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Study: Screening new colon cancer patients for Lynch syndrome cost-effective

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Screening every new colon cancer patient for a particular familial disorder extends lives at a reasonable cost, say Stanford University School of Medicine researchers. The team hopes the results will encourage more medical centers to adopt widespread screening policies.

Approximately 3 to 5 percent of colorectal tumors are caused by a heritable condition called Lynch syndrome, which greatly increases the odds of colon and other cancers in a person's lifetime. Siblings and children of someone with Lynch syndrome each have a 50 percent chance of carrying the mutation, so the first diagnosis in a family reveals the risk for many relatives. But the discovery can save lives.

"This is a situation where, if you find out genetic information, you can improve your outcome," said Uri Ladabaum, MD, associate professor of gastroenterology and hepatology, and lead author of the study. Lynch syndrome patients can take defensive steps (such as yearly colonoscopies) that can either prevent cancer or alert them to get cancer treatment early, when it has the best chance of working. Stanford and several other U.S. medical centers now test all colon tumors to identify families with the genetic disorder, but in an era of shrinking wallets and booming health-care costs, some may wonder whether these policies are worth it.

"We were interested in whether it would be cost-effective to test a lot of colon tumors to find the few that are due to Lynch syndrome and, if so, what would be the most cost-effective strategy," said Ladabaum. He and his colleagues used computer simulations to compare the years of lives

gained and the money spent if all new cases of colorectal cancer were tested for Lynch syndrome. They found that such screening programs can reduce cancer deaths at a price within the typical range of U.S. health-care costs. The study will be published in the July 19 issue of Annals of Internal Medicine.

Prior to the availability of genetic testing, Lynch syndrome was identified by sharp-eyed genetic counselors and physicians who noticed the high frequency of cancers in certain families. But this method isn't foolproof, especially if a patient doesn't know his or her family history. "We think there are other families out there that have a predisposition for cancers," said co-author James Ford, MD, associate professor of oncology, of genetics and of pediatrics. "The initial small investment of doing the screen is ultimately going to pay off in terms of costs to society as well as in saving lives."

An average person's lifetime risk of developing colon cancer is around 5 percent. For a person with Lynch syndrome, that risk grows to 70 percent or more. Lynch syndrome also raises the risk of other cancers, including uterine and ovarian cancer. Female patients with the disorder who get regular tumor checks and who choose to have preventative hysterectomies would benefit most from widespread screening of colon tumors, according to the study.

Lynch syndrome is caused by mutations in a set of genes that normally run quality control on the DNA of cells. The loss of a molecular DNA inspector predisposes Lynch syndrome patients to tumor growth. Pathologists can look for unusual patterns in the DNA of tumor cells that hint at the diminished quality control or they can take a more direct look to see which, if any, inspector is missing. Each method has its own level of accuracy as well as its own cost. Once a pathologist identifies a tumor that might be caused by the disorder, more tests are needed to confirm the suspicion and to determine the particular mutation being carried in

the patient.

The researchers used existing health statistics to simulate colon cancer patients of varying ages and family sizes. They incorporated known rates of Lynch syndrome and the associated odds of developing future colon, uterine and ovarian cancers. They then tested different scenarios of tumor screening and patient decisions, including whether patients alerted their family members and if those family members also got tested. The team then examined whether the costs fell within or below $50,000 to $100,000 per year of life gained, a typical range for the modern U.S. health-care system.

The most cost-effective method involved checking whether tumors were missing any molecular quality inspectors, followed by DNA sequencing of the suspected gene. But no matter which testing methods were used, it was most important to test multiple family members after the initial diagnosis. Pathologists use several tests to identify the specific mutation in the first family member, but that only needs to be done once. Subsequent diagnoses in relatives are much simpler. The researchers found that three or four family members needed to be tested and then follow recommended preventive measures for the process to have a reasonable price tag. "All these interventions are more likely to be cost-effective if you can spread the benefit across more relatives," said Ladabaum.

Family involvement can vary greatly among patients, in part because families differ in size and because patients have a wide range of responses to learning about the genetic disorder. "Families are complicated," said Nicolette Chun, a genetics counselor at Stanford who was not involved with the study. "Some patients spread the news far and wide to several family members. Others don't cope with the information well and aren't proactive."

The study suggests that more medical centers could adopt tumor-screening policies like Stanford's. "A systematic approach to identify families with Lynch syndrome makes sense clinically, because it can save lives, and economically, because its costs are comparable to other things we choose to spend our health-care dollars on," said Ladabaum. "We advocate establishing similar tumor-screening systems on a national level."

Provided by Stanford University

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