Surgery Can Improve Outcomes For Kids With Perforated Appendicitis

Pediatric surgeons can lower healthcare costs if they remove a young patient's perforated appendix sooner rather than later, according to new study results published in the April issue of the *Journal of the American College of Surgeons*. Acute appendicitis, which can precede a perforated appendix, disproportionately affects young people ages 10 to 19. However, the condition is more likely to progress to a perforation in children younger than age four, according to previous research findings.

It is estimated that approximately 77,000 children are hospitalized for appendicitis and similar conditions each year, and one-third of them will have a perforation before having an appendectomy. The study authors found that hospital charges for children who had a perforated appendix removed 24 hours after diagnosis were about $10,000 lower than charges for children who had the surgical procedure six to eight weeks later, after first being treated for abdominal infections and contamination from the perforated appendix. Further, hospital costs for the patients who were treated early were approximately $5,000 lower than those who underwent an appendectomy at a later time. One primary reason for the lower costs was that early appendectomy patients had better clinical outcomes and fewer adverse events.

Though both treatment approaches are common, "we hypothesized that the early surgical procedure would be better. In the trial, everyone is getting the same therapy - they're getting the appendix out. It's just a difference of when the operation happens," explained Martin L. Blakely, MD, FACS, study author and associate professor of surgery and pediatrics at Vanderbilt University School of Medicine. "Initially, we said that even if the clinical outcomes turned out to be the same, we need to know if costs are different."

Between October 2006 and August 2009, Dr. Blakely and fellow surgeons randomized 131 pediatric appendicitis patients at LeBonheur Children's Hospital into two groups: One group was assigned to receive an early operation after diagnosis of perforated appendicitis, while the other would undergo the procedure up to eight weeks after diagnosis. The five participating surgeons performed the appendectomy according to the patient's randomization group. Each participating child's resource usage and cost data, including labor costs, supplies, facility services and patient support services (i.e nutrition, social work, and family support) were then collected and analyzed. Analyses also included administrative and overhead costs, such as medical records management, information technology, admissions and billing procedures.

Patients who underwent the later appendectomy (interval appendectomy) received more medical interventions than those who had the early appendectomy. Later appendectomy patients stayed in the hospital two days longer, and 87 percent received a central venous catheter, compared with only 44 percent of patients who had the early operation. Of all patients who received catheters, 43 percent of later appendectomy patients were discharged with it, compared with only nine percent of early appendectomy patients.

Dr. Blakely said the biggest contributor to higher costs of delaying the operation was the increased likelihood of delayed appendectomy patients having an adverse event, such as an intra-abdominal abscess or an intestinal blockage. These adverse events, which led to emergency room visits and unplanned re-admissions, more than doubled hospital charges and costs. The authors found that 30 percent of the early appendectomy patients had an adverse event, compared with 55 percent of those who had the operation at a later time. These new study findings build on results from the same patient population that were published last year.

Early appendectomy also reduced patients' recovery time by nearly six days. Additionally, approximately 23 percent of the patients scheduled to have the appendectomy later ended up having the surgical procedure earlier than expected because their condition failed to improve adequately or failed to resolve. Dr. Blakely believes a larger, multi-hospital study is needed before surgeons and third-party payers should conclude that earlier is better than interval appendectomy. "That's where the surgeon comes in, to make the right choice," he explained.

"Surgeons decide based on their training or what they are used to doing. Maybe one surgeon came from a place where they only did interval [later] appendectomies, but another surgeon only did early appendectomies. So, the specific surgical plan of care patients get can, to some extent, depend on what day they show up," Dr. Blakely said. "Currently, we're being stimulated to compare the available surgical therapies with regard to outcomes and costs by various regulatory agencies. As we move toward practicing evidence-based medicine and surgery, it's our responsibility to our patients to study the available therapies so we can tell families which approach is more clinically sound and cost effective," he concluded.

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