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Lung Cancer Screening & What to Do When a Nodule Is Detected

Announcer:
Welcome to CME on ReachMD. This CME activity, titled, “Lung Cancer Screening and What to do When a Nodule is Detected” is presented by Dr. Eric Edell. This activity is brought to you by CHEST and supported by an independent educational grant from AstraZeneca.

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Here is your host, Dr. Edell.

Dr. Edell:
Good afternoon, everyone. My name is Eric Edell. I'm a pulmonary critical care physician at Mayo Clinic in Rochester, Minnesota. And I'm delighted today to be joined by my guest, Dr. Nichole Tanner, Professor of Medicine at Medical University of South Carolina and a Joint Appointment at the Ralph H. Johnson VA Hospital. Today, Dr. Tanner and I will be discussing topics on lung cancer screening and what to do once we find a lung nodule. Dr. Tanner, welcome.

Dr. Tanner:
Thank you so much for having me.

Dr. Edell:
So as we look at this issue of lung cancer, Dr. Tanner, we know that it remains the leading cancer cause of death in the United States. And we also know that screening has shown an effective strategy in changing the mortality of lung cancer. One of the questions that has come up repeatedly in the interaction with some of our colleagues, is the current criteria for lung cancer screening. Can you address with me the original criteria and how they're evolving now to criteria that might be more inclusive, and enabling us to pick up more lung cancers?

Dr. Tanner:
Sure, so as you know, the original U.S. Preventive Services Task Force criteria for screening was released in 2013. And that was after the evidence from the National Lung Screening Trial was published. Those criteria were really largely based on the National Lung Screening Trial entry criteria for participation. And with an additional modeling exercise, they extended the age criteria. So in the beginning, it was ages 55 modelled out to age 80, a current or former smoker, former smokers having quit within the past 15 years, with at least a 30-pack-year smoking history. And so that's how it all started. And again, largely based on the criteria that folks had to get into the National Lung Screening Trial.

Through the years, there's been a lot of evaluation of that eligibility criteria- some very interesting risk prediction modeling was done that showed if you took allcomers within the National Lung Screening Trial and stratified them by risk of developing lung cancer, those in the lowest quartile of risk actually had a higher number needed to screen with more false positives. And so there was a lot of discussion around that. So too, there was a lot of discussion around potential racial and gender disparities with the criteria as they stood. And so many groups evaluated the eligibility criteria, as they were to folks that had already developed lung cancer. And what they found was

that many of the people diagnosed with lung cancer that hadn't undergone screening would have been ineligible, based on screening criteria. And this was mainly in women and Black minorities. And so I think, - yeah, I think that gave people pause to say, 'Well, wait a second, are we missing a group of patients that should be screened?'

Dr. Edell:
Now, the criteria, the screening criteria, what are the acceptable age ranges now?

Dr. Tanner:
Sure. And so most recently, the task force updated its criteria. And we've gone from age 55, to a lower age threshold of age 50, and a smoking history from 30-pack-years to 20-pack-years. And so that actually increases the number of eligible folks. And again, some very great modeling done by very smart people, have shown that that would include more Blacks and more women who tend to develop lung cancer at an earlier stage with a lighter smoking history.

Dr. Edell:
Excellent, excellent. Well, being a screen - lung cancer screening expert as you are and you know, the information, the data is strong that we can affect mortality. Yet, it seems that there's still a challenge in getting programs going. What, in your mind are a couple of the major barriers for this implementation of screening programs?

Dr. Tanner:
Yeah, that's a loaded question with a lot of answers. But if I had to highlight, you know, we know that usually it takes up to 17 years for what's published in the literature to make it to mainstream, so that's probably issue number one, the NLST he was published in 2011. And things are slow.

The other thing is that lung screening is really multidisciplinary, and requires a lot of buy-in from different specialties. It's not a glossy brochure and a CT scanner. There's much more to that. So I think a lot of the barriers at least initially were public knowledge of it. There are lots of campaigns that - for breast cancer screening, and very few for lung cancer screening. So a lot of people in the population at large don't know that lung cancer screening is available. I also think as we look at eligibility, these are patients that are being targeted, not necessarily because of their age, but because of a poor health habit. Whereas, you know, traditional screening is based on age and maybe family history we're really targeting a group that has a poor health habit, and there's a lot of stigma related to that.

Then I think at the provider level there was some confusion at least in the beginning as to what the eligibility was, this whole notion of conducting shared decision-making and was - did they really have enough time to do it? I think that probably impacted uptake at the provider level. That and the National – I'm sorry, the American Academy of Family Physicians did not endorse lung cancer screening, yeah, until most recently. So I think those are the bigger - bigger barriers.

Also you know, I think insurance status is an issue too. So many of these folks that smoke cigarettes or smoked in the past tend to the lower socioeconomic status, might not have access to primary care providers, which is where most screening emanates. So there's a lot of things that can be worked on.

Dr. Edell:
Excellent summary, and it I think it stands out that the patient's knowledge and advocacy groups are the big drivers as you articulated in breast cancer, no question about that.

Now, one of the criteria, or one of the components of some screening programs required for current smokers to at least go through smoking cessation, is there evidence that the implementation of a screening program has resulted in reduc - reduction in smoking within that population or that cohort?

Dr. Tanner:
Right. Unfortunately, there's not a robust amount of data to show that lung cancer screening is really that teachable moment that folks had hoped for. And so I think the best data that we have thus far is from the NELSON trial, which is the European equivalent to the NLST, where they showed that knowing that there was a presence of a nodule on a low-dose CT scan really did prompt folks to stop smoking. But outside of that, I don't know that we've really shown that lung screening is a teachable moment. Now, that doesn't mean that we shouldn't try. The National Cancer Institute has huge trials that are going on right now, eight in fact, looking at the best way to incorporate lung cancer - I'm sorry, tobacco treatment with lung cancer screening. And so hopefully, we get some results from what - what they're calling the SCALE trial soon.

As it relates to the cost of lung cancer screening, we know that the cost per quality adjusted life year is around $80,000. The costs for quality adjusted life year, if you get one person just to quit smoking, is around $1,000. So we know that it's so important, and you really get your bang for your buck by encouraging folks to quit smoking.

Dr. Edell:
That's an outstanding metric for us to get out in public. Tremendous effect of simple well, nicotine addiction is not simple, but big, big bang for the buck, if you will. Great points.

let's change direction a little bit. Now we've talked about the screening and some of the challenges, but also some of the opportunities. Obviously, the best opportunity here is to detect the cancer early. So, once a nodule is identified, we have lots of different tools out there. But what's the best way to determine the likelihood of a malignancy?

Dr. Tanner:
Right. And so I think that's a great question. And when I think about pulmonary nodules, I'd like to separate them at least mentally in my mind between screen-detected nodules and incidentally-detected nodules. And an incidentally-detected nodule is one that is picked up when someone is scanned for another reason.

As it relates to screen-detected nodules I think we have a little bit of a buffer there in that structured reporting via Lung-RADS in most cases has been developed and really been helpful in helping us determine the interval of nodule follow-up. But with any pulmonary nodule, the first step is really to assess pretest probability of malignancy. Now that can be a physician who gut checks and says, 'yeah, the likelihood of this being cancer is X, so I'm going to do this.' Or we can use validated risk prediction calculators that have been shown to help us figure out what the pretest probability for cancer is. And the most, I think famous one or one that's known the best is the Mayo Clinic model or the Swenson model that helps us determine what bucket to put a nodule in. Because certainly the conundrum is you have a nodule, and you certainly don't want to do something invasive for a nodule that turns out to be benign, but you don't want to delay diagnosis in something that turns out to be malignant. And so I think for those that are just learning about nodules, for any trainees that are tuning into this starting with risk prediction calculators that are available online is extremely helpful because it gets you in the habit of trying to calculate what the pretest probability is. And then you can look at your guidelines the CHEST guidelines, for example, Fleischner Society, etc. So those are what I think about for incidentally-detected nodules.

For screen-detected nodules, there's actually a risk prediction calculator that was developed and validated in a screened population. And the reason the developmental and validated cohorts are so important is because we have to look at the prevalence of malignancy in those populations. And while it's counterintuitive in lung cancer screening, the prevalence of malignancy is pretty low, around 2%, while in other populations, like the Mayo risk model was developed in a population with a prevalence of 25%. So that's going to really change the inputs.

Now in the screened population, as it relates to screen-detected pulmonary nodules, there's actually a specific risk prediction model that's been developed to assess the risk in that population. And this was done, it's actually called the Brock calculator.

And the reason I make the differentiation between all of these calculators is it's really important to keep in mind what population a calculator was developed and then validated in as it relates to prevalence of malignancy. So while it does sound a bit counterintuitive, the prevalence of malignancy in the screened population is actually around 2%, versus the incidentally detected population where it's around 25%. And so the Mayo risk model was developed in that population while the Brock model was developed in a screened population. So when I'm looking at doing pretest probability with a validated calculator, I tend to look at the Brock model for screen-detected nodules.

Dr. Edell:
Perfect, that helps a lot. And I think our listeners will appreciate the differentiation.

The last thing I'd like to get your opinion on, Dr. Tanner, is the use of biologic markers. You alluded to the fact that, you know, obviously, we want to pick up the malignant nodules early so we can intervene, but we also don't want to intervene, or we'd like to reduce the amount of interventions that we do for a benign nodule. Where do the biomarkers fit in currently in our identifying those patients that have benign nodules versus malignant?

Dr. Tanner:
I think this is one of the most exciting parts of the science nowadays as it relates to pulmonary nodule evaluation. And so biomarkers for lung cancer really span the spectrum. You can conceive where you might have a biomarker that a person has drawn before they even lay in the CT scanner, to predict or augment what someone's risk would be. And then there are nodules that help us determine whether an indeterminate nodule is cancer or not. And then there's certainly biomarkers that we're all aware of that help us determine what type of therapies to prescribe or give our patients that have lung cancer.

So as it relates to biomarkers for indeterminant, pulmonary nodules, there's a lovely paper that was published that goes through all of the types of studies that need to be done. You know, there's discovery, like what biomarkers they're going to use. Then there's validation. And then there's clinical utility. So there are a number of industry trials that are ongoing to do all of those.

And so I think the ones that have moved along the furthest are those that have shown clinical validation, and now are being used to look at clinical utility. And so clinical utility, really, I think, for me is the gold standard as to when I feel comfortable implementing a new biomarker into my clinical practice. And what that means is not only has the biomarker been discovered, it's been internally validated, externally validated, shown to be clinically validated, and then shown to be clinically useful. So that means that a biomarker has changed the way a doctor acts. It's become an actionable item. And so that shows that it's clinically useful if you, for example decrease the number of procedures done for nodules that are not cancer. So there are biomarkers that rule cancer in and biomarkers that rule cancer out. And there are a few that are available commercially, some of which have gone through clinical utility studies and others that are currently going through clinical utility studies. And so that's kind of the state of the art.

Dr. Edell:
Excellent. Excellent. So it is exciting maybe one day, we will be able to, with much more accuracy, determine once we detect these nodules, whether the risk of being benign versus malignant is much more accurate. That's fantastic.

Well, this has been, as usual, very educational for me personally, and I'm hopeful that our listeners too have gleaned some useful information as they manage patients who are at risk for lung cancer, through the development and management of their screening programs. And then, for those patients that a nodule is either detected through screening or incidentally found, we've added some valuable information on how they'll manage those patients.

I want to thank your participation again, Dr. Tanner, as I said, it's always a pleasure to get together and learn from you. And I hope we get to cross paths in the near future.

Dr. Tanner:
Thanks so much, and thanks for the great conversation.

Announcer:
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