views you can see on the axial cut severe cord compression, the podis squashed. There’s a lot of tumor around the
vertebral body and but the patient is a very minimal weakness in her legs.

And so these patients here is the CAT scan shows mild compression fracture at T9 and no surgical consultation was requested.

And the question is should that each patient be taken emergently to the operating room? Because there is a little bit of weakness in the legs but no diagnosis. We don’t know what it is or wait on the surgery trying to establish a diagnosis and based on the diagnosis make a decision of what to do. And so on. This case, the patient. Make that accommodation by the nose surgeon. On call was to take the patient to
surgery and do a decompression.

And so I Laminectomy was done and 
you can see right here.

The back of the spine is removed.

The canal has been opened up.

You can see right here on
the postoperative MRI.

Did spinal cord looks a little bit better.

There's nothing much compression there,
but if you look at the axial cut
the majority of the tumors left
behind the entire vertebral bodies,
encased in tumor and all of that was not.

Touched by their purpose of the
surgery was really to just take
the portion within the canal that’s pressing on the spinal cord.

The postoperative specimen came back to be lymphoma.

And so the question was, was that the right choice for the patient considering it being a highly radiosensitive tumor, highly responding to adjuvant therapy and rarely actually needs any surgery, was there the right choice for the patient and part one of the downsides is not a patient needs to recover from the surgery. There's a fresh wound that will not tolerate with the Asian so quickly,
NOTE Confidence: 0.7114232525
00:15:01.910 --> 00:15:04.028 so there's some downside for doing
NOTE Confidence: 0.7114232525
00:15:04.028 --> 00:15:06.525 the surgery and now have to wait
NOTE Confidence: 0.7114232525
00:15:06.525 --> 00:15:07.539 for the treatment.
NOTE Confidence: 0.7114232525
00:15:07.540 --> 00:15:09.300 Now, let’s say we take the same case,
NOTE Confidence: 0.7114232525
00:15:09.300 --> 00:15:11.020 but instead of four out of five weakness,
NOTE Confidence: 0.7114232525
00:15:11.020 --> 00:15:12.496 the patient only had two out
NOTE Confidence: 0.7114232525
00:15:12.496 --> 00:15:13.234 of five weakness,
NOTE Confidence: 0.7114232525
00:15:13.240 --> 00:15:15.856 and would that have made a difference when
NOTE Confidence: 0.7114232525
00:15:15.856 --> 00:15:18.686 it comes to taking the patient to surgery?
NOTE Confidence: 0.7114232525
00:15:18.690 --> 00:15:21.858 So how much of a weakness is acceptable,
NOTE Confidence: 0.7114232525
00:15:21.860 --> 00:15:24.380 and how much of a weakness is not acceptable?
NOTE Confidence: 0.7114232525
00:15:24.380 --> 00:15:26.045 That becomes a very difficult
NOTE Confidence: 0.7114232525
00:15:26.045 --> 00:15:28.068 question to decide whether to take
NOTE Confidence: 0.7114232525
00:15:28.068 --> 00:15:29.856 to the patient’s surgery or not.
NOTE Confidence: 0.7114232525
00:15:29.860 --> 00:15:32.148 It is another patient with a 51 year
NOTE Confidence: 0.7114232525
00:15:32.148 --> 00:15:35.109 old 51 year old who comes in with weakness and some incontinence,
NOTE Confidence: 0.7114232525
00:15:35.109 --> 00:15:36.653 and you can see there is a tumor.
NOTE Confidence: 0.7114232525
00:15:36.660 --> 00:15:37.956 In the sacrum there’s a lot of tumor in the canal pressing on the spinal canal explained incontinence,
NOTE Confidence: 0.7114232525
00:15:39.927 --> 00:15:42.738 and some of the weakness and you can see another MRI here shows the finding of a broken sacrum.
NOTE Confidence: 0.7114232525
00:15:42.738 --> 00:15:44.634 can see another MRI here shows the finding of a broken sacrum.
NOTE Confidence: 0.7114232525
00:15:44.640 --> 00:15:47.139 and some of the weakness and you can see another MRI here shows the finding of a broken sacrum.
NOTE Confidence: 0.7114232525
00:15:47.139 --> 00:15:49.427 the finding of a broken sacrum.
NOTE Confidence: 0.7114232525
00:15:49.427 --> 00:15:51.707 the finding of a broken sacrum.
NOTE Confidence: 0.7114232525
00:15:51.710 --> 00:15:53.552 Some tumor in the canal and
NOTE Confidence: 0.7114232525
00:15:53.552 --> 00:15:54.780 the patient under men.
NOTE Confidence: 0.7114232525
00:15:54.780 --> 00:15:56.211 Emergent surgical intervention
NOTE Confidence: 0.7114232525
00:15:56.211 --> 00:15:58.596 with the Laminectomy and fixation,
NOTE Confidence: 0.7114232525
00:15:58.600 --> 00:16:01.048 but unfortunately this turns out to be a primary bound tumor with a counter sarcoma,
NOTE Confidence: 0.7114232525
00:16:01.048 --> 00:16:03.368 and when they found out it
NOTE Confidence: 0.7114232525
00:16:03.370 --> 00:16:04.534
00:16:04.534 --> 00:16:05.310 was a conscious or

00:16:05.360 --> 00:16:07.366 comma, the patient underwent

00:16:07.366 --> 00:16:08.530 stereotactic radiosurgery.

00:16:08.530 --> 00:16:10.684 Unfortunately, this is one of those

00:16:10.684 --> 00:16:12.438 tumors were the recommendation is

00:16:12.438 --> 00:16:14.244 to try and do an unblocker section.

00:16:16.364 --> 00:16:18.649 Once you enter this tumor and you

00:16:18.650 --> 00:16:21.415 then there is 100% chance of recurrence.

00:16:21.420 --> 00:16:23.164 So really the only chance of the queue

00:16:23.164 --> 00:16:25.066 for this patient would have been during

00:16:25.066 --> 00:16:27.006 the first surgery with attempt to remove

00:16:27.006 --> 00:16:28.665 it in one piece without entering it,

00:16:28.670 --> 00:16:29.456 unfortunately here.

00:16:29.456 --> 00:16:31.421 The patient may have done
well with the decompression, but the tumor have entered and death leads to spillage in the surrounding, which ultimately leads, will lead 100% to recurrence. And sure enough, this patient came back three years later and presented with this little bump in the back they thought was maybe one of the screws are getting loose. But when you look at the MRI you see that the entire tumor is now recurring, that the entire tumor is now recurring, and in fact that bump is actually a metastatic disease underneath the skin, which was expected considering that the surgery.
It was done with unfortunately intralesional instead of an unblocker section in.
Not only dead.
Now the rise is broken and then ended up taking this back patient back to surgery.
We remove the lesion itself in an unblock fashion, but it really makes no difference now since the tumor has spread, and here is a specimen revising the cancer here and the plastic surgeons came by and did a flap to close this one. So the take home message meant message in all these is that this could be a miss management.
In a way of trying to think through the process of what to do here and it could be related to bad timing operations or sometimes operation with no diagnosis where you don’t really know what to do, and so I’m just. I call it a triple W phenomena to be aware of the triple W of the wrong operation on the wrong patient, sometimes by the wrong surgeon, or emphasizing neurological issues versus uncle logical issues. So when you’re dealing with that this type of tumors and I’m going to go out fast just for the sake of time I mentioned.
Some of these issues here when it comes to the goal and a lot of these things has to be done with making the right diagnosis and now what it is that you're dealing with. Biopsy is extremely critical as much as possible. Anytime you have a chance, you have an option of doing a biopsy. Make sure that you do the biopsy up front. It is a patient that they supposedly thought that it has a contractor comma or a chordoma will schedule the surgery. A biopsy was done and it turned out that this was in a pending Mama,
which was a completely.

Different tumors require completely different surgery, so biopsies are very critical. Make sure on this particular case is that you avoid a trans or a trans rectal biopsies because. If the idea is to take the entire piece of tumor out, the track itself can lead to contamination, and so we typically mark where the track of the biopsy is being done, and then we'll remove the entire specimen with the track itself to make sure that the whole specimen is being removed in one piece,
and you can see right here some of the cases where the place where the skin was violated with that biopsy is being removed with the specimen itself, which means that the biopsy needs to be very close to the midline. Stay away from these type of issues where the biopsy is done very far way out to the side where we are unable to remove the track itself with the specimen. The biopsy needs to be very close to the midline. Uhm, I mentioned some of these intra lesional options unblock options. These are really the surgical
options that we have.

The Intralesional the

mentions of peace meals.

Here's a patient with two level metastatic disease at T3 and T4.

We as surgeons need to be comfortable with being able to approach the spine from any direction.

Possible weather through the front to the side through the back.

It is a case where the spinal cord is being suspended.

The nerve roots has been ligated and you can see that gives us access to the interior of the tables.

Find through the vertebres we can.
They then put the screws in our place and then we can actually remove the vertebral bodies through the back and then get underneath this power cord and sneakers a cage to replace the broken vertebrae. And that’s what it looks like after the surgery. The unblocker sections where we going in around the tumors are much more complicated is it is what more complicated is it is what we actually want to achieve with the entire segment of the spine is being removed in one piece without interrupting it and that.
Takes a lot of planning when it comes to work to make the cuts, ultimately to be able to remove the specimen in one piece and you can see in this picture again, the tumor has not been violated on a primary bone tumor and you can see right here are the entire segment of the vertebrae. Is able to be removed from around the spinal cord without interruption. Radiation obviously is a huge component to what we do. There is a conventional option just so the Asian there is a surgery followed by radiation and then
here it's Milo.
And in major cancer hospital we have the option of spinal radiosurgery.
We've written about there's a lot of cases out there about radiotherapy and radiation treatment option for patients with metastatic disease, and what are the indications for this thing. Recently we just published our series when I was at the James Cancer Hospital, but postoperative stereotactic body radiotherapy for spa metastasis and predictor of local control, and it's an amazing tool. To supplement our.
You know our intervention and maintaining control of these tumors, so you know the data is very promising. This is some of the cases you can see. These are cases that don’t need surgery. Here is a tumor with a recurrence around vertebral artery, and so really this is a totally non invasive alternative adjuvant treatment there to surgery. Cement injections allow you mentioned this patient know that this is a very good tool for patients with mild fractures who needs to continue going with treatment who.
cannot go through major surgeries.

So either you do it you plasty or you can do a kyphoplasty is where we put a ballooning.

You can inflate the balloon, correct some of the deformity removed the balloon and then inject cement into the bone.

There’s lots of papers that they would have been looked at the show that these treatments of cement injections are an amazing, not just diagnostic, but also therapeutic indications for patients with spine tumors.
Sometimes we can’t do it.

You know if there’s a lot of fracture, bad, fractional sometimes.

That bone is already in the canal.

The idea is to make sure that cement doesn’t leak into the canal and press the spinal cord.

Then lead to us nor logical issues.

Or sometimes you can see right here with the tumor.

It’s through the back of the bone and write it right through it.

So there are some contraindications.

of when not to do it.

This is what we don’t want to see happen with cement leak.
into the spinal canal or right here where you can see a lot of cement was injected and cement. Its kind of overlying the entire pickle sake sometimes. You see cement in other places, even in the brain you can see particle of cements going to. Here is a case where you don’t want to see again with cement was injected in the a lot of the cement leak into the canal leading to a patient presenting right after the surgery with neurological deficit. So you gotta watch for those things.
Here is a patient who have a lesion in the odontoid and we used to treat this with significant reconstruction of the cervical spine to help with mechanical neck pain. But now, if you really push the limits, cement is a huge tool and on this case is now we’re getting to the point where we don’t need to do big surgeries. We can actually go through the back of the mouth and injects cement directly into the odontoid and you can see what it looks like, after the surgery and we actually published.
this technique where we can use the stereotactic CT guided images and fluoroscopy,
unable to go through the back of the mouth without EMT colleagues and able to inject the cement.
Right into the broken vertebrae.
Instead of putting the patient through some sort of an exhibit cervical fixation,
so some of those country indication we can refute them, and we actually publish our series at MD Anderson.
When it comes to when to do
it and when not to do it,

NOTE Confidence: 0.832888775384615

and a conclusion was that relative

NOTE Confidence: 0.832888775384615

contraindications can be relaxed

NOTE Confidence: 0.832888775384615

for patient without other options

NOTE Confidence: 0.832888775384615

with no clinically significant

NOTE Confidence: 0.832888775384615

increase in complications.

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So I want to, for the sake of time,

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just go quickly through my last slide.

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Here, you know the key if

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you want to take one.

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Slide audible this is that this is

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when we’re thinking about Sergio.

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We’re thinking doing surgery for

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patient when we think that we

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can make a difference that we

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can after the prognosis we think
about doing surgery when there is significant spinal instability. The spine is so broken that the patient unable to get out of bed with thinking to do surgery when there isn’t nor logical deficits and painted by itself even without deficits, is also an indication for surgery. And so. Spine instability. Clearly, if you look at these MRI you can see that the fan is broken. This is something we can fix with surgery and there are now a scale that helps us that we have developed.
to define what is finding stability in patients with metastatic disease. And I’m not going to take you through it, but it’s a very nice since code that you can Add all these numbers and if you Add all these numbers when it comes to location pain that abolition it is is there alignment or know how much of their bodies involved you can Add all of these? Points and that will lead to deciding whether the patient is stable and unstable, which may help deciding whether to do surgery or not. Nor logical deficit is clearly something that we get called on and
then we have to make a decision as to whether to go on with surgery or not. And as I mentioned, just pain sometimes also helps us help with surgery, especially when we deal with the mechanical type NC traumatology which indicate a fracture. When you thinking about surgery, just always make sure that it's physically technically feasible to do adequate approach. Good strategy, satisfaction, reconstruction, and that ultimately it's going to give it doable.
Patient benefits, because ultimately these are this can end up to be, you know, very very large lesion for these patients, so I just want to get to the last part and that is the primary tumors. These are not metastatic disease, These are the most challenging cases. Some of them can be treated with adjuvant therapy, but most the converse of trauma in the chordoma cannot, and some of them can response to preoperative chemotherapy. But most don’t. They good example,
For example, denosumab, which helps very much in patient with giant cell tumor.

We used to think that all this patient needs surgery, but you can see they present with big holes in the vertebrae. But on denosumab, here is a patient with an L3 fracture. You can see on the CAT scan. Here is the CT reconstruction.

There is no L3, it’s completely eaten away by the. Tumor and you can see the PET scan over here. Here is the CT reconstruction.
of this L3 lesion.

Very large region, but you can see that with the NASA map you know the voter becomes very calcified and strong to the point that there may not be a role for surgery anymore for this patient population.

Here is a pharmacist again, the odontoid. The C2 vertebra is completely eaten away. There’s almost nothing left of the C2 vertebrae. All we did here is we stabilize is fine. We did not take the tumor out. You can see right here. There’s posterior stabilization and within couple of months the entire
bond filled in here and there is normal hall that was there before, so there is definitely a clear role for Asian therapy. Now why these unblock resections? Because that’s really the only way to give a chance for these patients. And here is a patient with a Seiko tumor that we can go in. We can like get a tickle sakkinen and unblock fashion. You can see the margins or clean all the way around it. And we know from all the data that’s out there that unblock resection can be
00:28:26.252 --> 00:28:29.370 can lead to Q of this patient period.
NOTE Confidence: 0.8644207125
00:28:29.370 --> 00:28:31.593 The patient with sarcoma in the meter at 6
NOTE Confidence: 0.8644207125
00:28:31.593 --> 00:28:33.840 pine we don’t want to enter this terminal.
NOTE Confidence: 0.8644207125
00:28:33.840 --> 00:28:35.366 We want to be able to remove
NOTE Confidence: 0.8644207125
00:28:35.366 --> 00:28:36.739 this tumor out in one piece.
NOTE Confidence: 0.8644207125
00:28:36.740 --> 00:28:38.546 Will plan where we going to make
NOTE Confidence: 0.8644207125
00:28:38.546 --> 00:28:40.064 our accounts to deliver this
NOTE Confidence: 0.8644207125
00:28:40.064 --> 00:28:41.784 vertebra from around the spinal
NOTE Confidence: 0.8644207125
00:28:41.784 --> 00:28:46.500 cord and ultimately able to remove.
NOTE Confidence: 0.8644207125
00:28:43.680 --> 00:28:46.500 The entire vertebrae in one piece
NOTE Confidence: 0.8644207125
00:28:46.500 --> 00:28:49.798 without entering it and able to then
NOTE Confidence: 0.8644207125
00:28:49.798 --> 00:28:52.150 reconstruct it and and and give the
NOTE Confidence: 0.8644207125
00:28:52.150 --> 00:28:54.430 patient a chance for Q of patient.
NOTE Confidence: 0.8644207125
00:28:54.430 --> 00:28:56.220 The sacral tumors are the
NOTE Confidence: 0.8644207125
00:28:56.220 --> 00:28:58.010 biggest ones to deal with,
NOTE Confidence: 0.8644207125
00:28:58.010 --> 00:28:59.906 and are the most complicated one.
There are lots of methodologies, and I’m sharing some slides here about how we approach these tumors. There are lots of techniques that I’m not going to get into this. Most surgery oriented talk about how to be able to remove. A lot of these sacral tumor and ultimately able to achieve an unblocker section on these tumors. Some of these techniques we have described here is some big example of the counter sarcoma that’s going up to the lumbar spine up to the pelvis. List is obviously combined with
A multidisciplinary approach, or an unblocker section was performed with orthopedics and urology and plastic surgery. The tumor was removed with a vascularized bone graft. Our publication discussed the technical aspect of using a talaga. Bone graft and dental reconstruction were significant issues in reconstructing these tumors. This is one of the stories.
that we’ve done that
ended up being the front cover
These are highly complex type
surgeries when it comes to do and
you can see interactive pictures of
the vascular grafts that has been.
Use on this particular patients,
and these patients ultimately
fuses very well.
This is the post operative picture
of the patient a year later,
so there are some fair frontiers
that have been looked at when it
comes to getting engineering involved
00:30:32.475 --> 00:30:34.709 with personalized model 3D printers.
NOTE Confidence: 0.752332653809524
00:30:34.710 --> 00:30:36.095 Try to predict which voters
NOTE Confidence: 0.752332653809524
00:30:36.095 --> 00:30:37.203 are going to break.
NOTE Confidence: 0.752332653809524
00:30:37.210 --> 00:30:40.258 We’re looking at animal models in
NOTE Confidence: 0.752332653809524
00:30:40.258 --> 00:30:41.782 unblock tissue characterization.
NOTE Confidence: 0.752332653809524
00:30:41.790 --> 00:30:43.954 We aiming toward personalized.
NOTE Confidence: 0.752332653809524
00:30:43.954 --> 00:30:47.200 Surgeries and its patients take the
NOTE Confidence: 0.752332653809524
00:30:47.283 --> 00:30:50.067 patients CAT scan the patient MRI,
NOTE Confidence: 0.752332653809524
00:30:50.070 --> 00:30:52.250 creating these 3D reconstruction
NOTE Confidence: 0.752332653809524
00:30:52.250 --> 00:30:54.430 models for these patients,
NOTE Confidence: 0.752332653809524
00:30:54.430 --> 00:30:55.453 creating those models,
NOTE Confidence: 0.752332653809524
00:30:55.453 --> 00:30:57.158 and then ultimately figuring out
NOTE Confidence: 0.752332653809524
00:30:57.158 --> 00:30:59.035 this is some of the 3D models
NOTE Confidence: 0.752332653809524
00:30:59.035 --> 00:31:00.816 that we have done on the lady
NOTE Confidence: 0.752332653809524
00:31:00.816 --> 00:31:02.276 with breast cancer and figuring
NOTE Confidence: 0.752332653809524
00:31:02.276 --> 00:31:04.594 out what type of surgeries with
00:31:04.594 --> 00:31:06.861 benefits these patients at the most.
NOTE Confidence: 0.752332653809524
00:31:06.861 --> 00:31:09.240 And then you can see some of the
NOTE Confidence: 0.752332653809524
00:31:09.240 --> 00:31:11.466 implants some of the 3D implants
NOTE Confidence: 0.752332653809524
00:31:11.466 --> 00:31:13.202 vertebres that can be patient
NOTE Confidence: 0.752332653809524
00:31:13.202 --> 00:31:16.086 specific for the patient you can see.
NOTE Confidence: 0.752332653809524
00:31:16.090 --> 00:31:19.010 Half his sacrum patient specific
NOTE Confidence: 0.752332653809524
00:31:19.010 --> 00:31:20.854 for these particular patients,
NOTE Confidence: 0.752332653809524
00:31:20.854 --> 00:31:22.698 we’re looking at different
NOTE Confidence: 0.752332653809524
00:31:22.698 --> 00:31:25.159 modeling to reconstruct the spine.
NOTE Confidence: 0.752332653809524
00:31:25.160 --> 00:31:25.573 Again,
NOTE Confidence: 0.752332653809524
00:31:25.573 --> 00:31:27.225 these are all specifically
NOTE Confidence: 0.752332653809524
00:31:27.225 --> 00:31:28.978 for the patients itself,
NOTE Confidence: 0.752332653809524
00:31:28.978 --> 00:31:32.534 so it’s just some of the slides
NOTE Confidence: 0.752332653809524
00:31:32.534 --> 00:31:34.920 that we are doing right now.
NOTE Confidence: 0.752332653809524
00:31:34.920 --> 00:31:35.850 So in conclusion,
the management is challenging, it can restore and protect neurological function. It can improve pain, it can impact the quality of the patient's life. Understanding the biology of these tumors is critical in defining the goal of treatment in a given patient and determining the most appropriate therapeutic options. Surgeons dealing with this neoplasm really should be familiar with. All surgical approaches as well as complex anterior posterior construction techniques in order to provide.
optimal care for these patients.

So overall I want to end up as saying it, try it. Don’t try to be good.

Uhm, thank you.

OK, thank you very much for a really fascinating talk and let it challenging field.

Unfortunately, since we’re running late, we won’t have time for questions.

I know there are some,

so please direct your questions directly to Doctor Mandel,

but we do have a second speaker today.

Thank you very much.

Thank you so our second speaker
today is Henry Park and you can maybe get your slides up. Henry is an assistant professor of therapeutic radiology here and chief of RIP Thoracic radiotherapy. He received his undergraduate and medical degrees from Yale and completed internal medicine. Training of the Harvard system then returned to Yale for radiation oncology. He specializes in radiation therapy for lung cancer and had neck cancer and brain tumors and is also quite active in comparative effectiveness in health services research as well as Serbian. As our program Director,
00:33:02.208 --> 00:33:04.436 residency director in in
00:33:04.436 --> 00:33:05.550 therapeutic radiology.
00:33:05.550 --> 00:33:07.867 So Henry on the floor is yours.
00:33:08.340 --> 00:33:10.640 OK, thank you very much for
00:33:10.640 --> 00:33:11.560 the very kind introduction.
00:33:11.560 --> 00:33:13.342 So today I'll be speaking about
00:33:13.342 --> 00:33:15.149 the new directions in Lung SBRT.
00:33:18.050 --> 00:33:19.418 So here my disclosures.
00:33:21.490 --> 00:33:23.786 So that my my my goals today to
00:33:23.786 --> 00:33:25.316 discuss updated evidence on the
00:33:25.316 --> 00:33:27.104 role of SBRT in early stage.
00:33:27.110 --> 00:33:28.762 Non small cell lung cancer as well
00:33:28.762 --> 00:33:30.138 as long although ministered disease
00:33:30.138 --> 00:33:32.280 will also be reviewing our lung cancer
00:33:32.280 --> 00:33:33.678 clinical trials that involve longest
period T that we've had open here at Yale.

So first we'll start with early stage, non small cell, medically inoperable patients.

So if here we have an elderly patient with lung nodule that's deemed medically inoperable to because of the patients pulmonary status, how do we treat so really? It's all about the real estate mantra. How we end up treating this so SPFT those fractionation just to kind of walk you through a few terms here when we talk about conventionally.
factoring fractionated radiation,

we talk about low dose per fraction,

about two grade per day over many fractions,

usually about 30 to 35 fractions

over six to seven weeks.

Hypofractionated radiation is

a moderate dose per fraction,

about three to seven grade per day

usually about 30 to 35 fractions

over six to seven weeks.

Hypofractionated radiation is

a moderate dose per fraction,

about three to seven grade per day

over a fewer number of fractions,

about 8 to 20 on SBRT would be

a high dose per fraction,

so usually tend to 18,

but really up to even 34 grade over

which is defined in the US as
one to five fractions.

I’ll also talk about this concept, called biologically effective dose, orbed.

This speed increases with higher dose per fraction and actually increases.

With a lower number of fractions, so 54 Gray and three fractions is actually higher in bedded,

in 60 Gray and five fractions, which is there which is afterwards are higher than 60 Gray in in 30 fractions.

So in an effort for us for tumors that are outside was called No fly zone, we call this the fly zone,
which is within two centimeters of proximal tracheal bronchial tree. Anything that’s peripheral to that are outside of it can be treated in, in the user with a high dose 3 fraction regimen, so we know from the chisel trial the best party is is superior to conventionally fractionated radiation for stage one non small cell lung cancers like this. But we know that if you’re treating within the central region of this. This area, then the plastic can be too high, whereas the opening treat outside of it. The outcomes of an excellent 98% control at
00:35:43.394 --> 00:35:45.718 three years and 90% control in five years.
NOTE Confidence: 0.852341551904762

00:35:47.960 --> 00:35:49.920 Uh so so we did some work here as well
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00:35:49.974 --> 00:35:51.815 as some other places where we looked
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00:35:51.815 --> 00:35:53.836 at for central tumors. How do we?
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00:35:53.836 --> 00:35:55.740 How do we proceed with SBRT here?
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00:35:55.740 --> 00:35:57.796 So this is a program that was started
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00:35:57.796 --> 00:35:59.701 by Roy Decker several years ago
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00:35:59.701 --> 00:36:01.699 and really to decrease the dose,
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00:36:01.700 --> 00:36:03.440 but also standard fractionation
NOTE Confidence: 0.852341551904762

00:36:03.440 --> 00:36:04.745 to five sessions.
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00:36:04.750 --> 00:36:07.956 So using looking at your retrospective data,
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00:36:07.960 --> 00:36:10.138 we found that overall survival local
NOTE Confidence: 0.852341551904762

00:36:10.138 --> 00:36:12.056 control and toxicity were similar
NOTE Confidence: 0.852341551904762

00:36:12.056 --> 00:36:14.076 between central and peripheral tumors
NOTE Confidence: 0.852341551904762

00:36:14.076 --> 00:36:16.339 that have been followed up with an
NOTE Confidence: 0.852341551904762

00:36:16.340 --> 00:36:18.629 RPG 0813 trial phase one two study.
How that that was using those escalation with five fractions to see that there really it really all there, the doses that they were using. This is safe and effective. For central tumors. This is a dose deescalated 3 fraction measurement. We need to call it dream. This is for central but not Ultra central lung tumors. So either primary non small cell
lung cancers or metastases that
uses a similar BB to current five
fraction regiments but lower than
current three fraction regiments
to be more convenient for patients.
Given that we’re not necessarily
sure that those D escalation as
well as extending fractionation
is really essential in this case.
So we’re looking at a lower dose 3
fraction instead for the central tumors,
we define this as being within 2 centimeters,
but not a budding the the the Safa,
guess hard or or the tricky monkey tree.
So as a phase one two study,
we’re targeting 60 patients in total
over the course of five years.

We had this open for the past year and have a clear about 13 patients.

So we were pretty much on target here.

Our primary endpoints are grade three plus toxicity as well as local control.

Also, for Ultra Central tumors, were there either a budding or within a centimeter or critical central structures.

Do we avoid SBRT altogether and then use a more fractionated Benjamin?

It’s the highest trial here, just published this year that looked at high dose 8 fraction regiments with a similar be the to the current
five fraction regiment and found actually the closer you get to the mainstem bronchi or the trachea, the higher likelihood of fatal toxicities. So it’s a very serious. This news in general, but actually even having grade 5 toxicity was up to the even the 30 to 40% of Maine. When you get that close to the mainstem bronchi or trachea. A much lower risk if you’re on your low bar bronchus instead. So these are things that are very concerning to us with using these very high doses and ultra central tumors.
So what do we do instead when they’re not candidates for SBRT based on either tumor size or based on location like we talked about?

You know we’ve been doing some work with with this medical students here. Nadia Saeed and all sassy and using the National Cancer database of you know, with retrospective studies showing that there was higher survival among stage one non small cell lung cancer patients who are receiving hyperfractionated radiation compared to conventionally fractionated radiation, especially when using a higher higher BD.
So we also look at a yield databases as well.

Comparing a lower dose 15 fraction regimen to a higher dose eating fraction regimen to those who are not candidates for SBRT and we hope that.

One day I will be. We can maybe compare this winter and for those who are, maybe a lower dose SP regimen to see what works best for these ultra central teams.

On a different topic here for multiple targets, if we have multiple nodes,
muscle lung cancers, which we sometimes do encounter, can they be treated simultaneously with SPRT? This is work that we just published this past week that looking at and we look at our own data here among 60 patients treated over the last 12 years to 126 lesions and found 87% local control and 70% overall survival at the two year mark with acceptable toxicity. 3% Grade 2 toxicity and only 3% grade. Three plus toxicity in both of those cases we would have used a different regimen. These days those were both treated.
A very long time ago.

Now, moving on to SBR T plus systemic therapy. So you know, we know from the surgical shared.

Putting some words, you know those done done here from Dan Buffa and his group that patients may undergo surgery may benefit from chemotherapy and even more recent trials showing that immunotherapy may help in selected patients as well.

So can SBR T patients also benefit from systemic therapy as well?

We looked at our data here that showed patients who were perceived Mantis stomach therapy.
you know did have a lower risk of regional distant failure, so but we do also do know that chemotherapy is challenging in this offering fail SPT population, which has garnered a lot of interest in using immunotherapy instead, so can be immune checkpoint inhibitors. One study we have two studies open here at Yale that are looking at this question. One is the keynote 867 trial, which is a phase three study targeting 500 patients. This would look at SBRT plus. Concurrent in admin panel is a man versus.
For stage one and two non small cell lung cancer this is open. It’s been opened at the in New Haven and North Haven only at this point, but this would be a cute free week infusion. Either way, whether you get the immunotherapy or placebo. But the endpoints being event free survival and overall survival, we also are about ready to activate this new study. which has been activated nationally but ready to open here and all of our care centers. So it’s a phase three that’s targeting 480 patients.
Similar question, but the slightly different SBRT plus minus MU Advent concurrent attachment therapy, which will be in this case different mean therapy would be.

No friend only for six months instead of 12. A big difference is that.

Truly just got the SBRT and then there’s only including high risk factors which are size greater than two centimeters SUV Max of 6.2 or a grade of two to three on lapsing.

And again this will be open at all care centers that have yellow radiation. So moving out the early station
as muscle lung cancer.

Medically operable patients, so can ask European alternative to surgery for medically operable patients.

First was work from there, from James you and Kerry Gross. Looking at CR Medicare, looking at a retrospective study here that founded overall survival was improved for patients who received surgery versus those who received SPR T. The short term plasticity did seem to favor SPRT, but then even out by about two years out in the National Cancer Database from Denver.
Office Group found that overall survival was higher among those who got surgery than those who got SPR T even after adjusting for known confounders, including selecting for only patients who had refused. He had refused surgery, but we’re recommending surgery for those who had no committees or Hello Committee score. However, we know that selection and indication bias is a concern when comparing surgery and SBRT retrospectively there have been there’s work out of.
00:43:03.318 --> 00:43:05.157 here as well as other places showing

NOTE Confidence: 0.805608484347826

00:43:05.157 --> 00:43:06.842 that patients who are considered

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00:43:06.842 --> 00:43:08.943 operable who do receive SPRT do

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00:43:08.943 --> 00:43:10.683 have higher overall survival and

NOTE Confidence: 0.805608484347826

00:43:10.683 --> 00:43:12.104 progression free survival compared

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00:43:12.104 --> 00:43:13.729 to those who are inoperable,

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00:43:13.730 --> 00:43:17.629 so it’s difficult to compare these patients.

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00:43:17.630 --> 00:43:19.475 Contracted an apples to apples

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00:43:19.475 --> 00:43:21.747 comparison even though they do have

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00:43:21.747 --> 00:43:24.246 similar local control and regional

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00:43:24.246 --> 00:43:27.450 distant failure as well among operable

NOTE Confidence: 0.805608484347826

00:43:27.538 --> 00:43:30.170 versus inoperable SBRT patients.

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00:43:30.170 --> 00:43:32.620 So I think that because like this,

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00:43:32.620 --> 00:43:33.296 this this,

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00:43:33.296 --> 00:43:35.324 this four part reviews here that

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00:43:35.330 --> 00:43:37.370 I’ve drawn a few figures from.
You know one thing you should use was showing here is that randomized phase three trials of surgery versus SBRT are ongoing, but have been historically difficult to recruit in these four here have accrued a total of 2.9% of the targets, so really they all had the clothes being very underpowered. There's a Fowler study at the VA that is probably the most promising ongoing trial. So far as accrued more than I think more than all these have combined so far, yet this is targeting 670 patients and is not due to read out for at least five years.
So in the meantime, what do we do? We know that the stars and roselle trials have been actually merged together and pooled analysis that again both underpowered and closed early due to poor accrual. They did find it. In this case. A surprising result that SBRT patients actually had higher overall survival and in this population. Which was a very small population again, but it was similar in recurrence Crucible. A larger study was done more
recently a nonrandomized study, so single ARM SBRT trial that had better accrual but from Indy Anderson that looked at that actually had a protocol specified comparison to an institutional surgical cohort and found that certain outcomes in this population was similar to surgery and overall survival progression. Free survival and other outcomes and again surprising results that 87% overall survival. At five years for SBRT so hard to know how to extrapolate some of the older studies that included patients who were
not great surgical candidates in terms, especially in terms of overall survival. So at the end you know with the fact that it beckoned, and several Members who are here right now is at the love you know from different disciplines. We all got together and it’s been working on this four part yield guideline. That’s a collaboration that that transformative, practical framework for weighing short term versus long term benefits and downsides. So this is one of many figures in this paper that are are looking at, you know how? How can we go through all the
data that’s out there right now, as imperfect as it is, and? Trying to figure out which patients you may benefit from SPRT, lobectomy, sublumbar resection, or ablation, and as you can see in this figure, there’s nuances with and patient selection. That’s really critical and and, that was very proud of how well our team has worked, as in a tumor board, as well as just on the phone. Otherwise working through these. Working through the decisions about how to handle each individual patient.
So I'm moving on to long arguments that disease, uhm, here we pick up all the mess that disease as an intermediate state between local and systemic disease where the the kind of original helmet and excellent definition was that there may be a small subset for whom radical local treatment of primary cancer and almost at legions might have a curative potential, often defined as 123 or one to five patients. So we know the surgery or radiation may have a larger role in localized disease. With an stomach there be having
a much smaller role in Wylie,

metastatic disease is really the opposite,

where it’s stomach therapy is a primary

deisease, there may be a role for both.

So here this is some going for

the papers here that some trials

that are phase two looking at

local consolidative therapy.

In this case the Gomez studied in the

Anderson showed that either surgery

or SBRT for stage four non small

cell lung cancer patients with one to

three metastases and no progression

91
after three plus months of chemo, actually had increased progression, free survival and overall survival. Median of 41 versus 17 months compared to not. Using a local resolves OK and then use it stomach therapy alone after this point. This was also shown you know this this study just the best PRT but similar population stage four non small cell lung cancer from the southwestern after three plus months of chemotherapy this had to be stopped early because of the very clear progression free survival improvement this was.
This was shut down by the IRB because it’s not about to be ethical to continue this study. Uh, and then come see if a comment looked at all domestic cases of any primary and found the five year overall survival of 42% versus 18%. So actually quite similar to the Golden study showed that really, that’s where 4.5% in this case. So they they did have three that’s in this population, but there was no quality of life difference among among the best. So you know, there’s always caution.
Of course it needs to be taken when you do this, all those were the chemotherapy alone era. Now we’re in the immunotherapy area as well. So energy LU002 is the current ongoing phase three study that’s looking at a similar population, but now allowing for immunotherapy in there in the most recent amendment. So I think we still quite relevant question to ask at this point. They do require that you use SBRT for at least one lesion, but can use surgery for other regions as well. So now for long, oligo progressive disease.
This is a somewhat different concept in that there may not necessarily have just a few minutes up front. You may have several types of disease and have good control with stomach therapy, but when you stay on this systemic therapy or when you’re off of it, if one or a few areas grow, then you’re faced with choices. Do you switch therapy to continue therapy, or do you add therapy and so this is some workouts so so so this is some workouts from staff get injured. I’m looking at the SBRT for oligo, progressive mounts, muscle lung cancer.
After immunotherapy,
a small study of 26 patients who had acquired resistance to
15 of them had local therapy without
so they either were treatment holiday
15 of them had local therapy without
systemically or just remain on
their on their same amino therapy.
It’s a somewhat busy the figure here,
but the in essence the green
is where they were able to.
The circles are where you got local therapy.
The green is when they were able to stay on.
Immunotherapy and then Gray is when
they had to switch to something
else to your overall survival was 92% and quite a few patients were able to maintain mean checkpoint inhibitors for years. In some cases after local therapy.

So this is a state from Redecan Allison Campbell, an investigator initiated trials here that looked at SBRT for all the progressive, non small cells lung cancer. After immunotherapy as well, this is a 21 patients faced one and two study where he gave Pembroke until progression, then SBRT and then then.
00:50:17.735 --> 00:50:18.776 restarted Kimbrough again.
NOTE Confidence: 0.872031570588235
00:50:18.780 --> 00:50:20.535 Right afterwards the endpoint was
NOTE Confidence: 0.872031570588235
00:50:20.535 --> 00:50:22.755 overall response rate and non irradiated
NOTE Confidence: 0.872031570588235
00:50:22.755 --> 00:50:24.795 legions to really to investigate.
NOTE Confidence: 0.872031570588235
00:50:24.800 --> 00:50:26.016 Can you reinvigorate this
NOTE Confidence: 0.872031570588235
00:50:26.016 --> 00:50:27.536 immune response and maybe even
NOTE Confidence: 0.872031570588235
00:50:27.536 --> 00:50:29.120 get enough scope of response
NOTE Confidence: 0.82679625
00:50:29.120 --> 00:50:30.980 to sites that were not treated?
NOTE Confidence: 0.82679625
00:50:30.980 --> 00:50:33.760 Disease Control overall was 57%,
NOTE Confidence: 0.82679625
00:50:33.760 --> 00:50:36.760 but interestingly there were two patients.
NOTE Confidence: 0.82679625
00:50:36.760 --> 00:50:38.824 10% of the group that had a partial
NOTE Confidence: 0.82679625
00:50:38.824 --> 00:50:40.746 response for more than a year and and,
NOTE Confidence: 0.82679625
00:50:40.750 --> 00:50:43.564 and there’s lots of ongoing studies now
NOTE Confidence: 0.82679625
00:50:43.564 --> 00:50:45.746 investigating more about about who this
NOTE Confidence: 0.82679625
00:50:45.746 --> 00:50:48.237 you know the the the factors that may
NOTE Confidence: 0.82679625
00:50:48.237 --> 00:50:50.435 have led to that for those patients.
So just Astro the last month was presented this curb study out of MSK that looked at a similar population of knots, muscle lung cancer patients, or breast cancer patients, and interestingly, found a large PFS benefit for SBRT for non small cell lung cancer patients, but not for breast cancer patients. You can see in lung 44 nine weeks whereas breast was 18 versus 19. No difference there. Paper still yet to come out, so I think there’s still a lot of questions here, but this is.
Intriguing data that maybe this is not this.

Note: Confidence: 0.82679625

Maybe histology independent in terms of the role of SBRT.

Note: Confidence: 0.82679625

In this context stuff Joe Hung is about to activate this study as well for renal cell carcinoma.

Note: Confidence: 0.82679625

This is a phase two study where we're looking at ICI until disease progression and then SPRT.

Note: Confidence: 0.82679625

And then I see I again at the end point being progression free survival.

Note: Confidence: 0.82679625

So there's a lot going on in this arena.

Note: Confidence: 0.82679625

Just again for the CD three study.

Note: Confidence: 0.82679625

We do include all capacities, all progressive disease as well.
This teams that are central, so we've had this review here that we were last here on local updated therapies. If you want more details, feel free to refer to this on other studies that have come out as well. So in summary, we come for early season of muscle lung cancer. You know our future directions here are that we're really looking to optimize patient selection and SBRT dose fractionation for peripheral tumors for central tumors, or we have this D3 trial like I mentioned, as well as Ultra central tumors.
which we’re currently investigating retrospectively and hopefully leading to a prospective study. At some point we’re looking to add immunotherapy to SPRT and seeing to investigate whether that is helpful or not, in which populations may be useful. Two ongoing trials open it, yell as well. The keynote and the swab studies Olga Ministik. Another progressive disease, optimizing patient selection, and those fractionation as well as sequencing, combining SPRT without CI. So we
make sure that the prospective studies. If you're if credit, that's his name going forward.

So outside the scope today we have a lot of exciting, ongoing, pending trials at and pending trials at the yield a lung dart, as well as the T Red Dart.

I'm not going to get into this today, but locally advanced non small cell lung cancer limited stage and extensive stage small cell lung cancers. There's a lot going on, so we're excited to be working on that.

And finally, like to acknowledge our
yield domestic radiotherapy program,

NOTE Confidence: 0.887258881818182

the members of our team have been phenomenal.

NOTE Confidence: 0.887258881818182

We’ve been working weekly

NOTE Confidence: 0.887258881818182

and chart rounds ever since.

NOTE Confidence: 0.887258881818182

I had the honor of taking this over

NOTE Confidence: 0.887258881818182

this program in 2019 from Roy Decker,

NOTE Confidence: 0.887258881818182

who’s been just amazing mentor of

NOTE Confidence: 0.887258881818182

mine and we really started the SPRT

NOTE Confidence: 0.887258881818182

program here at Yale several years ago,

NOTE Confidence: 0.887258881818182

and among our six sides,

NOTE Confidence: 0.887258881818182

we go over all of radiation plans

NOTE Confidence: 0.887258881818182

having to do with lung cancer every

NOTE Confidence: 0.887258881818182

week to be sure we’re improving

NOTE Confidence: 0.887258881818182

communication and quality assurance

NOTE Confidence: 0.887258881818182

and standardizing practice and then

NOTE Confidence: 0.887258881818182

sharing and sharing information.
So I'm very blessed to work with this wonderful team.

Thank you all very much for your time today.

It's very impressive results. Some of the trials you showed us are there questions.

I see someone has a hand up, but I can't see who that is.

Or the questions in the chat.

So so Henry in your time here, what do you think has been the biggest step advance? In radiotherapy specifically, I think our ability
00:54:37.750 --> 00:54:40.250 to really use the imaging that
NOTE Confidence: 0.886416345
00:54:40.250 --> 00:54:43.708 we have of and and and be able to
NOTE Confidence: 0.886416345
00:54:43.708 --> 00:54:45.803 target even more precisely overtime,
NOTE Confidence: 0.886416345
00:54:45.810 --> 00:54:47.224 and I think you know we’re excited
NOTE Confidence: 0.886416345
00:54:47.224 --> 00:54:48.940 to have a new reflection machine.
NOTE Confidence: 0.886416345
00:54:48.940 --> 00:54:51.569 You know that’s coming in soon to be able
NOTE Confidence: 0.886416345
00:54:51.569 --> 00:54:53.170 to target all of them attached season Algo.
NOTE Confidence: 0.886416345
00:54:53.170 --> 00:54:53.866 Progressive disease.
NOTE Confidence: 0.886416345
00:54:53.866 --> 00:54:55.954 I think that’s really the future
NOTE Confidence: 0.886416345
00:54:55.954 --> 00:55:01.300 in terms of, you know,
NOTE Confidence: 0.886416345
00:55:01.300 --> 00:55:02.840 Therapy.
NOTE Confidence: 0.886416345
00:55:02.840 --> 00:55:04.838 There’s been so impressive and
NOTE Confidence: 0.886416345
00:55:04.838 --> 00:55:06.600 and especially in lung cancer,
NOTE Confidence: 0.886416345
00:55:06.600 --> 00:55:08.520 where we see just, you know,
so much better survival than we’ve ever seen before. Vestige for patients you know and combine this with targeted agents and immunotherapy and chemotherapy to really extend survival and and, you know, are we going to seek? You know we’re seeing more patients at that 10 year Mark? Now you know even more who are still disease free, so you know, it’s it’s. It’s very exciting time that you know, as a technology improves in our. Ability to select patients
00:55:34.730 --> 00:55:36.410 properly for this improves.
NOTE Confidence: 0.886416345

00:55:36.410 --> 00:55:38.540 We're hoping to really see
NOTE Confidence: 0.886416345

00:55:38.540 --> 00:55:40.244 more patients benefit from,
NOTE Confidence: 0.886416345

00:55:40.250 --> 00:55:40.802 you know,
NOTE Confidence: 0.886416345

00:55:40.802 --> 00:55:41.906 from from using SBRT
NOTE Confidence: 0.7572500875

00:55:41.920 --> 00:55:43.620 in this setting. Perfect
NOTE Confidence: 0.69801159

00:55:43.690 --> 00:55:46.540 we have doctor D. Do you have a question?
NOTE Confidence: 0.8902136575

00:55:49.530 --> 00:55:53.750 I see a hand. Uhm, maybe not.
NOTE Confidence: 0.8902136575

00:55:53.750 --> 00:55:55.680 OK, well thank both speakers again.
NOTE Confidence: 0.8902136575

00:55:55.680 --> 00:55:56.884 It was a terrific series and I
NOTE Confidence: 0.8902136575

00:55:56.884 --> 00:55:58.290 learned a lot and I hope the
NOTE Confidence: 0.8902136575

00:55:58.290 --> 00:55:59.580 audience did. Also thank you.
NOTE Confidence: 0.970883715

00:56:00.600 --> 00:56:01.130 Thank you.