Welcome everybody to the second installment of the head and neck cancer programs 2022 CME Series Co, hosted by myself and Doctor Burtness. Unfortunately, Doctor Burtness can’t be here today, which is fairly appropriate because we’re really talking a lot about advancing the role of surgery and head neck cancers. I’ll be filling in for Doctor Burton, speaking about a exciting new trial that, well, not for us in the academic world, not so new,
but it’s recently been published.

Um, the ECOG Akron 3311 trial.

And so I’ll be filling in for Doctor Burtness on that.

So the this is part two of three

We have 3 speakers today.

The first will be me filling in for Doctor Burtness on the 3311 trial.

I’m talking about D intensification of radiation therapy for HPV.

And then we have Doctor Verma who will be speaking about the appropriate
00:01:08.318 --> 00:01:11.331 use of tours and open surgery in
management of head neck cancer.

00:01:11.331 --> 00:01:14.419 And of course,
we have Doctor Sam and Payab Avash
who will be speaking about radiomics
of head and neck cancer and I'll
introduce them before they speak.

00:01:28.330 --> 00:01:28.823 So without further ado,
I think our numbers are kind of leveling off,
so.

00:01:28.823 --> 00:01:31.781 I'm going to get started talking
about this very interesting and
exciting new trial recently published.

00:01:31.781 --> 00:01:34.723 but there I am, Sir Omara,
I’m associate professor of surgery at Yale and the chief of Head Neck surgery. Here we have a wonderful head neck cancer team and I’m fortunate enough to lead the surgical aspect of that. So this trial is entitled Transoral oral robotic surgical resection followed by randomization to lower standard dose IRT for resectable P-16 positive. Locally advanced oral pharynx cancer. This is in our circles really known as 3311, basically ECOG 3311. The authors you can see are here, particularly Doctor Ferris from Pittsburgh, the lead author.
and of course Dr Burtness, the senior author on the paper as well in the last last author here. So this is an interesting study because on the population included oropharynx cancer patients who are amenable to transoral resection. The treatment was essentially transoral surgery and then risk adjusted post operative therapy. So the risk status was determined by postoperative pathologic parameters like extranodal extension margin status and the number of.
Positive metastatic nodes.

I’m going to show a schema in the next slide that will really describe the different groups and how risk stratification was performed. In addition, intermediate risk patients for subgroup analysis were stratified by smoking history less than 10 versus greater than 10 pack years of history. And in this study, important functional assessments including modified barium swallows and patient reported outcomes including the fact. Your neck and the M daddy dysphagia index.
So this is really the key slide to understand how this study was conducted. So that we had HPV P16 positive squamous cell carcinoma or the oral pharynx, stage in the 7th edition three or four, but they were all T1 or T2 and N1 or 2B in 122B cancers and they were baseline functional and quality of life assessments done. All patients that underwent transoral resection, this could be laser. More robotic or bovian headlight, but they all had transoral resection and a neck dissection. Following that patients were
stratified into the low risk arm, which were negative margins and no intermediate risk features. And these patients went on to observation alone, no radiation, no chemotherapy. Then there was the high risk arm. These patients had positive margins greater than one millimeter of extranodal extension or five or more. Metastatic lymph nodes and they went on to chemotherapy and radiation therapy with 66 great. The randomization actually happened in these intermediate risk patients and these were close margins.
The less than or equal to 1 millimeter

VNE and the two to four metastatic lymph nodes and PN I perineural invasion and lymphovascular invasion.

These patients were actually randomized into either 50 Gray or 60 Gray.

Over 30 fractions and the outcomes were two year progression, free survival, local regional recurrence and functional outcomes and quality of life.

There were really two important objectives. One of them was the feasibility of doing a multi institutional study.
with transoral surgery followed by risk adjusted adjuvant therapy.

As I can see many of the participants here know it’s pretty challenging to get surgeons into randomized control trials. That’s sort of the domain. Generally if of our radiation and more. Commonly our chemotherapy or oncology colleagues, but so one of them was just the feasibility to do this and we looked at overall accrual surgical quality and the risk distribution of patients that we brought into this study. The second outcome which I’ll be talking a lot about today is 2 year progression
NOTE Confidence: 0.84064258
00:06:17.445 --> 00:06:20.167 free survival at 50 Gray versus 60
NOTE Confidence: 0.84064258
00:06:20.167 --> 00:06:22.543 Gray for those intermediate risk patients.
NOTE Confidence: 0.84064258
00:06:22.550 --> 00:06:24.860 So can we effectively de intensify
NOTE Confidence: 0.84064258
00:06:24.860 --> 00:06:27.437 therapy to 50 Gray in these
NOTE Confidence: 0.84064258
00:06:27.437 --> 00:06:29.827 intermediate risk patients versus 60?
NOTE Confidence: 0.84064258
00:06:29.830 --> 00:06:32.970 Without impacting 2 year progression
NOTE Confidence: 0.84064258
00:06:32.970 --> 00:06:35.390 free survival then secondary
NOTE Confidence: 0.84064258
00:06:35.390 --> 00:06:37.130 objectives were toxicity,
NOTE Confidence: 0.84064258
00:06:37.130 --> 00:06:38.250 overall survival,
NOTE Confidence: 0.84064258
00:06:38.250 --> 00:06:40.490 swallowing function and the
NOTE Confidence: 0.84064258
00:06:40.490 --> 00:06:42.170 patient reported outcomes.
NOTE Confidence: 0.84064258
00:06:42.170 --> 00:06:44.690 The original study design had
NOTE Confidence: 0.84064258
00:06:44.690 --> 00:06:47.948 180 called for 180 patients who
NOTE Confidence: 0.84064258
00:06:47.948 --> 00:06:50.120 were randomized with intermediate
NOTE Confidence: 0.84064258
00:06:50.213 --> 00:06:53.202 risk and that’s assuming that 35%
NOTE Confidence: 0.84064258
00:06:53.202 --> 00:06:56.574 of patients would be valuable in
NOTE Confidence: 0.84064258
00:06:56.574 --> 00:06:59.220 that intermediate risk category.
NOTE Confidence: 0.84064258
00:06:59.220 --> 00:07:00.228 As the study proceeded,
NOTE Confidence: 0.84064258
00:07:00.228 --> 00:07:02.110 there was a higher proportion of patients
NOTE Confidence: 0.84064258
00:07:02.110 --> 00:07:03.690 saying that higher risk category,
NOTE Confidence: 0.84064258
00:07:03.690 --> 00:07:05.979 the RMD where they were getting chemo
NOTE Confidence: 0.84064258
00:07:05.979 --> 00:07:08.474 radiation and so the total accrual goal
NOTE Confidence: 0.84064258
00:07:08.474 --> 00:07:10.960 was actually increased to 515 patients.
NOTE Confidence: 0.84064258
00:07:10.960 --> 00:07:14.565 And there was a plan for interim
NOTE Confidence: 0.84064258
00:07:14.565 --> 00:07:17.337 analysis at one year for R&B and
NOTE Confidence: 0.84064258
00:07:17.340 --> 00:07:19.876 CAB&C arms A/B and C and of course
NOTE Confidence: 0.84064258
00:07:19.876 --> 00:07:21.454 assessing the surgical quality
NOTE Confidence: 0.84064258
00:07:21.454 --> 00:07:24.230 and risk distribution for the 1st
NOTE Confidence: 0.84064258
00:07:24.230 --> 00:07:26.630 59 patients completing surgery.
NOTE Confidence: 0.746682525
00:07:28.690 --> 00:07:34.067 So from this study accrued from 2013 to 2017,
NOTE Confidence: 0.746682525
00:07:34.070 --> 00:07:36.730 there were 87 credentialed
00:07:36.730 --> 00:07:39.332 surgeons and 68 of them accrued
00:07:39.332 --> 00:07:41.240 into the study and these patients,
00:07:41.240 --> 00:07:43.220 these surgeons perform transoral
00:07:43.220 --> 00:07:46.766 resections in 519 P, 16 positive
00:07:46.766 --> 00:07:50.600 oropharynx cancers stage T1 to two.
00:07:50.600 --> 00:07:53.162 Without matted neck nodes and then
00:07:53.162 --> 00:07:54.870 post operative management was
determined based on the risk factor.
00:07:54.870 --> 00:08:01.225 So arm A which was observation alone
00:08:01.225 --> 00:08:05.280 enrolled 38 patients and then arm D
00:08:05.280 --> 00:08:08.145 the high risk patients enrolled
00:08:08.145 --> 00:08:10.810 which was chemotherapy plus radiation,
00:08:10.810 --> 00:08:13.876 the high risk patients enrolled
00:08:13.876 --> 00:08:15.435 these were the patients that
00:08:15.435 --> 00:08:17.597 were randomized to 50 or 60 Gray
00:08:17.597 --> 00:08:19.466
enrolled 100 or 109 patients.

And then as I stated before, ARM D assignment was based on Extranodal extension more than one millimeter, greater than 4 nodes and or positive overall in this study the positive margin rate was 3.3%. There were some patients that were deemed ineligible, which I will discuss briefly as well. And 27 of those patients had labs or scans just not done to protocol. But the treatment arm distribution for these patients did mirror those for this 360 eligible and treated patients. So you can see the reasons for
exclusion from the 519 patients down to the final group of patients. And there were a number of reasons. Some did not receive a transoral resection. Some patients were just deemed ineligible. Patients were not assigned or randomized or never started treatment. For example, patients who had end to CN three disease. And in the end these were the numbers that I just described. The reasons patients were ineligible more specifically were that, for example, pre study scans or labs were not done within the four weeks prior to registrations.
If patients had clinical T3 disease at baseline, they were excluded or ineligible for this study. A few patients were unknown while they were ineligible and to see disease. The primary was not measurable radiographically or clinically, so it could not be appropriately clinically staged. There were no nodes at baseline clinically and then and you can see the other reasons for ineligibility in this cohort of patients Step 2. So step one is a transoral resection and then step two was a post operative treatment eligibility.
And you can see the reasons for this for example surgery was performed more than four weeks from the registration to step one or. Starting radiation was greater than seven weeks post surgery. The results were actually quite intriguing. Here you can see the three-year progression free survival data in that in ARM a, the low risk group or there's observational loan, no radiation transoral surgery alone. three-year progression free survival was 96.9%. The high risk group who received
chemotherapy and radiation

after transoral surgery,

the three-year progression free survival was 91%.

In these two groups that were randomized to either 50 Gray or 60 Gray, you can see the three-year progression free survival was 94.9% and 93.5%.

There were some deaths without recurrence and you can see here in the chemoradiation group there were three deaths in the observation group there were none and one in each of the. Randomized groups and you can see the recurrence numbers,
the absolute numbers as well.
The transoral surgery and low dose radiation radiation based on this study, based on these preliminary results is were there was worthy of further study based on criteria created a priori. We also looked at in this study at the M Daddy scores and the fact head and neck score, so patient reported outcomes and what you can see here is the following. This is arm a, the M Daddy dysphagia MD Anderson Dysphasia index composite scores. You can see the baseline dysphagia index at 89% post surgery.
There was obviously a drop in the Dysphasia index and then patients actually recovered. Quite nicely and you can see the same numbers here which I’ll show graphically shortly.

For arm B, the randomized groups to 50 Gray, 60 Gray and the chemo radiation groups here and you can see the decline in dysphasia index PRO’s here in this group of patients and the same thing was done for the fact head and neck patient reported outcomes tool.

In this group of patients and the same numbers we went over and you can see how tight they are arm D did have.
a slightly lower overall survival, progression free survival here. And in the ineligible and treated groups, this was measured here as well. And graphically you can see the uh in the M daddy composite scores, the observational loan group did best, RMD chemo radiated did worse compared to baseline. But overall these tumors are still quite, quite good and the intermediate risk groups and same for the fact head and neck total scores. So the conclusion of this study were the transoral resection for
P-16 positive or famous cancer is safe and results in good oncologic outcomes and this can offer a promising de intensification approach to treatment for oropharynx cancer patients.

In patients who have low risk disease progression free survival is favorable without any postoperative therapy and in those patients who have uninvolved margins less than five nodes, minimal or no ENE we can reduce postoperative radiation therapy without chemotherapy. Without impacting progression free survival.

So finally transoral surgery with 50 Gray should be in the future compared to optimal nonsurgical
therapy in some phase three trials

This was coordinated by the ECOG Akron

The centers that accrued and Yale was definitely a major accrued to this study.

I did want to spend a few minutes talking about two more items related to this study.

One is an abstract that was just recently presented a few weeks ago at ASCO,

based on data from 3311 not yet published,

but was presented in abstract form with this.

Abstract tried to analyze the

looking at patients who smoked 10
greater than 10 Packers or versus

As most of the people on this call know,

smoking can be a.

A risk factor for worse survival in

oropharynx cancer and HPV associated

cancer puts classically has been

described as an intermediate risk as

opposed to the the high risk patient

and to the favorable risk patients.

This study however showed let me just

got to the the data that there was

no difference in overall survival

or progression free survival for

smokers in this cohort of patients

in 3311 who had transoral resections.
So these even these Intermediate.

Risk HPV oral various cancer patients who are current smokers or who have a history of greater than 10 pack years had favorable 3 year progression free survival and overall survival that were not worse than those non-smokers or less than 10 pack your history.

So this data actually shows the first treatment approach meaning surgery plus. treatment approach meaning surgery plus. Radiation therapy without chemo, in which outcomes were not influenced by smoking status.

A final study I want to share with you is tours in the real world.
Where you’re treated matters.

This is a study we published a few years ago.

This is actually in 2019 was published,

but I think is quite apropos to this discussion.

We looked at the National Cancer database and looked at positive margin rates and predictors in transoral robotic surgery after federal approval of the robot for Oropharynx cancer treatment.

We looked at 3000 patients in the National Cancer database soon after approval and had to exclude some patients,
but ended up with about 2600 patients for analysis.

In the real world during this study period the positive margin rate was not the three-point 3% presented in this study at the academic centers, at credentialed by surgeons and it was actually a higher than a lot of the studies that look at transoral surgery in high volume centers. Nationally the overall positive margin rate was 17% of patients with T1 and T2 had a positive margin.

Type of less than 20 percent, 13% and 17%.

And when you get to T3 and T4 cancers,
which I will mention it, for which the da Vinci robot at least is not FDA approved, positive marginal rates are significantly higher. In this study, we looked at factors associated with positive margin rate and we found that T classification, Lymphovascular invasion and volume of cases by the facility patients were less likely to yield positive margins. You can see how we define this was less than three cases per year, three to 10 cases,
and then more than 10 cases per year. And you can see the difference. A high volume facilities had a rate still much higher than this study with credentialed academic surgeons, but 13% versus 21 percent, for low volume sensors. So the conclusion of this retrospective database study was in the year since FDA approval. Positive margin rates has been substantially higher than reported in high volume tour centers with academic surgeons. When you get to higher T stages,
these rates can exceed 28% and then high volume facilities are half as likely to yield to positive margins as compared to low volume centers on multivariate analysis. So that’s what I wanted to tell you all about the ECOT 3311 trial, which basically showed that D intensification approaches are possible for HPV associated P-16 positive oropharynx cancer. Right. So you guys are welcome to put any questions in the chat. I’m going to be moderating. You probably won’t see them all, but I’ll moderate them and.
We'll move on to our next. Next, speakers and we'll do the questions probably at the end. So our next speaker, thanks, Evan, you must start sharing. Our next speaker is Doctor Avanti Verma, who returned to us at Yale after her years as an undergraduate here. And even additionally you're doing research here. She went off to New York and Atlanta to do. Our ENT and advanced head and neck cancer training and we were lucky.
enough to recruit her back to New Haven as into our section of head and neck surgery here at Yale.

She's assistant professor of surgery and the lead of head neck surgery at the VA in Connecticut here as well.

So Doctor Verma will be speaking to us about the appropriate use of tours in open surgery.

Thank you so much. Doctor Verma.

Yes, thank you for the kind introduction. So I. We'll be speaking about using transoral robotic surgery and it was one of the modalities used in ECOG 3311, but probably the most
prominent one and sort of.

Think of this as an option and alternative compared to open surgery and we’ll soon learn that patient selection really matters.

So I will go through that and some of the technical aspects of the surgery as well.

OK. So you know, just as an overview of the head and neck anatomy, Umm, we think about tumors in these in this whole region as occurring in different sites and then within sites. So there’s many, many different sites of the head and neck.
depends on the location of the tumor.

And in all these areas there's blood vessels, lymphatic channels, nerves that we are trying to preserve the best we can. Muscles, bone, cartilage, everything.

So you know, anatomic considerations are very important to us in general, the principles of head neck cancer surgery include complete visualization which can be a challenge given that we're working in small areas and with that visualization we want to achieve on block tumor resection all in one piece with negative margins, traditionally margins.
5 millimeters or greater and then in addition to doing that as best as we can, we'd like to preserve surrounding structures that are important for function of our patients. So the the gold standard or traditional or open approaches. Generally all of these approaches are transcervical or through the neck, requiring a neck or facial incision on the left hand side. In the oropharynx category, the the few approaches to the orphans that were traditionally used for quite a while are the mandibular automy.
approach which requires a lip split

incision most often and you can see in

that cartoon down there that the mandible.

Sort of split open and you can see this tongue.

The tongue is retracted to one side and you can see this tongue.

based tumor in the visualization.

As I said, which is important here is

which is important here is

is very good in this case,

but it requires a lot of work and a lot

of potential morbidity to the patient.

Another approach to large tongue based

tumors includes going through the

floor of mouth sling and musculature
there to bring the tongue down into the neck and so you can visualize the almost the entire tongue, essentially the entire tongue. Through the neck and respect your tumor that way, which again is associated with morbidity. For smaller tumors of the tongue base, a trans hyoid approach with the fairing gotami can also be used. Don’t focus too much on the larynx today, but you know the open approach to the larynx. The gold standard again is a total laryngectomy for Laura. You know especially advanced
stage laryngeal tumors, partial interjections can be considered depending on the location and the patients' comorbidities. Those include vertical partial laryngectomy, super cricoid laryngectomy, and a supraglottic laryngectomy. And later in this talk, I'm going to mention that the robot can be used for the Super Glottic. Enemy on the right hand side, the parapharyngeal space usually requires a transcervical approach, which can be achieved with mobilization or excision of the submandibular gland.
NOTE Confidence: 0.916647868571429
00:24:45.514 --> 00:24:48.529 into the parapharyngeal space there.
NOTE Confidence: 0.939279612
00:24:48.530 --> 00:24:51.490 Or it can be done in a trans parotid
NOTE Confidence: 0.939279612
00:24:51.490 --> 00:24:55.280 approach, which requires a facial nerve
NOTE Confidence: 0.939279612
00:24:55.280 --> 00:24:57.850 dissection and removal and mobilization of
NOTE Confidence: 0.939279612
00:24:57.850 --> 00:25:00.730 the deep lobe of the parotid gland,
NOTE Confidence: 0.939279612
00:25:00.730 --> 00:25:03.790 which can be quite extensive.
NOTE Confidence: 0.939279612
00:25:03.790 --> 00:25:06.394 So some minimally invasive approaches that
NOTE Confidence: 0.939279612
00:25:06.394 --> 00:25:09.422 have come up recently and are robotic
NOTE Confidence: 0.939279612
00:25:09.422 --> 00:25:12.350 surgery, which I'll focus on today.
NOTE Confidence: 0.939279612
00:25:12.350 --> 00:25:14.793 And robotic surgery can be used to
NOTE Confidence: 0.939279612
00:25:14.793 --> 00:25:17.346 access the oropharynx in lieu of those
NOTE Confidence: 0.939279612
00:25:17.346 --> 00:25:19.146 bigger approaches that I mentioned.
NOTE Confidence: 0.939279612
00:25:19.150 --> 00:25:21.383 The supraglottic larynx can also be accessed
NOTE Confidence: 0.939279612
00:25:21.383 --> 00:25:23.848 as well as the parapharyngeal space.
NOTE Confidence: 0.939279612
00:25:23.850 --> 00:25:24.990 And in that photo below,
you can see that the surgeon is at the surgeon console controlling the robotic arms, which are closer to the patient and there’s an assistant. Of making sure the arms and the patient are OK. On the right hand side, again there’s laser surgery which has existed for longer, a couple more decades than robotic surgery which has really come up in the past two decades. And there’s many kinds of lasers, but primarily this is used for the Super glottic larynx and larynx. It can be used for the oropharynx.
as well and for the trachea.

So for transoral robotic surgery, when it was first being used for head and neck and it was really the US side, that was the model that was being used. And on the left hand side, you can see that there’s a surgeon console with sort of those eye pieces where the surgeon can see and have a great view of the field. And then there’s the controls there. That you know the fingers go into and sort of control the robotic arms. there’s petals that provide. Pottery and a left sided pedal.
that controls the camera as well.

So you really have control of everything.

In the middle is the patient cart which is basically what’s right at the patient and the arms have trocars that go into the patient’s mouth which you can see on the right hand side.

And then the final component is the vision cart which is this tower and a screen with really high definition. Images there for the assistant to be able to see, and for the scrub tech and anyone assisting in the surgery to be able to see what’s going on.
More recently, a new 4th generation robot, also from da Vinci, has been FDA approved for surgery of the head and neck, and it’s the single port robots. On the left hand side, you can see that there’s just one cannula instead of the three, and there’s a camera and robotic arms that come out through the single cannula, which measures 2.5 centimeters in diameter. So it is quite small and the camera itself has some flexibility. As you can see in the middle photo, you can bend, there’s certain pose,
you know, we call it the Cobra pose so that it can sort of bend to look up or bend to look down. And the robotic arms have more mobility in the wrist. There’s much more degrees of mobility there. So there’s usually one arm that has a four steps to help retract or grab tissue. The other arm usually has cauter and even the forceps arm can be connected to bipolar cauter. Both arms and then this model of robot actually has the option of a fourth arm that you can use however you’d like, and some of us will put a second.
NOTE Confidence: 0.7989513
00:28:23.054 --> 00:28:25.331 four steps there to keep longer
NOTE Confidence: 0.7989513
00:28:25.331 --> 00:28:27.336 retraction on tissue if needed.
NOTE Confidence: 0.7989513
00:28:27.340 --> 00:28:28.720 On the right hand side,
NOTE Confidence: 0.7989513
00:28:28.720 --> 00:28:31.424 there’s a photo of what the port looks
NOTE Confidence: 0.7989513
00:28:31.424 --> 00:28:33.310 like going into the patient’s mouth.
NOTE Confidence: 0.7989513
00:28:33.310 --> 00:28:34.760 And then there’s a retractor.
NOTE Confidence: 0.7989513
00:28:34.760 --> 00:28:36.992 This is the FKW retractor that’s
NOTE Confidence: 0.7989513
00:28:36.992 --> 00:28:39.160 holding the mouth open and keeping
NOTE Confidence: 0.7989513
00:28:39.160 --> 00:28:41.592 the tongue out of out of the way.
NOTE Confidence: 0.7125055
00:28:43.670 --> 00:28:45.830 So the indications for towards Umm,
NOTE Confidence: 0.7125055
00:28:45.830 --> 00:28:47.405 you know we discussed it a little
NOTE Confidence: 0.7125055
00:28:47.405 --> 00:28:49.415 bit when we were talking about ECOG
NOTE Confidence: 0.7125055
00:28:49.415 --> 00:28:51.725 3311 on particularly early stage or
NOTE Confidence: 0.7125055
00:28:51.725 --> 00:28:53.550 financial squamous cell carcinoma.
NOTE Confidence: 0.7125055
00:28:53.550 --> 00:28:57.262 So T1 and T2 lesions of the tonsil
NOTE Confidence: 0.7125055

45
and tongue base cancers of the soft palate primarily you know are not always so amenable to this because of functional downsides such as Villa Ferringer and sufficiency. Isolated lesions of the posterior pharyngeal wall may be considered, but if quite a bit. That is being resected and we usually do not proceed with this approach. I mentioned early stage supraglottic squamous cell carcinoma which I'll mention again later and then benign tumors of the oropharynx, supraglottis and the parapharyngeal space could also be considered
for transoral robotic resection.

Transoral robotic surgery can also be used for sleep apnea,
but I won’t focus on that today.

Lingual tonsillectomy or tongue based reduction can be done for patients who.

To have this contributing to their sleep apnea,

the first photo is sort of our view when we have good retraction,

there's a tonsil tumor on the right hand side and you know the head is at the bottom of the screen and the chin is at the top of the screen.

And so we're looking from above and you
00:30:02.795 --> 00:30:05.668 know we can see the tip of the epiglottis,
NOTE Confidence: 0.712505505
00:30:05.670 --> 00:30:07.200 the tongue base on both sides.
NOTE Confidence: 0.712505505
00:30:07.200 --> 00:30:09.615 We have full view of the tonsil
NOTE Confidence: 0.712505505
00:30:09.615 --> 00:30:11.800 cancer and even margins of tissue
NOTE Confidence: 0.712505505
00:30:11.800 --> 00:30:14.313 around it and you can see that.
NOTE Confidence: 0.712505505
00:30:14.320 --> 00:30:16.658 Four steps in the left hand corner
NOTE Confidence: 0.712505505
00:30:16.658 --> 00:30:18.309 corner just ready to start.
NOTE Confidence: 0.712505505
00:30:18.310 --> 00:30:21.454 And then on the right hand side there's
NOTE Confidence: 0.712505505
00:30:21.454 --> 00:30:24.284 a specimen post resection that I was
NOTE Confidence: 0.712505505
00:30:24.284 --> 00:30:26.582 trying to Orient for the pathologist.
NOTE Confidence: 0.712505505
00:30:26.582 --> 00:30:28.850 So using some of the anatomic
NOTE Confidence: 0.712505505
00:30:28.926 --> 00:30:30.886 landmarks can help because this
NOTE Confidence: 0.712505505
00:30:30.886 --> 00:30:33.320 is very much A3 dimensional tumor
NOTE Confidence: 0.712505505
00:30:33.320 --> 00:30:35.345 and A3 dimensional resection and
NOTE Confidence: 0.712505505
00:30:35.345 --> 00:30:37.644 all of this technology helps us,
NOTE Confidence: 0.712505505
00:30:37.644 --> 00:30:38.318 you know,
NOTE Confidence: 0.712505505
00:30:38.318 --> 00:30:41.878 see where we need to see to to achieve this.
NOTE Confidence: 0.712505505
00:30:41.880 --> 00:30:44.046 So the clinical evaluation for tours
NOTE Confidence: 0.712505505
00:30:44.046 --> 00:30:46.950 when we see a patient who’s referred to
NOTE Confidence: 0.712505505
00:30:46.950 --> 00:30:49.909 to see if this is even something that
NOTE Confidence: 0.712505505
00:30:49.909 --> 00:30:52.716 we can offer depend on many things.
NOTE Confidence: 0.712505505
00:30:52.720 --> 00:30:54.610 The tumor factors include the
NOTE Confidence: 0.712505505
00:30:54.610 --> 00:30:57.290 size and size is close is closely
NOTE Confidence: 0.712505505
00:30:57.290 --> 00:31:00.830 so T1 or T2 tumors,
NOTE Confidence: 0.712505505
00:31:00.830 --> 00:31:02.685 anything bigger than that we
NOTE Confidence: 0.712505505
00:31:02.685 --> 00:31:08.240 probably would not consider this.
NOTE Confidence: 0.712505505
00:31:08.240 --> 00:31:10.820 The location is also important
NOTE Confidence: 0.712505505
00:31:10.820 --> 00:31:13.325 midline tumors sometimes.
NOTE Confidence: 0.712505505
00:31:13.325 --> 00:31:16.412 Are at risk of injury to both lingual
NOTE Confidence: 0.712505505
00:31:16.412 --> 00:31:18.878 arteries which I’ll mention again later.
NOTE Confidence: 0.712505505
So you know we prefer to do this approach for lateralized tumors.
The depth also factors into stage and we can tell that sometimes by palpation on clinical exam and some you know it definitely with imaging as well. If there's trismus this patient can only open 2 centimeters and someone's really pushing with their thumb. You know then that you won't be good for us, especially with the 2.5 centimeter, cannula that it has to get in the mouth. So that's something that's important to consider.
The tongue size is also important. There’s a lot of tease here. So people sort of remember this as the rule of the teas status of the teeth and the jaw, whether they’re mandibular Tori and then neck mobility or tilting of the neck, anyone who’s had spinal instability or spinal surgery. You know we have to evaluate for that to make sure we can get the exposure we need for this. I added to this prior treatment as well in patients who have had previous surgery, previous radiation in particular and this is sort of a salvage surgery.
We have other considerations including you know whether that when we do these resections we don’t necessarily put tissue you know to reconstruct, but in these patients we might have to do that.

To protect the carotid artery or any other vital structures, because healing might not be as optimal as As for patients who haven’t been treated before.

So the you know the clinical exam if you know we rely on a transoral inspection and palpation, but we also rely on a flexible laryngoscopic exam.
And between those two things we kind of have a sense of the extent, location, depth of the tumor whether we could access this. But a radiology is also very helpful for us when we evaluate patients and tumors the location of the carotid artery is. Is very important, especially if we’re looking at a patient who has a retropharyngeal carotid and you can see that pretty prominently in the left side in that image with the arrows.
So if this patient needed a radical tonsillectomy, we probably would not consider that in this case if we thought that the carotid artery would be exposed or even potentially injured by this, or even potentially injured by this, by this approach. Tongue based tumors, sometimes we can, we can still do um resections on a patient with a retropharyngeal carotid, but that takes a lot of you know very intense study of the skin and making sure that it will stay away from your resection bed or that you won’t keep it exposed.
Then you know the I mentioned before that the tumor could be closely associated with the lingual arteries on both sides and that would be a contraindication to transoral robotic surgery.

In the middle image, you can see a very endophytic tumor that is invading and extrinsic tongue musculature. So this would already be a higher stage and a contraindication to tours, but this likely would involve the lingual artery on that side. On the right hand side is probably
00:34:37.503 --> 00:34:39.764 a similarly sized tumor but much
more exophytic.

 NOTE Confidence: 0.878180918333333

00:34:39.764 --> 00:34:40.546 So that’s sort of a counterpoint to
that middle image that sometimes we

 NOTE Confidence: 0.878180918333333

00:34:40.550 --> 00:34:42.811 see these endophytic tumors that

 NOTE Confidence: 0.878180918333333

00:34:42.811 --> 00:34:44.976 wouldn’t be ideal for transoral surgery,

 NOTE Confidence: 0.878180918333333

00:34:44.976 --> 00:34:46.866 but then sometimes we see these.

 NOTE Confidence: 0.878180918333333

00:34:46.866 --> 00:34:49.387 Exophytic ones where we know we can

 NOTE Confidence: 0.878180918333333

00:34:49.390 --> 00:34:50.680 stay away from the lingual artery

 NOTE Confidence: 0.878180918333333

00:34:50.680 --> 00:35:03.370 and resect it with minimal

 NOTE Confidence: 0.878180918333333

00:34:53.382 --> 00:35:01.270 functional morbidity to the patient.

 NOTE Confidence: 0.878180918333333

00:35:01.270 --> 00:35:04.770 So the benefits of tours

 NOTE Confidence: 0.878180918333333

00:35:04.840 --> 00:35:07.640 which would be necessary in some of these

 NOTE Confidence: 0.891057378260869

00:35:07.640 --> 00:35:10.009 open approaches and faster rehabilitation,

 NOTE Confidence: 0.891057378260869

00:35:10.010 --> 00:35:13.070 recovery of speech and swallow function.
The surgery is shorter as well as the hospital stay. And we would really consider this as Doctor Mayer mentioned in his talk if we were able to reduce or eliminate even the need for post operative treatment. So post operative or adjuvant therapy and I just put the ECOG 3311 schema up there. Just as a reminder as to you know one of the reasons we do transoral robotic surgery to minimize adjuvant treatment if we can. If we think that we could not say
there’s a small primary tumor,
but there’s matted nodes and obvious extranodal extension that you know that would put them in the high risk arm,
then maybe you know we should consider upfront chemo radiation.
The risk of tours include taste disturbance and tongue numbness on those 2GO hand in hand primarily because of retraction.
Using these FK retractors or the Med robotic retractors or even the Crow Davis and having that that blade against the tongue for quite a while can cause these things and some patients last longer than others.
that is improved with Torres is swallowing return to swallow function, there still can be problems with swallowing in the immediate. Post operative period Velopharyngeal insufficiency is something that I mentioned, particularly if there is a significant portion of the soft palate that’s resected if in oropharyngeal squamous cell carcinoma in particular, a neck dissection typically is performed with the transoral robotic surgery. And so when that happens, there is a risk of fistula between the oropharynx resection and the neck.
and so we have to monitor for that.

Carefully, um, during the surgeries in some cases, in some surgeons would tend you to stage the neck dissection for do that first and then do the robotic surgery later or if we do it at the same time, there are some local reconstruction options that we can consider to close a fistula and you know those that’s important to keep an eye out for the other thing about the neck portion of the surgery particularly in oropharyngeal squamous cell carcinoma. Is ligation of the external
00:37:35.310 --> 00:37:37.260 carotid artery or its branches.
NOTE Confidence: 0.891057378260869

00:37:37.260 --> 00:37:39.580 Because bleeding is a very feared risk of tours,
NOTE Confidence: 0.891057378260869

00:37:39.580 --> 00:37:41.436 it can be life threatening and
NOTE Confidence: 0.891057378260869

00:37:41.440 --> 00:37:43.660 it doesn’t happen immediately.
NOTE Confidence: 0.891057378260869

00:37:43.660 --> 00:37:45.140 It tends to happen over
NOTE Confidence: 0.891057378260869

00:37:45.140 --> 00:37:47.340 a week postoperatively.
NOTE Confidence: 0.891057378260869

00:37:47.340 --> 00:37:53.124 So it is standard of care to ligate these
NOTE Confidence: 0.891057378260869

00:37:53.124 --> 00:37:55.558 branches to minimize the risk of bleeding.
NOTE Confidence: 0.851145724

00:37:57.740 --> 00:37:59.700 Contraindications to transoral robotic
NOTE Confidence: 0.851145724

00:38:02.150 --> 00:38:04.579 surgery include inability to visualize
NOTE Confidence: 0.851145724

00:38:04.580 --> 00:38:07.190 Trans orally if there is carotid
NOTE Confidence: 0.851145724

00:38:07.190 --> 00:38:09.840 artery involvement of the tumor which
NOTE Confidence: 0.851145724

00:38:09.840 --> 00:38:12.318 would upstage the tumor as well,
NOTE Confidence: 0.851145724
prevertebral fashion involvement,
any mandibular invasion,
and if there's greater than 50% tongue
based involvement or greater than 50%
posterior pharyngeal wall involvement.
I also mentioned the medicalized
or retropharyngeal carotid.
Um, but sometimes it particularly
in tongue based resections.
If it’s really posterior,
it can be still considered.
So this is sort of some
relevant internal anatomy.
The two pictures on the
left depict the initial approach
00:38:50.473 --> 00:38:53.149 to a radical tonsillectomy.

So the forceps is holding the pharyngeal constrictor muscle and this is sort of the first incision that we make in a radical tonsillectomy. We expose that medial teratoid muscle and use that pharyngeal constrictor as our deep margin essentially. And as that's being retracted medially and that sort of whitish fluffy thing stuff you see is the parapharyngeal fat. And so that's where the blood vessels are the things you want to avoid.
Dissected laterally so we can continue working on the muscle that can get transected and often does is the styloglossus muscle where that blue arrow is. So there’s a lot of internal anatomy that we’re thinking about as we do these resections and on the right hand side that’s that dorsal lingual artery because during a tongue based resection or focused on where that is and you can see that dorsal lingual artery. In the circle there that’s often that often can show up and we
are watching out for it especially
it almost comes up as like a
knuckle of a vessel as you’re in
the tongue based musculature.
So we’re always watching out
for that when we do these,
do these cases and thanks to the
technology of the robot we really have
great visualization as we’re working.
Sometimes it can be more
challenging in that photo,
some of those longer blades are used to
get deeper and exposed to super glottis.
Again, transoral robotic surgery is used for early stage tumors at T1 and T2. Some surgeons do report using this for T3 tumors as long as both vocal cords are mobile, which basically precludes paragliding. Face involvement. The airway considerations you know are interesting and super chaotic. Squamous cell carcinoma. I think there are some cases in which doing a tracheostomy up front to protect the airway and in the event of any bleeding could be considered more so than for or...
pharyngeal squamous cell carcinoma. And the major source of bleeding if it were to occur would be from the superior laryngeal artery in this case and in the bottom photo. You can see that there’s on the lingual surface of the epiglottis, there is a tumor there and so the robot is being used to visualize it and also then for resection contraindications. There include limited exposure. Poor pulmonary reserve is actually a contraindication to a supraglottic laryngectomy as well as you know.
it can be a difficult recovery,

there can be aspiration postoperatively.

Involvement of the anterior commissure

thyroid cartilage is also contraindication,
as is periodic space invasion.

That could cause vocal cord fixation

Some tumors that with minimal

involvement of the pyriform

sinus can be resected this way.

But if there is involvement of

the apex of the pyriform sinus

or any post cricoid mucosa,

that's also a contraindication.

And just briefly for the final slides,

wanted to review trends or robotic
surgery for the parapharyngeal space.

Generally it’s used for a well circumscribed tumors most commonly for a deep lobe parotid neoplasm such as a pleomorphic adenoma and these generally are in the pre styloid space. And the the bottom picture if you can see it sort of depicts the pre styloid versus the post styloid, but generally the pre styloid space is occupied by. Parapharyngeal fat in the post dilate space is where the great vessels are and and the associated nerves. So This is why we would probably not
use this for post thyroid tumor.

There have been reports of resecting benign tumors as large as 8 centimeters trans orally there are.

I think again selection is very important.

The relationship to the internal carotid artery is key here.

So if the artery is displaced laterally and you can see it.

A plane between the tumor and the carotid, I think you know that that's a sign that this could be safe to do with a transoral robotic approach.

In some cases with these deep lobe salivary gland tumors or prodded gland tumors,
extension through the stylo mandibular tunnel may require a combined or an open approach because of that. Because it’s hard to get laterally beyond and I’ll show you photos of that and that this creates a dumbbell appearance on imaging. So the the graphic on top just shows where the stylo mandibular ligament is and that barrier sort of causes the tumor to grow around it and create a dumbbell. And so part of that could be accessed very easily trans orally as you can see the bottom right image.
But the part that’s abutting the deep lobe of the product can be difficult. So sometimes this. This would require just an open approach or a combined approach. The advantages of going trans orally to approach these is that there’s less risk of first bite syndrome and fry syndrome, which are well described after transcervical or transpara added approaches to the parapharyngeal space. There’s less risk of Cialis steel because you’re not dissecting the parotid gland, and then there’s less risk of facial nerve injury because you’re not dissecting that either.
And of course there’s no external incision. That, you know, the main disadvantage is that there’s a very narrow corridor of exposure and if there’s any bleeding that occurs there, there can be a lot of difficulty controlling that. So sometimes when surgeons are doing this, they’ll have a backup open approach so you can convert to an open approach if needed to control any bleeding, even though there’s a decreased risk of facial nerve injury and
other adverse effects,
the glossopharyngeal nerve.
Is actually closely associated
with the styloglossus muscle,
so that’s an increased risk of injury here.
So the you know in conclusion traditional
open surgery is the gold standard
and what’s been done for many,
many years to approach the tumors
of the head and neck with the following
purposes to visualization on block
resection with negative margins and
preservation of surrounding structures.
Robotic surgery over the past
two decades or slightly more has
demonstrated that you know we can
achieve similar outcomes with improved functional outcomes but we have to select our patients carefully. Based on clinical aspects and radio graphic aspects too.

So here are my references and I had a question slide while we were waiting till the end so. Thank you. We'll wait till the end. That's great.

Thank you so much Doctor Verma for that great run through a transoral robotic surgery and Susan head neck.

Great. So our final speaker for this evening is not a surgeon, but we work very closely with him as
surgeons and he's done some really exciting work on road radiomics.

Dr Pavish is did his MD at Tehran University, was a research fellow at Mass General, went through his radiology training and did a neuro Neuroradiology fellowship, highly coveted at UCSF. Probably more than five years ago at this point. And now he’s assistant professor of Radiology in Neuroradiology at Yale University. And he’s going to be speaking about Radiomics, so I’ll hand it over to him.

Thanks Doctor Mehta for
introduction and invitation.

Um, so I will be speaking about Radiomics in head and neck cancer.

Do not have any conflict of interest and the talk will be focused on the application of radiomics.

A short and brief description of what we are talking about when we are referring to radio mix, how this can help with diagnosis and molecular subtyping of tumors, prognostication, prediction of survival and perhaps treatment planning in patients with head and neck cancer.
And this was a review article that we published with Doctor Burtness a couple of years ago. And so. When we talk about radiomics, this basically represent a hard coded series of hard coded algorithm that extract numeric features from medical images. So it was basically started along with the omics spectrum, as you might have heard about genomics, proteomics. The idea is that we extract a large amount of numeric and quantitative information from medical images and try to harness information from them for precision diagnosis.
And precision treatment planning. Now the RADIOMICS features or the radiomics numbers are in generally representative of the intensity, shape and texture of a target lesion. In this case head and neck cancer intensity, basically the brightness of the tumor or lesion of interest on medical images. We are pretty much always working with grayscale images, the shape of the tumor. And also the texture, how much it is heterogeneous and this large amount of information that we extract or actually well suited for.
machine learning algorithms because those are preferred and suitable statistical models to make a prediction. So some of the references that I make are related to brain tumors, but you can. Basically apply the same concept to head and neck tumors. So when we talk about intensity features, you can think about the mean or range of the intensity or brightness that you see in a specific lesion, but it can also get a little bit more sophisticated. We can think about the magnitude of the changes of the voxel values in an image. Now would be referred to as energy.
or entropy like randomness of the values and the image. So that’s why, you know, we basically get a larger number of numeric values that are representative of the intensity feature and. In medical images, when we talk about the radiomics intensity feature, this is again. Course we did with posterior fossa tumors and this was like the information from the histogram, ADC histogram in these tumors and you can see how this is different from one tumor subtypes to another and.
we apply this for differentiation of posterior fossa brain tumors.
The shape of a tumor may also have an impact. We usually think about the volume how big a tumor is but sometimes the surface and it’s. We may also have an impact. I haven’t found like a good example in terms of head and neck tumors, but for example. This paper which was done on glioblastoma showed that how much did the basically minimum volume of a bounding ellipsoid may have an impact on the overall survival of the glioblastoma.
So there is some work that can be done on looking into how does the shape of a tumor affect the prognosis or. Perhaps the way affect treatment planning. And then the last thing that I mentioned or the texture of the tumor, how much the tumor is heterogeneous. Now the numbers or the metrics that we use for this are a little bit complex. But in general you can think about it as we are looking into seeing how much the intensity of 1 region is different from the region next. The more heterogeneous tumor is we
perhaps expected. Could be more advanced.

It’s perhaps has like more time to grow.

There are some areas that have necrosis, some are still, growing and some are more vascular.

And this was the work that was done for example for subtyping of the medulloblastoma along the same line.

When we are looking at the texture or heterogeneity of the tumor, we can apply some filters and this.

is like a example of how does these filters change the original image.

For example we can pass, we can apply low pass and High Pass filter a low pass.
Winter kind of smooths out the image, getting the overall view of the original vision is by in a high pass filter you can look more into the contrast or the edges. So.

This is, for example, a prostate cancer. This is how we apply these filters in three directions and we get eight different derivatives. Again, these are all sorts of manipulation that we do just to get more and more information about the. Are the tumor going above and beyond the intensity and shape and
00:54:10.069 --> 00:54:11.954 specifically trying to figure out
00:54:11.954 --> 00:54:13.970 what we can get in terms of the
00:54:14.038 --> 00:54:15.578 information from the heterogeneity
00:54:15.578 --> 00:54:19.820 or the texture of the tumors, so.
00:54:19.820 --> 00:54:23.160 I just referred to like.
00:54:23.160 --> 00:54:26.974 Think that you know like three
00:54:26.974 --> 00:54:30.454 of the works that we have done
00:54:30.454 --> 00:54:33.974 here could showcase of what we
00:54:33.974 --> 00:54:36.790 can achieve with radiomics.
00:54:36.790 --> 00:54:39.431 molecular subtyping of tumor.
00:54:39.431 --> 00:54:40.381 So as you all know HPV status is very
00:54:40.381 --> 00:54:43.250 important in terms of prognostication.
00:54:43.250 --> 00:54:45.530 It’s indeed the first step for
00:54:45.530 --> 00:54:47.888 us to decide how we’re going
00:54:47.888 --> 00:54:52.790 to stage a tumor after 2018.
NOTE Confidence: 0.879755833333333
00:54:52.790 --> 00:54:54.746 Adjustment of the AGC.
NOTE Confidence: 0.879755833333333
00:54:54.746 --> 00:54:58.271 So we tried to use radiomics features
NOTE Confidence: 0.879755833333333
00:54:58.271 --> 00:55:01.694 from Pet city to predict the HPV
NOTE Confidence: 0.879755833333333
00:55:01.694 --> 00:55:04.790 status of head and neck tumors.
NOTE Confidence: 0.879755833333333
00:55:04.790 --> 00:55:10.790 So we segmented the the.
NOTE Confidence: 0.879755833333333
00:55:10.790 --> 00:55:14.276 The primary lesion is segmented the
NOTE Confidence: 0.879755833333333
00:55:14.276 --> 00:55:17.603 metastatic lymph nodes on pet CT
NOTE Confidence: 0.879755833333333
00:55:17.603 --> 00:55:20.778 we extracted it roughly like 1000.
NOTE Confidence: 0.879755833333333
00:55:20.778 --> 00:55:23.700 Features are representing the intensity,
NOTE Confidence: 0.879755833333333
00:55:23.700 --> 00:55:27.532 shape and texture of these primary
NOTE Confidence: 0.879755833333333
00:55:27.532 --> 00:55:31.024 lesion and tumors we were using.
NOTE Confidence: 0.66507816
00:55:33.520 --> 00:55:38.248 Roughly A144 from the Cancer
NOTE Confidence: 0.66507816
00:55:38.248 --> 00:55:41.396 Imaging Archive and 291 from Yale,
NOTE Confidence: 0.66507816
00:55:41.396 --> 00:55:46.326 and we split it into a training slash,
NOTE Confidence: 0.66507816
00:55:46.326 --> 00:55:49.214 cross validation and an
NOTE Confidence: 0.66507816
independent validation cohort.

We were trying to see which image modality and which combination of input variables are important for are would be most accurate in terms of prediction of HPV status. So here you can see that it was very extensive work.

We were trying to see whether pets alone, city alone or pet city information using primary tumor. Lymph nodes or the consensus of the tumor and nodes or consensus of all lymph nodes will be give us the best model. Long story short, is that what? We found that a combination of the
00:56:36.321 --> 00:56:40.050 pet CT using the consensus of the
00:56:40.050 --> 00:56:43.290 primary lesion and the lymph nodes
00:56:43.290 --> 00:56:46.128 can give us the best prediction.
00:56:46.130 --> 00:56:48.636 And these are the AU says that
00:56:48.636 --> 00:56:51.627 we could get in our independent
00:56:51.627 --> 00:56:54.059 and external validation cohorts.
00:56:54.060 --> 00:56:57.910 So you may question that, OK,
00:56:57.910 --> 00:57:02.896 so how does this really affect our,
00:57:02.900 --> 00:57:04.512 you know, staging really,
00:57:04.512 --> 00:57:06.527 because you always will have
00:57:06.527 --> 00:57:11.020 a tumor sample to decide.
00:57:08.660 --> 00:57:11.020 Now if you look at how the
00:57:11.020 --> 00:57:12.620 pathologists actually do it,
00:57:12.620 --> 00:57:15.580 there are different stages sometimes,
00:57:16.193 --> 00:57:18.645 technically the guideline from
NOTE Confidence: 0.66507816
00:57:18.645 --> 00:57:20.472 the American Pathological
NOTE Confidence: 0.66507816
00:57:20.472 --> 00:57:24.108 Association is that they first do.
NOTE Confidence: 0.66507816
00:57:24.110 --> 00:57:26.270 And immunohistochemistry and then they
NOTE Confidence: 0.66507816
00:57:26.270 --> 00:57:29.190 do if depending on how certain they
NOTE Confidence: 0.66507816
00:57:29.190 --> 00:57:32.390 are based on the IHC, they do the PCR.
NOTE Confidence: 0.66507816
00:57:32.390 --> 00:57:35.088 Here at Yale we pretty much go
NOTE Confidence: 0.66507816
00:57:35.088 --> 00:57:37.398 for everything we go for PCR.
NOTE Confidence: 0.66507816
00:57:37.400 --> 00:57:37.888 However,
NOTE Confidence: 0.66507816
00:57:37.888 --> 00:57:41.792 what we proposed in our paper is that
NOTE Confidence: 0.66507816
00:57:41.792 --> 00:57:46.214 this is not a substitute for tissue sampling,
NOTE Confidence: 0.66507816
00:57:46.220 --> 00:57:48.644 but this can mostly work as an adjunct
NOTE Confidence: 0.66507816
00:57:48.644 --> 00:57:50.939 to the tissue sampling results.
NOTE Confidence: 0.66507816
00:57:50.940 --> 00:57:52.860 In other words,
NOTE Confidence: 0.66507816
00:57:52.860 --> 00:57:58.560 if you have a PC order or even
NOTE Confidence: 0.66507816
00:57:58.560 --> 00:58:01.700 histochemistry that is equivocal,
maybe we can use this to supplement that.
Analysis and that pathology report, so.
Again, something that is perhaps not going
to at this point we are still far away from replacing tissue sampling,
but perhaps we have some quantitative and reliable methods to supplement those whenever needed.
Now how about prognostication?
So we try to see whether or not using the RADIOMICS features can help with prediction and prognostication and prediction of the survival beyond the JC staging.
And the reason why we looked at a JC staging was because. It’s kind of like you can say like the benchmark for a prognostication. We were again using a series of HPV positive and HPV negative patients and our modeling was to predict those both progression for survival and overall survival using these radiomics features and. This is, I think it can give you the gist of it. So these are different time points, 2 year, three-year, four year and five year. And as you can see for both HPV
positive and for HPV negative, the RADIOMICS features could differentiate between high risk and low risk. Patients? Fairly well. As you can see, for HIV positive in all four time points that we tried, we could achieve significance. P value for differentiation, but really the agency is staging. Was not able to differentiate the low risk and high risk patients. Uh with this I mean even achieving the statistical significance, I should note that we actually excluded.
any stage four patients from our analysis and the same thing as you. This was actually, I'm sorry, this was an HP negative series, ohh, sorry, this is the overall survival, this is the progression free survival, so kind of. Same story here. Could be I forgot to include this slide about the HPV negative series. But the bottom line is that we and the way we envision this is that in future in addition to just tumor size, lymph node size or the anatomical extension of the tumor, we probably can get a bunch of numbers that can help us.
Bitter stage, the patient. This is based on the very baseline pity. This is how currently we proceed to stage our patients. So if we have a better way of staging them at the baseline in terms of the survival and prognostication. Then we will have better way of treatment planning and smarter way of treatment planning, so. I we envision that perhaps in New York near future in addition to. General you know like a staging numbers we may have like more sophisticated numbers that can
tell us this is a low risk,
NOTE Confidence: 0.744778033636364
This is a high risk patient in terms
NOTE Confidence: 0.744778033636364
of the survival and then finally.
NOTE Confidence: 0.72370419625
We did look to see if there are.
NOTE Confidence: 0.72370419625
If Radiomics can help predict locoregional
NOTE Confidence: 0.72370419625
progression after radiotherapy in
NOTE Confidence: 0.72370419625
HPV associated oropharyngeal cancer.
NOTE Confidence: 0.72370419625
And this is a very good follow up
NOTE Confidence: 0.72370419625
to presentation by Doctor Mehra
NOTE Confidence: 0.72370419625
and the E 3311 in the sense that
NOTE Confidence: 0.72370419625
these patients are potential.
NOTE Confidence: 0.72370419625
Candidates for intensity reduction
NOTE Confidence: 0.72370419625
in terms of radiotherapy.
NOTE Confidence: 0.72370419625
So if we know that who are more at
NOTE Confidence: 0.72370419625
risk of post radiotherapy regional
NOTE Confidence: 0.72370419625
progression and who is less likely

96
01:02:50.198 --> 01:02:53.079 to have the original progression,
01:02:53.079 --> 01:02:55.533 then you can perhaps use that
01:02:55.533 --> 01:02:56.760 for treatment planning.
01:02:59.200 --> 01:03:01.570 We use kind of similar methodology
01:03:01.570 --> 01:03:04.819 that we use for survival prediction,
01:03:04.820 --> 01:03:08.551 this time only focused on HPV positive
01:03:08.551 --> 01:03:11.582 patients would receive radiotherapy and
01:03:11.582 --> 01:03:17.000 as you can see here we could basically.
01:03:20.570 --> 01:03:22.814 Predict the overall survival
01:03:22.814 --> 01:03:26.180 progression for so and local regional
01:03:26.265 --> 01:03:30.218 recurrence Indian which is better?
01:03:30.218 --> 01:03:34.398 Accuracy compared to the agency.
01:03:34.400 --> 01:03:36.710 If we want to use again agency
01:03:36.710 --> 01:03:39.000 aging as a prognosticator,
01:03:39.000 --> 01:03:41.956 one thing that I should mention is
that you may see that, you know, like over time we kind of lose the accuracy. It's simply because we had. Smaller number of patients who were followed beyond three years. So when you have less data your machine learning model just would not have enough input to generate good prognostic model. So in general this is basically a very detailed information detailed of the local regional recurrence, based on the AGC staging, different stages, oral stage,
the age of the patient and how did they reconcile. So in general, Radiomics offers an automated way of image analysis. It will provide a numeric and quantitative metrics for machine learning algorithms. And I tried to present some of the work that we have done here as how we can use this for differentiation, molecular subtyping of the tumors, prediction of the treatment response and survival prognostication. So yeah, let’s hope that it was helpful for you. Thank
you Doctor Pravesh, that was.
Really exciting stuff.
There are, there are some questions.
Thank you everyone for staying on time.
We're pretty much right on time where
There are some questions that
people had for the first talk there
I'll answer that one is the
we want it to be which is great.
There are some questions that
people had for the first talk there
I was a question but are we doing
deep intensification already?
I'll answer that one is the
short answer is yes.
You know a lot of the as you could
see there were I don’t know maybe 5060
academic centers I’m recruiting to the.
He called 3311 trial and you know we
were seeing results you know before
publication and patients were asking
and so off trial you know there
was some discussions about this
and now once the abstract came out
did intensification is happening.
I mean some might say tours alone
is densification but also deep
intensification of the dose of
radiation is happening already
at major academic centers.
But I think it has to be done in a mindful.
Thoughtful way, multidisciplinary way,
you know,
with all options presented to patients.
Doctor Verma,

there was a question about tonsils versus base of tongue.

Is it easier to approach than the other? Does it impact your decision of what you know?

How does that impact your decision to do tours if it’s in the base of tongue versus the tonsil?

Yeah, that’s a good question. I think considerations might be different and particularly the anatomical considerations.

If it’s a tonsil tumor, you already know it’s lateralized, a tongue based tumor.
You still have to evaluate. If it’s approaching midline for example, then you know we would probably not recommend doing a transoral resection also because we would have to consider management of both sides of the neck in terms of potential. Regional metastasis to lymph nodes. But you know I think if it’s, it’s not that we would choose one over the other necessarily. I think it’s just different considerations, but that’s a great question.
01:07:40.369 --> 01:07:41.853 is when do you do bilateral neck dissections along with tours and how does that factor into your decision of whether or not to do tours?

01:07:44.906 --> 01:07:46.607 And in a tongue-based tumor that you're doing it towards resection on and there is approach even you know a couple millimeter or millimeter or so between you know close to midline we we have to consider you know management of both necks and this is actually where again the multidisciplinary
01:08:14.881 --> 01:08:16.821 approach really matters and before 
NOTE Confidence: 0.827773608260869
01:08:16.821 --> 01:08:18.909 we consider or proceed with this. 
NOTE Confidence: 0.827773608260869
01:08:18.910 --> 01:08:20.083 Kind of surgery, 
NOTE Confidence: 0.827773608260869
01:08:20.083 --> 01:08:22.429 we have a radiation oncology and 
NOTE Confidence: 0.827773608260869
01:08:22.429 --> 01:08:24.651 medical oncology colleagues see the 
NOTE Confidence: 0.827773608260869
01:08:24.651 --> 01:08:27.285 patient and we could consider either 
NOTE Confidence: 0.827773608260869
01:08:27.360 --> 01:08:29.916 not doing the transoral resection and 
NOTE Confidence: 0.827773608260869
01:08:29.916 --> 01:08:32.242 doing chemo radiation or if there’s 
NOTE Confidence: 0.827773608260869
01:08:32.242 --> 01:08:34.108 some factor that you know really 
NOTE Confidence: 0.827773608260869
01:08:34.108 --> 01:08:36.320 pushes us towards transoral surgery, 
NOTE Confidence: 0.827773608260869
01:08:36.320 --> 01:08:38.396 we could consider bilateral neck dissections. 
NOTE Confidence: 0.712619793
01:08:40.370 --> 01:08:43.072 Great. And then Doctor Paul Bashere was 
NOTE Confidence: 0.712619793
01:08:43.072 --> 01:08:45.610 a question about, well, first of all, 
NOTE Confidence: 0.712619793
01:08:45.610 --> 01:08:47.335 someone coming is very exciting 
NOTE Confidence: 0.712619793
01:08:47.335 --> 01:08:50.164 how you can use radiomic data to 
NOTE Confidence: 0.712619793
help with prognostication and very interesting to hear your reviews about. You know one day potentially putting in it into something like a staging system even, which is really exciting. I mean right now we use pretty crude metrics on imaging like invasion into this muscle. Therefore it is this stage, but you’re you’re proposing in the future to use on almost, you know numeric data from RADIOMICS to help with pronunciation. Is that is that a true statement and I just want to add that, for example. Right now the Umm, we are working again. It’s kind of pioneered by
my colleague Dr Maria Mboya, who is working on brain tumors. We have already implemented the pipeline that extracted radiomics numbers. So technically speaking she has like an automated segmentation of brain tumors, so. Umm, from the packs, like from the visage packs that, yeah, you can directly get the numbers, the radio mix number for brain tumors. So we can, you know, technically easily apply this to your or pet cities.
And get those numbers and we talked about.

We literally talked about the models that I developed.

It’s just that I use.

Our coding for um, the machine learning algorithms and the they were you know.

The our practice system has a a Python The our practice system has a a Python on basically language compatibility.

But yes, I mean literally here we are very close to you know, getting those numbers on on on our tax system.

Great. That’s wonderful.

And then there’s another question about how about using radiomics to predict extranodal extension.
01:11:06.704 --> 01:11:09.127 in a lymph node in the neck,

01:11:09.130 --> 01:11:11.735 which could totally change whether

01:11:11.735 --> 01:11:15.336 or not we recommend surgery or not

01:11:15.336 --> 01:11:18.048 based on the current NCCN guideline,

01:11:18.050 --> 01:11:18.863 treatment recommendations and

01:11:18.863 --> 01:11:20.489 what are your thoughts on that?

01:11:20.560 --> 01:11:26.112 Yeah, so actually. Benjamin Connor,

01:11:26.112 --> 01:11:29.628 who is a radiation oncology resident,

01:11:29.630 --> 01:11:32.158 he’s now at the Dana Farber’s.

01:11:32.158 --> 01:11:35.290 He developed that they use

01:11:35.290 --> 01:11:38.380 a deep learning model.

01:11:38.380 --> 01:11:41.420 We actually even tried radomes which

01:11:43.480 --> 01:11:45.940 And at the time, yeah,

01:11:45.940 --> 01:11:47.935 like he was about to leave Yale.
We talked about bringing in his model to our park system. It didn’t work. And now he’s at Dana Farber. They also have like similar pack system as us. I know that he’s working on it and his model has like an accuracy close to 0 point like 80% and it was even more accurate than radiologist for prediction of the extranodal extension. So I do believe that we are very close to really implementing all of these in our clinical day-to-day.
01:12:28.906 --> 01:12:30.457 question for you, Professor.

01:12:30.457 --> 01:12:32.592 There are groups of patients

01:12:32.592 --> 01:12:34.818 for whom radiomics or machine

01:12:34.818 --> 01:12:36.610 learning models are not,

01:12:36.610 --> 01:12:38.005 are not as predictive that

01:12:38.005 --> 01:12:39.400 you just know up front.

01:12:40.100 --> 01:12:42.718 So we are our models are as

01:12:42.718 --> 01:12:45.669 good as the data that we have.

01:12:45.670 --> 01:12:47.511 So that’s why I mean when I

01:12:47.511 --> 01:12:49.112 mentioned that for example we do

01:12:49.112 --> 01:12:50.869 not have if we don’t have data

01:12:50.933 --> 01:12:52.679 for you know long term prediction

01:12:52.679 --> 01:12:54.601 or models are not working.

01:12:54.601 --> 01:12:59.858 So we barely have data on HPV.

01:12:59.860 --> 01:13:01.000 Negative patients.
So our models are less accurate for HPV, negative or for angio cancer. It’s only works if we have enough data and yet for example. Since the introduction of PD1 inhibitor, the two the treatment response has changed. So now we have to train a new set of models for prediction of how, how this is gonna you know like how would that affect the survival of the patients. So the the all the models that we developed were based on information that came from somewhere from 2011 to 2016 so there is a lag between the models of your developing and the
current cutting edge treatments.

We have to retrain the models based on the most up-to-date treatments that we have.

Very interesting, very interesting.

All right. Well, I think that answers all the questions.

I wanted to thank our speakers, doctor Avanti Verma,

doctor Sam Kavesh for joining us and we want to thank all the participants

who logged in today and the ones who will also see this on the website.

This will be posted on the Twitter for Yale Cancer Center,
01:14:33.140 --> 01:14:36.239 will be on the Yale Cancer website and.
NOTE Confidence: 0.78188524
01:14:36.240 --> 01:14:37.550 Please reach out to if
NOTE Confidence: 0.78188524
01:14:37.550 --> 01:14:38.598 you have any questions.
NOTE Confidence: 0.78188524
01:14:38.600 --> 01:14:40.328 Thank you all very much for joining us.
NOTE Confidence: 0.9789504
01:14:41.450 --> 01:14:46.000 Thank you. Thank you.