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Cancer Vaccines: Are They the Wave of the Future?

BY CATLIN NALLEY

Cancer vaccines, while not a new idea, have gained momentum in recent years, leading to an increase in research efforts.

"Although evidence that our immune system can eliminate tumors was already observed in the 1890s, tumor immunology has been a minor research field because it was believed that our immune system cannot attack self-derived cancer cells," explained Takemasa Tsuji, PhD, Assistant Professor of Oncology at Roswell Park Cancer Institute, Buffalo, N.Y.

"Since the seminal discovery in 1991 that one of the human tumor antigens, called MAGE-A1, is recognized by white blood cells, many other immunogenic tumor antigens have been identified and cancer vaccines targeting such molecularly defined tumor antigens are being actively tested today."

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How to Improve Lung Cancer Screening for High-Risk People

BY PEGGY EASTMAN

Screening high-risk current and former smokers every year with low-dose CT (LDCT) has been shown to reduce lung cancer mortality by up to 20 percent. But such screening also raises concerns about inadvertent consequences such as false positives and downstream medical procedures and costs, according to invited speakers at a workshop sponsored by the National Cancer Policy Forum (NCPF) in Washington, D.C.

The NCPF panel of members is a component of the National Academies of Science, Engineering, and Medicine; the purpose of the workshop was to consider challenges in the implementation of LDCT and ways of improving such screening. A written summary report from the workshop is expected in several months; during the meeting, speakers shared their suggestions on effective ways of implementing LDCT screening.

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Stem Cell Transplantation for HIV-Associated Lymphoma

New research published in *Blood* (doi:10.1182/blood-2015-08-664706) challenges the generally held belief that individuals with HIV and aggressive lymphoma are not candidates for standard treatment.

According to researchers, people with HIV-associated lymphoma who receive autologous stem cell transplant have similar survival rates and are no more at risk of serious complications compared to those without HIV receiving this therapy.

People living with HIV—even those whose infection is well-controlled with modern combination antiretroviral therapy—remain at significant risk of cancer. The risk of non-Hodgkin lymphoma alone is up to 25-fold greater for people with HIV than for those without the infection, and malignancies have quickly become a leading cause of death as people with HIV live longer.

Autologous hematopoietic cell transplant (AHCT) has become the standard of care for treating relapsed and treatment-resistant Hodgkin and non-Hodgkin lymphoma; however, its use in HIV-infected patients is largely limited to centers with HIV-specific expertise.

Clinicians have historically been hesitant to treat HIV patients with stem cell transplant due to concerns their immune systems would not effectively recover after intensive chemotherapy or that the procedure would cause excessive toxicities or infections post-transplant. However, in this phase II clinical trial, designed to prospectively evaluate the safety and effectiveness of AHCT for patients with HIV-related lymphoma, researchers

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PERIODICALS

How to Improve Lung Cancer Screening for High-Risk People

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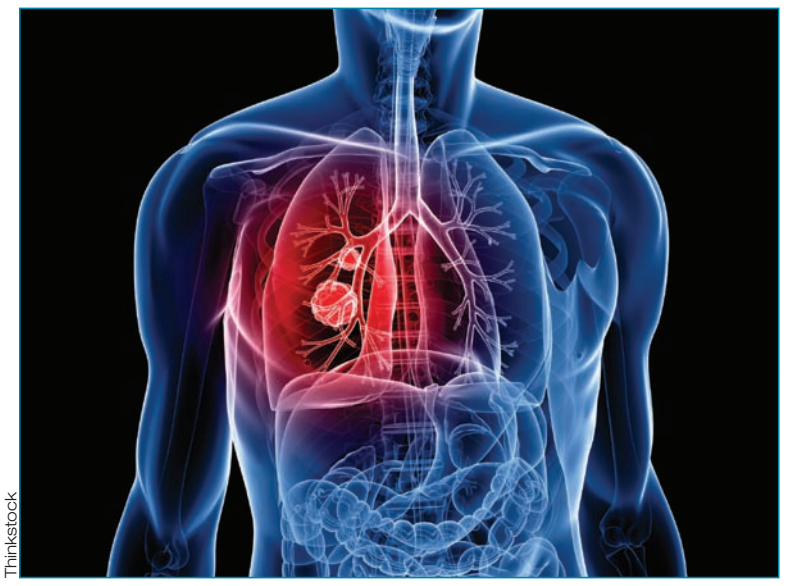
Importance of Screening

Undergirding the issue of lung cancer screening is the heavy toll lung cancer takes on Americans. It is the third most common cancer and the leading cause of cancer-related deaths in the U.S. The overall 5-year relative survival rate of lung cancer patients is less than 18 percent (less than 5% if there are distant metastases), in large part due to late diagnoses.

"Few are diagnosed at the localized stage," said Greta Massetti, PhD, Associate Director for Science in the Division of Cancer Prevention and Control at the CDC. She added that, while lung cancer disparities in black and white patients have been narrowing, they still persist—with blacks experiencing a poorer prognosis. So LDCT might help to reduce that health disparities gap.

Persuasive data from the National Lung Screening Trial (NLST) showed that annual screening of more than 53,000 high-risk people (current or former heavy smokers) with LDCT cut lung cancer deaths by 20 percent. NLST was funded by the National Cancer Institute (NCI). At the time, those results were announced in November 2010 by then NCI Director Harold Varmus, MD, and he emphasized the data should in no way be interpreted to mean that LDCT screening can prevent lung cancer or make smoking "safer."

On the basis of the NLST evidence, the U.S. Preventive Services Task Force in 2013 recommended annual LDCT screening for high-risk people meeting certain criteria. Candidates must be current smokers or those who quit within the past 15 years, and who are between the ages of 55 to 80, with a history of at least 30 pack years of cigarette smoking. Thirty pack years is defined as smoking an average of a pack of cigarettes a day for 30 years.



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Other studies, such as the Danish trial DANTE, also have found benefits to LDCT screening for lung cancer in high-risk people—specifically in detecting many more stage 1 lung cancers. However, a 3-year follow-up from DANTE suggests the effect of LDCT screening may be smaller than anticipated.

LDCT Screening Strategies

Speakers at the NCPF meeting suggested the following strategies to ensure LDCT screening is implemented to ensure best outcomes.

- The use of patient navigators to help educate screening candidates and achieve truly shared decision-making on whether to be screened or not.
- More physician education on the benefits and harms of LDCT screening.
- More physician education on the process of shared decision-making.
- The use of algorithms and computer-aided detection to reduce false positives in LDCT screening.
- The expansion of high-quality tobacco cessation programs available by referral to LDCT screening candidates who still smoke.
- Incorporating smoking cessation programs directly into the process of LDCT screening.
- Increasing efforts to provide community outreach and information on LDCT screening to hard-to-reach populations.
- Increasing radiological capacity for LDCT screening in underserved geographic areas, such as rural and mountainous parts of the country and the Great Plains.

Coverage Guidelines

Medicare covers yearly LDCT screening for beneficiaries ages 55-77 at high risk of lung cancer who meet the above criteria provided the screening is done in a radiographic facility that meets certain defined quality standards, said Joseph Chin, MD, MS, Deputy Director of the Coverage and Analysis Group in the Center for Clinical Standards and Quality at the Centers for Medicare and Medicaid Services (CMS). The screening must be ordered by a physician or other qualified health provider.

Chin said Medicare also covers a counseling visit between provider and patient to discuss the pros and cons of screening, and to arrive at shared decision-making on the screening. But he noted there is a discrepancy between the number of screening procedures and the number of visits regarding shared decision-making, with far fewer such counseling visits being billed than screening procedures. This discrepancy suggests not all high-risk people who undergo LDCT screening are adequately educated about its benefits and risks, noted speakers.

Currently, "there is a homogeneity of guidelines on lung cancer screening," said Peter Bach, MD, MAPP, Director of Memorial Sloan Kettering's Center for Health Policy and Outcomes and Chair of the CMS Technical Expert Panel. Groups recommending LDCT screening for high-risk individuals include the American Society of Clinical Oncology, American Cancer Society (ACS), National Comprehensive Cancer Network, and a number of specialty societies.

But, noted Bach, the study participants in NLST were not typical of the high-risk population at large, since they tended to be younger (only 9% were over age 69 at entry) and more educated. Nor was the care setting typical, he said, since most were screened in academic settings. Bach cautioned that, while the risk of lung cancer rises with age, so, too, does the risk of false positives.

"It's not like a flu vaccine, where it's absolutely recommended," he said. Bach also pointed out that, as life expectancy falls, the risk of surgical mortality rises—an important consideration should the lung cancer screening lead to further procedures. "Efforts are underway to create standards for follow-ups and biopsies," said Bach.

Screening Issues to Discuss

In addition to concerns about false positives and downstream consequences in asymptomatic high-risk individuals who undergo LDTC screening for lung cancer, speakers also raised the following issues.

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Learning Objectives for This Month's CME Activity: After participating in this CME activity, readers should be better able to identify the benefits of low-dose computed tomography (LDCT) screening for high-risk patients.

BREAST CANCER

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mutations were enrolled, 5/14 (36%, 90% CI: 15-61%) achieved clinical benefit, including one complete response, one partial response, and three stable disease for at least 6 months. The trial met its primary endpoint. The data provided proof of concept regarding *HER2* mutation as a therapeutic target in non-amplified breast cancer. Accrual is ongoing for neratinib plus fulvestrant in ER+, HER2 mutated, non-amplified MBC. (ClinicalTrials.gov: NCT01670877)

***LBA503:** Trastuzumab Biosimilar MYL-14010 demonstrated equivalency to trastuzumab for treating HER2+ MBC*
Heritage study is a phase III double blind study that compared MYL-14010 versus trastuzumab when combined with taxanes as first line treatment for HER2 positive MBC and demonstrated equivalency in efficacy, side effect profile, immunogenicity and population pharmacokinetics of the two agents. MYL-1401O has the potential to provide an affordable trastuzumab biosimilar for patients with HER2 positive breast cancer.

***Abstract 504:** Pertuzumab in HER2 positive breast cancer progressed on prior trastuzumab regimen*
PHEREXA trial is a phase III study evaluating the benefit of adding pertuzumab to trastuzumab plus capecitabine in HER2+ MBC progressed on previous trastuzumab regimens. The median PFS was 9.0 months in the trastuzumab/capecitabine arm vs 11.1 months in the trastuzumab/capecitabine/pertuzumab arm, HR (95% CI) 0.82 (0.65-1.02), p=0.07, without statistically significant difference between the two arms. At this time, there is insufficient data to recommend pertuzumab in later lines of treatment.

***Abstract 1011:** Glutaminase as a novel therapeutic target for TNBC*
Cancer cells have altered glucose metabolism and dependency on glutamine cell growth and survival. TNBC has increased expression of glutaminase which converts glutamine to glutamate and sensitivity to glutaminase inhibition in preclinical studies. A phase I study of CB-839, an oral small molecule inhibitor of glutaminase in combination with paclitaxel in TNBC was presented and demonstrated promising activity. Partial response was observed in three of 15 patients (20%), two of whom were heavily pretreated and with prior disease progression on paclitaxel in the metastatic setting. Additional clinical development is warranted.

***Abstract 1000:** Anthracycline remains an important component of adjuvant regimens for HER2- breast cancer*
The ABC adjuvant trials (B-49, B-46-I/USOR 07132) were conducted to determine if TC (docetaxel and cyclophosphamide) for 6 cycles is non-inferior to combination regimens of doxorubicin/cyclophosphamide with docetaxel or paclitaxel (TaxAC) in women with resected high-risk, HER2-negative breast cancer. The primary endpoint of the study was invasive disease free survival (iDFS). With 399 iDFS events, 4 year iDFS is 88.2 percent for TC versus 90.7 percent for TaxAC. HR=1.23, 95 percent CI (1.01-1.5), p=0.04. TC was inferior to TaxAC. Longer follow-up should clarify the clinical utility of these initial findings. OT

LUNG CANCER SCREENING

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- While LDCT radiation is a fairly low dose, "it is still a concern," especially over time with repeated screenings, said Barnett Kramer, MD, MPH, Director of the Division of Cancer Prevention at NCI and a member of the NCPF workshop planning committee. Radiating the chest means radiating the breast, he noted. Otis Brawley, MD, Chief Medical Officer and Executive Vice President of the ACS and a member of the NCPF, agreed. He cautioned that screening "is not a slam dunk," and said radiation-induced harm to the lung and breast is "information that very few people appreciate."
- Although shared decision-making is the goal, cancer screening discussions often fail to adequately inform and engage patients, said Richard M. Hoffman, MD, MPH, Professor of Internal Medicine and Epidemiology and Director of the Division of General Internal Medicine at the University of Iowa's Carver College of Medicine, Iowa City. Hoffman said "there are a lot of misconceptions about smoking," with some people believing that screening can be protective against lung cancer. Furthermore, he said, some people may not want to undergo lung cancer surgery if the screening detects cancer and surgery is recommended.
- Whether high-quality smoking cessation programs are adequately linked to lung cancer screening programs, since stopping smoking should be the goal of every high-risk screening candidate who still smokes. Screening alone does not seem to change smoking behavior.
- Whether there is adequate insurance coverage for LDCT, especially for younger patients who are not Medicare eligible. Will they incur out-of-pocket costs if they have the screening?
- Whether there is adequate insurance coverage for follow-up tests and procedures, should the screening show an abnormal finding.
- What to do about incidental abnormal findings that might not ever cause harm during the person's lifetime. "Just because we find something doesn't mean we need to do something about it," said Douglas E. Wood, MD, Professor and Interim Chair of the Department of Surgery and Chief of the Division of Cardiothoracic Surgery at the University of Washington. Specifically, he said, some lung nodules can be managed with careful surveillance, and do not need to be immediately removed.

Developing LDCT Centers

Brawley told *Oncology Times* he also is concerned about the potential commercialization of LDCT centers and about hospitals that decide to offer and advertise such screening as a business decision because of the revenue it will generate—not just from the screening itself but also from downstream testing and procedures. In that case, he warned, the shared decision-making visits between provider and screening candidate may be merely perfunctory, not a substantive effort to inform and educate the person and to determine his/her individual values, wishes, and preferences.

When it comes to starting an LDCT screening program, "the costs should be justified in the business plan," said Christopher S. Lathan, MD, MS, MPH, a medical oncologist in the Lowe Center for Thoracic Oncology at Dana Farber Cancer Institute, founding faculty Director of the Cancer Care Equity Program at Dana-Farber, Assistant Professor of Medicine at Harvard Medical School and a member of the workshop planning committee.

He told *Oncology Times* he is not overly worried about the overbuilding of LDCT centers because right now "the uptake is quite low." He added, "It's expensive to start such a screening program." Lathan stressed the benefits of LDCT: "I see patients with metastatic lung cancer. If we can prevent that, we should do it."

While it is important to implement LDCT screening judiciously now, there may come a time fairly soon when it becomes outdated by new technology, cautioned Fabrice Smieliauskas, PhD, Assistant Professor in the Department of Public Health Sciences and Co-Chair of the Cancer Policy and Outcomes Workgroup in the Comprehensive Cancer Center at the University of Chicago. New blood-based DNA lung cancer screening tests may be imminent, he said, which would reduce the capacity need for LDCT centers. OT

Peggy Eastman is a contributing writer.