

Inflammatory marker levels in total knee arthroplasty

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Dear Editor,

Total knee arthroplasty (TKA) is a preferred procedure for joint replacement, yielding good results despite an early postoperative elevation of acute-phase response (APR) markers such as C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR).¹⁻⁷ These markers may increase due to local injury, inflammation, or periprosthetic joint infection (PJI), with elevated levels potentially persisting for up to three months.¹⁻⁷ Consequently, both the sensitivity and specificity of CRP and ESR in diagnosing early or late TKA infections have been the focus of research in various countries. We read with great interest the study by Sadiq KI and colleagues, recently published in this Journal, which compared ESR and CRP levels among 34 patients who underwent TKA from June 2022 to October 2023, without any evidence of inflammation, infection, uncontrolled chronic disease, or previously confirmed autoimmune disorders.⁵ Evaluations of typical time levels and physiological kinetics of CRP and ESR were conducted in the early postoperative period, lasting more than four weeks.⁵ The highest postoperative mean levels of CRP occurred in the first week, while the peak ESR levels were observed in the second week.⁵ In this context, it is pertinent to highlight the significance of the

forementioned article to enhance the global interest of healthcare professionals.

The pre- and postoperative levels of CRP, ESR, and fibrinogen were compared in 62 patients who developed PJIs after hip arthroplasty or TKA performed between 2016 and 2022.¹ On postoperative days one and three, CRP levels were lower than expected for TKA, while they were elevated on day six for hip arthroplasty; neither ESR nor fibrinogen levels showed a statistically significant correlation with early PJIs.¹ The authors noted that CRP levels in acute PJIs deviated from established literature patterns.¹ The sensitivity and specificity of CRP in TKA infections were evaluated in 19 patients before surgery; five of these patients were also assessed on the first, seventh, and 15th days after surgery (early postoperative), while the remaining 14 patients were evaluated at one, three, six, 12, 24, and 36 months (late chronic).² In the first month, there were 59 false positive cases (elevated CRP with negative cultures), corresponding to 80% sensitivity and 67.6% specificity.² The authors suggested employing different serum and synovial tests for diagnosing PJIs.² Among the 159 patients who underwent total hip or knee arthroplasty (KA), 12 experienced implant complications and various APR markers (albumin, pre-albumin, intensive care

infection score, nutritional risk index, and leukocyte counts) proved useful predictors.³ As preoperative albumin levels differed between groups with and without complications, the authors emphasized the importance of novel markers, particularly hypoalbuminemia, which may surpass elevated CRP levels in predicting implant complications in hip or KA.³ Brazilian research teams have also investigated APR markers in hospitalized patients.^{4,6} The frequency of hyponatremia in adult surgical patients with or without APR syndrome was assessed by measuring simultaneous plasma sodium and albumin levels in 168 adults in surgical wards, with trauma, infection, hypoalbuminemia, leukopenia, or leukocytosis.⁴ APR-positive patients (n = 113) exhibited lower hemoglobin and albumin levels than APR-negative patients, with hyponatremia predominating among APR-positive cases, likely attributable to low albumin levels associated with APR mechanisms.⁴ Furthermore, these authors noted that ESR may be influenced by serum levels of fibrinogen, immunoglobulins, and other APR proteins, as well as the degree of anemia.⁶ The normal ESR increases with age, following a linear pattern in women and a parabolic pattern in men.⁶ Korean researchers have focused on plasmatic and urinary cytokines as biomarkers for knee osteoarthritis (OA), examining their relationships with cartilage and synovial fluid markers in 40 patients who underwent TKA or unicompartmental KA due to severe knee OA.⁷ The control group included 15 non-OA individuals, and levels of 19 cytokines, MMP-1, MMP-3, COMP, CTX-II, and hyaluronan (HA) were evaluated using ELISA kits.⁷ The plasmatic levels of CCL11, CXCL16, IL-8, IL-15, and HA, as well as urinary levels of CCL2, CCL11, CCL19, CXCL16, IL-1 β , IL-6, IL-8, IL-12p70, IL-15, IL-33, MMP-3, HA, CTX-II, and COMP, were significantly elevated in patients with severe knee OA.⁷ The authors emphasized the abundance of inflammatory mediators in the plasma of knee OA patients, particularly plasmatic (CCL11, IL-15, CCL11) and urinary (CCL19) markers of inflammation.⁷

In conclusion, serum, synovial, and urinary tests are valuable tools for diagnosing PJI.

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