

PERSPECTIVE

LESS IS MORE

Chronic Concern Over an Acute-Phase Reactant A Teachable Moment

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A 59-year-old man with a history of shoulder and knee pain presented to our clinic reporting 6 years of left osteoarthritic hip pain. His pain had been progressive, and at the time of presentation, he required the use of a cane for support. The results of radiologic studies showed a loss of joint space with thinning of the upper aspect of the left hip joint with bone-on-bone appearance and subchondral cyst formation. The femoral head articular contour showed flattening and severe atrophy on x-ray. He had no history of prior joint replacement or cardiovascular disease. He was referred to the orthopedic surgery clinic, where he was deemed an appropriate candidate and scheduled for total hip arthroplasty. The operation was subsequently canceled when preoperative screening laboratory test results revealed an elevated serum C-reactive protein (CRP) level of 11.6 mg/L (to convert to nanomoles per liter, multiply by 9.524). Despite the fact that the patient felt well and there was no evident disease process to explain this abnormality, repeated CRP studies were obtained subsequently, and all results were in excess of the specified presurgical criterion of less than 2.9 mg/L. Meanwhile, the patient has reluctantly begun taking hydrocodone/acetaminophen and etodolac for pain control. His surgery has not been rescheduled.

C-reactive protein is an acute-phase reactant that can be detected early in a disease process before other symptoms begin to appear. It is often used to monitor disease activity or detect an inflammatory process because of its rapid decline with resolution of inflammation.¹ An elevated serum CRP concentration is not specific and can be seen with trauma, infection, inflammation, tissue infarction, or malignant neoplasm.² Specific concerns regarding CRP levels preoperatively may stem in part from studies showing a correlation between increased preoperative CRP levels and postoperative complications among patients undergoing esophagectomy for squamous cell carcinoma and adenocarcinoma.³

However, this correlation was unrelated to infection and confounded by other variables.³ Studies regarding increased CRP levels in patients undergoing cardiac surgery have shown this elevation to be a risk factor for postoperative infection. Unfortunately, there are no data to suggest that use of this measurement in patient management has influenced the rate of infection or other surgical complications.⁴ Use of a CRP level criterion prior to elective orthopedic surgical procedures may be a result of concerns that this could indicate a chronic inflammatory state or subclinical infection that may compromise the outcome of prosthetic placement. However, in the absence of other systemic indicators or comorbidities, this concern is poorly founded.

Although CRP levels are sometimes measured as part of preoperative evaluation for elective surgery, this practice is not supported by existing evidence or guidelines. In a review of the preoperative testing literature for healthy patients undergoing noncardiac elective surgery between 2001 and 2011, Johansson et al⁵ found insufficient evidence to support CRP screening for these asymptomatic patients. National and international guidelines, such as those of the United Kingdom National Institute for Health and Care Excellence⁶ and the American Society of Anesthesiologists,⁷ do not recommend routine CRP screening in asymptomatic patients undergoing elective surgery.

Cancellation of this patient's procedure due to an isolated elevation in his CRP level is not only unjustified on the basis of current recommendations but a cause of harm. Our patient continues to experience pain and limited mobility associated with his impairment. He has begun a narcotic pain management regimen, which he had been previously avoiding. The focus of his medical care seems to have veered off course as a result of this unnecessary "routine" test—from improving his quality of life to following the graph of his CRP levels.

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1. Cole DS, Watts A, Scott-Coombes D, Avades T. Clinical utility of peri-operative C-reactive protein testing in general surgery. *Ann R Coll Surg Engl*. 2008;90(4):317-321.
2. Pepys MB, Hirschfield GM. C-reactive protein: a critical update. *J Clin Invest*. 2003;111(12):1805-1812.
3. Gockel I, Dirksen K, Messow CM, Junginger T. Significance of preoperative C-reactive protein as a

parameter of the perioperative course and long-term prognosis in squamous cell carcinoma and adenocarcinoma of the oesophagus. *World J Gastroenterol*. 2006;12(23):3746-3750.

4. Cappabianca G, Paparella D, Visicchio G, et al. Preoperative C-reactive protein predicts mid-term outcome after cardiac surgery. *Ann Thorac Surg*. 2006;82(6):2170-2178.
5. Johansson T, Fritsch G, Flamm M, et al. Effectiveness of non-cardiac preoperative testing in non-cardiac elective surgery: a systematic review. *Br J Anaesth*. 2013;110(6):926-939.

6. National Institute for Clinical Excellence. *Guidance on the Use of Preoperative Tests for Elective Surgery: NICE Clinical Guideline No. 3*. London, England: National Institute for Clinical Excellence; 2003.

7. American Society of Anesthesiologists Task Force on Pre-anesthesia Evaluation. Practice advisory for pre-anesthesia evaluation: a report by the American Society of Anesthesiologists Task Force on Preanesthesia Evaluation. *Anesthesiology*. 2002;96(2):485-496.