

Researchers find topical TXA in total joint replacement lowers blood transfusion use

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Orthopedic surgeons from The Miriam Hospital have conducted a cost-benefit analysis of topical tranexamic acid (TXA) in primary total hip and knee arthroplasty patients that revealed a 12 percent transfusion rate reduction - from 17.5 percent to 5.5 percent - with no significant difference in complication rates. In addition to reducing the risk for postoperative bleeding and transfusion following total joint replacement, use of topical TXA enabled approximately 9.3 percent more patients to be discharged to home rather than to a skilled nursing facility. The study and its findings have been published in print in *The Journal of Arthroplasty*.

"Historically, with hip or knee replacement, there was a 25 to 30 percent chance of a blood [transfusion](#)," says John Froehlich, M.D., program director of the Total Joint Center at The Miriam Hospital and a principal investigator on the study. "We realized that this high frequency of transfusions was associated with longer hospital stays and a higher risk of infections, which we are always working to avoid. Tranexamic acid has been around for 30 years, but because there was concern about the danger of administering it intravenously, we opted to inject it in the joints. We found it to be effective in reducing ongoing blood loss and the subsequent need for transfusion, and we have now standardized the practice."

The reduction of perioperative blood transfusions in total joint arthroplasty has been an ongoing goal in the effort to deliver more efficient and effective health care. According to several studies, blood

transfusions may add a 3 to 20 percent risk of postoperative infection. Perioperative transfusion adds both cost to the procedure and risk to the patient, including joint infection, allergic reaction and viral transmission, which led to The Miriam's analysis of topical TXA in primary hip and knee arthroplasty.

Tranexamic acid is a synthetic derivative of the amino acid lysine, and produces antifibrinolytic activity by competitively inhibiting lysine binding sites on plasminogen molecules. Through this process, TXA is able to help the body stabilize blood clot formation and thereby reduce bleeding at surgical sites. Most protocols of TXA in total joint arthroplasty have involved intravenous delivery of TXA. However, a theoretical concern for the possibility of causing new blood clots in veins may be why intravenous TXA implementation has been slow to progress. A growing number of studies have indicated that intraarticular, or topical, injection administration may provide advantages. These include potentially reduced costs with a single injection, surgeon control, and localization and concentration of the drug more precisely at the surgical site.

"As the evidence for topical TXA grew, our arthroplasty surgeons started adopting topical TXA for total joint arthroplasty," adds Froehlich, "and The Total Joint Center at The Miriam Hospital has seen a marked reduction in transfusion rates, saving \$83.73 per patient based on transfusion costs alone after accounting for the cost of TXA."

Conducted from March 2012 to March 2013, The Miriam's study of topical TXA included 591 consecutive patients undergoing primary hip or knee arthroplasty by five surgeons. Of those, 311 patients received topical TXA and 280 were control patients. On September 1, 2012, surgeons started administering topical TXA to all total joint patients intraoperatively. The months of August and September 2012 were excluded from the study to prevent overlap. The proportion of patients

was similar between the two cohorts for each surgeon, and bilateral total joints, revision joints, and fractures requiring arthroplasty were excluded from the study.

Results showed that with use of topical TXA in total joint arthroplasty, the use of blood transfusions fell dramatically by 12 percent, the cost of surgical care goes down, and patients tend to not stay hospitalized as long and go home instead of needing to stay in a rehabilitation facility.

"Topical TXA for total joint replacement allows us to do a better job of getting people home and better sooner," says Lee Rubin, M.D., an orthopedic surgeon with the Total Joint Center at The Miriam Hospital, also a principal investigator on the study. "It reduces transfusion rates, increases home disposition, and reduces cost in primary hip and knee arthroplasty. If we can reduce the infection rate after these surgeries, we will change people's lives in a very positive way, save millions of health care dollars a year nationally, and improve total joint replacement outcomes and quality of care."

Rubin concludes, "Perhaps most importantly, we have now developed a simple, standardized, and cost-effective protocol for the use of topical TXA during [total joint replacement](#) that can be immediately used by any surgeon around the world to improve patient care. By studying our own outcomes and publishing this study, we have helped to establish a new standard of care and position The Miriam Hospital's Total Joint Center as a national and international leader in the field."

Provided by Lifespan

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