Regional anesthesia for pediatric knee surgery reduces pain, speeds recovery

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Dr. Tarun Bhalla of Nationwide Children`s Hospital uses an ultrasound machine to locate and numb specific nerves during a recent knee surgery on a 15-year old patient. Credit: Nationwide Children's Hospital

A recent study of an ultrasound-guided regional anesthesia technique, called femoral nerve block, shows that it leads to less opioid use and allows the majority of patients to go home within hours of surgery. As many as 98 percent of all pediatric knee surgeries performed at Nationwide Children's Hospital were done in an outpatient setting, as a result of this method that reduces post-operative pain and speeds

recovery.

"Our goal with this technique is to reduce pain, which improves patient outcomes and patient satisfaction," said Tarun Bhalla, MD, director of Acute Pain and Regional Anesthesia at Nationwide Children's and a co-author of the study. "We also use fewer pain medicines intraoperatively as well as postoperatively, so we could really avoid a lot of the side effects that come along with them. We're localizing our numbing medicine to the area where the incision is being made to keep the coverage localized."

Anesthesiologists use ultrasound to guide a needle to the specific surgical site and deliver local anesthetic to numb only the nerves in that region. A femoral nerve block numbs the femoral nerve, which runs close to the femoral artery and conducts signals running along the front of the thigh, the inner leg and the foot. By numbing this nerve, all feeling to those regions is blocked. The anesthetic blocks pain for up to 12 hours in some cases, significantly reducing post-operative pain. Following surgery, patients have a catheter that runs to the surgical site. The catheter is connected to an exterior pump that delivers anesthetic to the area for up to three days after surgery, while the patient is at home.

The study also showed for patients who did require hospitalization spent fewer days inpatient as a result of ultrasound-guided regional anesthesia.

"With a significant reduction of inpatient stays, patients are going home within a couple hours after coming out of surgery and they have an easier recovery," Dr. Bhalla said. "I think the quality of recovery is much better because the patients are so much more comfortable at home and not surrounded by the sounds of hospital machines."

For the study, which was published in a recent issue of the *Journal of Pediatric Orthopedics*, researchers reviewed records of 376 patients age 7

to 18 years old who underwent arthroscopic knee surgery at Nationwide Children's between July 2008 and July 2011. Of these patients, 131 received a femoral nerve block in addition to general anesthesia, while 245 received general anesthesia alone. Patients who received the combined anesthesia reported less pain, required less pain medication after surgery and had shorter hospital stays when compared to patients who had general anesthesia alone. This includes 98 percent of ACL reconstructions, which are considered to be one of the most painful of all procedures evaluated in the study.

"It's a safe procedure that's markedly improved our ability to perform outpatient surgical services and in fact, it's become very rare for us to have any overnight stays for knee reconstruction," said Kevin E. Klingele, MD, chief of Orthopedics at Nationwide Children's and a co-author of the study.

While this study looked specifically at arthroscopic knee surgery, regional anesthesia is also becoming more widely used in orthopedic procedures in the shoulder, elbow and wrist and in other surgical procedures in the abdomen. Regional anesthesia is being used in cardiac and urological surgeries as well.

"Ultrasound-guided regional anesthesia is being used more regularly in pediatric patients, and more often in younger and younger patients," said Dr. Bhalla, also director of the Pediatric Regional Anesthesia fellowship at Nationwide Children's and a faculty member at The Ohio State University College of Medicine. "One of the most significant side effects of opioid use in infants is depressed respiratory function, which leads many infants to require intubation. Reducing the need for narcotics helps the infants come off ventilation more quickly."

Nationwide Children's is one of 13 medical centers nationwide participating in the Pediatric Regional Anesthesia Network, or PRAN, a

collaboration designed to support the collection of highly audited data on practice patterns and complications and to facilitate collaborative research in regional anesthetic techniques in infants and children. Participating institutions report the number of regional anesthesia procedures they do each month.

"Since 2010, we have significantly increased the number of blocks we are doing and now perform 150 and 200 a month," said Dr. Bhalla, who travels around the country and the world teaching other medical centers how to do these procedures in pediatric patients. "Of course, it's reduced cost to patients and families, reduced cost to insurance companies. So, it really is a whole benefit for the community and improves the experience for our patients."

Provided by Nationwide Children's Hospital