Platelet transfusions increase odds of death in some rare blood cell disorders

January 14 2015

People hospitalized with certain rare blood cell disorders frequently receive a treatment that is associated with a two- to fivefold increase in death, according to a new study that reviewed hospital records nationwide. The study authors recommend that for these rare disorders, doctors should administer the treatment, a platelet transfusion, only in exceptional circumstances.

The Johns Hopkins-led study, published Jan. 14, 2015 in *Blood*, the journal of the American Society of Hematology, is the first nationwide review of nearly 100,000 combined hospital admissions for three rare blood cell disorders: thrombotic thrombocytopenic purpura (TTP), heparin-induced thrombocytopenia (HIT) and immune thrombocytopenic purpura (ITP).

"Because these conditions are so rare, they're difficult to study," says Aaron Tobian, M.D., Ph.D., an associate professor of pathology at the Johns Hopkins University School of Medicine and an expert in transfusion medicine. "There was some suggestion that transfusion may be harmful in these conditions, but it really was not known until now. Our study is the first one to show that platelet transfusions are frequently administered to patients with ITP, HIT and TTP, and that they're associated with higher odds of arterial blood clots and mortality in TTP and HIT."

All three conditions are immune system disorders marked by low levels of the colorless blood cells called platelets that help seal up damaged

blood vessels. TTP is a life-threatening condition in which clots form in small blood vessels, resulting in a low overall platelet count. It occurs in less than one out of every 100,000 people per year. ITP is a less serious tendency to bleeding, seen in about one in every 20,000 children and one in every 50,000 adults, which often clears up on its own. HIT is a life-threatening reaction to the drug heparin, given to patients to prevent the formation of blood clots. For unknown reasons, in about 1 to 5 percent of patients given heparin, the immune system responds by producing clots rather than suppressing them.

Because the disorders are rare, hematologists have little to go on when deciding how to treat them. When a panel of experts convened by the AABB—formerly known as the American Association of Blood Banks—issued guidelines for platelet transfusions in November 2014, it made no recommendation on treatments for ITP, TTP and HIT.

To fill the data gap, Tobian, who served on that expert panel, and several Johns Hopkins colleagues turned to the Nationwide Inpatient Sample, a federal database that contains billing records for about 20 percent of all patients treated and discharged at about 1,000 U.S. community hospitals in 47 states. The database, which does not reveal patients' identities, contains information on about 8 million inpatient hospitalizations per year nationwide. The Johns Hopkins-led study covered the years 2007 to 2011.

"The Nationwide Inpatient Sample is an incredible resource, especially for studying uncommon diseases," says Ruchika Goel, M.D., M.P.H., a clinical fellow in pediatric hematology oncology at The Johns Hopkins Hospital and the study's lead author.

"Our analysis found no significantly increased risks from platelet transfusions in ITP," Goel says. "But in TTP, a platelet transfusion increased the odds of a potentially lethal arterial blood clot more than

fivefold and doubled the odds of a heart attack." In HIT, platelet transfusions increased the risk of bleeding fivefold and the risk of an arterial clot more than threefold.

In TTP, the odds of dying in the hospital doubled when the patient was given a platelet transfusion. In HIT, the odds of dying were five times greater with a platelet transfusion.

The researchers were surprised to find that one in 10 TTP patients and one in 13 HIT patients got platelet transfusions, in spite of some practitioners' concerns about the risks. In some cases, Tobian says, doctors may not know the patient has a platelet disorder until they see the potentially deadly reaction to the transfusion. "In other cases, it may be used as the treatment of last resort in the very sickest patients," he says.

Tobian and colleagues believe that for patients with HIT and TTP, platelet transfusions should be reserved "only for severe, life-threatening bleeding refractory to other therapies or major surgery." For HIT patients, the first step is to stop administering heparin, and TTP patients should be transferred to a hospital that can administer plasma exchange therapy, he says.

Provided by Johns Hopkins University School of Medicine