

Researchers find safer way to use common but potentially dangerous medication

February 29 2012

A team of global scientists, led by researchers at Intermountain Medical Center in Salt Lake City, has developed a safer and more accurate way to administer warfarin, one of the most commonly prescribed but also potentially dangerous medications in the United States.

As part of a worldwide study, the research team developed and tested a new formula that combines individual [genetic data](#) with a [mathematical model](#) to help physicians more accurately predict patient response to the popular blood-thinning drug.

Researchers found that the formula was safer and more accurate than current methods used to dose for warfarin patients. They're hopeful that the more accurate dosing will eliminate many emergency hospitalizations among warfarin users. Results of the team's study are published in the February edition of the journal, *Thrombosis and Haemostasis*.

Every year, more than two million Americans begin taking warfarin after joint [replacement surgery](#) or who have [heart rhythm disorders](#), [stroke risk](#), [deep vein thrombosis](#), or other common conditions. Because patient response to the drug is so variable, it's difficult for physicians to determine safe, yet effective dosages for each individual.

The consequences can be serious: If patients get too much warfarin, they can develop uncontrolled bleeding; too little and they can suffer a stroke or a blood clot in another location.

"Physicians usually test a patient's blood once or twice in the first week after starting warfarin to see if it's clotting properly," said Benjamin Horne, PhD, director of [genetic epidemiology](#) at the Intermountain [Medical Center](#) Heart Institute and lead author of the study. "But we've shown that because of [genetic variation](#), patient response to warfarin continues to change after the first week and dosing may need to change, too."

The research group, comprised of physicians and scientists at 13 centers in the United States, Europe, and Asia, tracked 1,342 patients on days six through 11 after beginning treatment with warfarin. The team considered factors such as individual body mass index, medication usage, age, gender, and whether or not the patients carried two genes that are known to influence the way warfarin affects the body.

From those data, Dr. Horne and his colleagues were able to create a mathematical model to predict individual patient response to warfarin. The group applied their new algorithm to 342 different patients to validate that it could accurately predict patient response to the drug and help determine more appropriate dosages.

"We discovered that the algorithm is significantly more precise and accurate in identifying the best dose for an individual patient," said Dr. Horne.

He said the body's response to warfarin stabilizes after the second week of treatment, and that the algorithm can determine the safest dose possible for the full course of warfarin treatment. Researchers believe future studies will demonstrate the financial, as well as clinical, benefits of conducting genetic tests needed to perfect the dosing for individual patients.

"This is a very hopeful first step in that direction," said Dr. Horne. "I

expect we'll see more studies in the future that show the real effect this tool will have on the lives of patients."

The algorithm is the latest research on genetics and warfarin dosing at Intermountain Medical Center. An earlier project, led by Intermountain Heart Institute cardiologist Jeffrey L. Anderson, MD, examined the effectiveness of genetic testing on warfarin use.

Both group's findings are being used to build a computer tool that works within Intermountain Healthcare's electronic medical record system and that will perform warfarin calculations automatically, thereby increasing patient safety.

"This promises to be a powerful tool to tailor [warfarin](#) dosing to each individual patient," said Scott C. Woller, MD, an internal medicine specialist at Intermountain Medical Center who is helping to create the computer system. "The goal of this effort is to make patient-specific dosing algorithms as accessible as possible to busy clinicians."

Provided by Intermountain Medical Center

Citation: Researchers find safer way to use common but potentially dangerous medication (2012, February 29) retrieved 23 April 2024 from <https://medicalxpress.com/news/2012-02-safer-common-potentially-dangerous-medication.html>

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