DPD Blood Test Predicts Odds of Severe Chemo Side Effects

For people with cancer being treated with chemo drugs in the class fluoropyrimidines, DPD testing can be lifesaving.

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Soon to be offered through insurance to all people with cancer in England, a genetic test aims to reduce the serious side effects associated with some types of chemotherapy treatment. The test identifies individuals who have an enzyme deficiency that drastically increases their risk of experiencing serious—and, in some cases, life-threatening—conditions.

By measuring blood levels of the substrate uracil, a compound found in a class of chemotherapy drugs known as fluoropyrimidines, dihydropyrimidine dehydrogenase (DPD) testing can detect the presence of any of more than 50 mutations in the gene DPYD, which regulates the body's metabolism of fluoropyrimidines. Common fluoropyrimidines include carmofur, capecitabine, fluorouracil and doxifluridine, which are used to treat cancers of the colon, anus, breast and stomach, among others.

Most people with the typical, or wild-type, form of DPYD can metabolize the uracil in fluoropyrimidines relatively easily, but people with a mutated form of DPYD have an impaired ability—or even an inability—to do so, which can result in severe nausea, vomiting, breathlessness and peeling or blistering of the skin.

Recognizing the value of DPD testing, England's National Health Service (NHS) will be making the test available nationwide, according to The Guardian. The NHS notes that of the 38,000 people with cancer who begin treatment with fluoropyrimidines in England annually, 10% to 40% will experience severe side effects, and 1% will die as a direct result.

One early beneficiary of DPD testing is John McGuire, a 71-year-old man undergoing chemotherapy treatment for colorectal cancer at Guy's Hospital in London. McGuire informed The Guardian that his fluoropyrimidine dosage was reduced after his DPD test came back positive, indicating that he was at high risk for serious side effects.

"I'm delighted with the treatment I have received from the team at Guy's Hospital and have had little to no side effects from my treatment," McGuire said. "I think I am going to be really happy with the outcome."

In March 2020, the European Society for Clinical Oncology updated its guidelines to recommend that all cancer patients to be treated by injection or infusion with fluoropyrimidines first receive DPD testing. In the United States, however, oncology societies have not called for universal pretesting. Individual oncologists can still order the test, but it is considered investigational, so it may not be covered by insurance.

The move by the NHS represents another step in the mainstreaming of precision medicine, which tailors treatments to the individual. “As our understanding of the role our DNA plays in disease grows, we will be able to use this approach to help develop personalized treatments for other conditions and embed genomics into routine care,” Dame Sue Hill, PhD, the chief scientific officer for England and the senior responsible officer for genomics at NHS England, told The Guardian.

To read about how cancer treatment can negatively affect your ability to enjoy your day-to-day activities, read “Cancer and Quality of Life: Side Effects.” To learn how to manage specific chemotherapy side effects, see “How to Manage Side Effects of Cancer Treatment Through Nutrition.”
