Bonnie Addario, a lung cancer survivor and founder of the Bonnie J. Addario Lung Cancer Foundation in San Carlos, says the test is "fabulous news" that will lead to targeted treatments

Gene test may aid early-stage lung cancer patients

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In a finding that could improve the survival odds for early-stage lung cancer patients, UCSF researchers have determined a new molecular test can predict more accurately than current diagnostic methods which tumors are more likely to be aggressive and turn deadly.

The study results, published Thursday in the medical journal The Lancet, come from the two largest clinical trials ever conducted on the molecular genetics of lung cancer and included early-stage patients from Northern California Kaiser hospitals as well as from China.

In both trial groups, a 14-gene test, which was based on developments originally made at UCSF but created by a Mountain View company, was able to accurately determine a patient's odds of death within five years of surgery by analyzing the biological makeup of the tumor.

This potentially could save lives by helping patients with early-stage but "bad" disease decide after surgery to remove tumors whether to undergo additional treatment such as chemotherapy or targeted radiation, the researchers said.

Dr. David Jablons, chief of UCSF's thoracic oncology program and an author of the study, called the results a breakthrough for earlier-stage patients who have tough treatment decisions to make.

"It can help enhance the chance of curing more patients, and this is not an insignificant problem," he said. "This is 50,000 patients in the U.S. alone or more a year and hundreds of thousands of patients a year worldwide."

Most deadly cancer

Lung cancer is the most common cause of cancer death in the United States as well as the world. More people die each year from lung cancer - some 160,000 people in this country alone - than from breast, colon and prostate cancers combined.

One reason it's so deadly is that lung cancer is caught in the early stages in only about 30 percent of those who are diagnosed. Also, unlike other types of cancer where early diagnosis can increase survival upward of 90 percent, as many as 45 percent of people with the earliest stage of lung cancer die within five years, despite seemingly successful surgery.

"The fact of the matter is people do not do well in general, even with early-stage lung cancer," said Jablons. He said current methods of detecting and staging the disease - using scans, surgery and clinical observation - are insufficient to determine the aggressive nature of the disease.

The molecular assay, developed by Mountain View's Pinpoint Genomics, analyzes the activity level of the 14 genes in preserved tissue samples as compared to levels in the normal lung. It then characterizes whether that tumor poses a high, intermediate or low risk of death for the patient.

This study - which was based on tissue samples from 433 Northern California Kaiser patients and 1,006 patients from China - and found that the test very accurately predicted the likelihood of death in both groups.

"There really hasn't been a tool to more clearly identify the patients who have the more difficult biology," said David Berryman, Pinpoint's chief executive officer.

"The key to it is to really hone in on a specific set of genes that would be a prognosticator of progression or more aggressive disease."

Ready for market

Berryman said that the test, which received the proper approvals last year, is commercially available but that the company has been waiting for these results before moving forward with it. He said he hopes Medicare and health insurers will cover the test as those payers have with other gene-based tests.

Health experts say the test is most similar to the diagnostic test Oncotype DX, which can identify high-risk breast cancer patients who will benefit most from chemotherapy.

But what the research involving the Pinpoint test doesn't yet show is whether additional therapy following surgery for lung-cancer patients actually improves survival rates for those patients.

"Knowing this result will have benefit (to the patient) is the real question of course," said Stephen Van Den Eeden, research scientist at the Kaiser Permanente's Division of Research in Oakland.

Additional research is also needed to identify which chemotherapies would be most beneficial, although genetic testing to identify certain mutations that respond to specific lung cancer therapies is already available.

While the studies were funded by Pinpoint and private endowments to UCSF, researchers stressed that they were conducted under strict guidelines and using blinded conditions to prevent bias.

Tip of the iceberg

Bonnie Addario, a lung cancer survivor and founder of the Bonnie J. Addario Lung Cancer Foundation in San Carlos, called the research "fabulous news" that she expects will lead to better, more targeted therapies for patients in the advent of personalized medicine.

"Just a few short years ago, deciding what chemotherapy to give a patient was like throwing spaghetti at the wall," Addario said. "Now we have a much better idea which regimens to put patients on. We're at the tip of the iceberg, but it's moving fast and very exciting."

Lung cancer statistics

Cases: An estimated 226,160 new cases of lung cancer will be diagnosed this year in the United States and about 160,340 people will die of the disease. About a third of those are diagnosed in the early stages.

Future: Nearly 7 percent of people born today will be diagnosed with lung cancer during their lifetime.

Deaths: Lung cancer claims an estimated 1.4 million lives worldwide every year.

Cost: $10.3 billion is spent in the United States each year on lung cancer treatment.

Research: The National Cancer Institute, the nation's principal agency for cancer research, invested $281.9 million in lung cancer research in 2010. That same year, it invested $300.5 million in prostate cancer and $631.2 million in breast cancer research.

Sources: National Cancer Institute; World Health Organization
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