INTRODUCTION:
Osteoarthritis (OA) is one of the most common degenerative joint diseases that progressively results in loss of joint function and can result in substantial morbidity and disability in the elderly (1). Knee OA is the leading cause of severe pain and functional limitation. Total knee arthroplasty (TKA) is an effective procedure to relieve pain, restore knee function, and improve quality of life for patients with end stage knee arthritis. C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) are very useful routine laboratory screening tests for diagnosis of potential infection. Interleukin 6 (IL-6) is principally responsible for activating the hepatic synthesis of CRP, which has been considered the inflammatory biomarker of choice in orthopaedic surgery (2, 3). The purpose of this study was to investigate the serial changes of serum IL-6, CRP, ESR, skin temperature, and clinical status after uncomplicated TKA and determine the relationship of these parameters following TKA.

MATERIALS AND METHODS:
Ethical approval of this study was obtained from the Institutional Review Board on Human Research of the Faculty of Medicine, Chulalongkorn University and was conducted in compliance with the guidelines of the Declaration of Helsinki. Written informed consent was obtained from the patients and healthy volunteers prior to their participation in the study.
Forty-nine patients aged 50 to 78 years diagnosed with primary knee osteoarthritis (40 females and 9 males; mean age 67.8±1.1 years) were recruited in this prospective study. In each case a tourniquet and drain were used. Femoral, tibial and patellar components were NexGen (Zimmer, Warsaw, Indiana, USA) using polymethylmethacrylate cement Palacos R containing gentamycin (Heraeus Medical GmbH, Germany). All patients were mobilized on the first day after surgery.
CRP was performed using the latex particle enhanced nephelometric immune assay on the BN ProSpec analyzer (Dade Behring, Germany) and was expressed in milligrams per deciliter (mg/dl). ESR was determined using the Westergren method. The concentrations of IL-6 in serum were measured by commercially available human IL-6 ELISA MAX sets (Biolegend, San Diego, CA) according to the manufacturer’s instructions.
The skin temperature of both knees was evaluated postoperatively at 2, 6, 12, and 24 weeks during follow up review in the knee clinic. The temperature was evaluated using digital pocket surface thermometers at four different locations on the anterior aspect of the knee (superomedial, superolateral, inferomedial, and inferolateral border of the patella). The mean of the two reading was taken as the final temperature. Similar measurement was also employed on the contralateral knee, which was used as the control knee. Assessment taken at mid day was selected as the time for taking readings for the rest of the study.
Statistical analysis was performed using SPSS software. Comparisons between groups were employed using Student’s t-test and Mann-Whitney U-test. A p value < 0.05 was considered to indicate statistical significance.

RESULTS:
There were no complications within the study period or on further follow up. Patients who developed complication following knee replacement were excluded from the study. The values of serum IL-6, CRP, and ESR are shown in Figure 1. Serum IL-6 concentration elevated rapidly and peaked 24 hours postoperatively at maximum levels. In addition, the CRP level increased and reached maximum levels elevated rapidly and peaked 24 hours postoperatively at maximum significance. CRP, and ESR are shown in Figure 1. Serum IL-6 concentration within the first postoperative week in all patients. Both serum IL-6 and CRP correlate with a high degree of inflammatory activity with a more rapid increase and a faster return to normal values than ESR, suggesting that IL-6 and/or CRP measurements could be more favorable than ESR measurements in determining the presence of infection during early postoperative period. This study has also shown that the skin temperature of the operated knee is significantly raised following surgery and remains elevated at 24 weeks postoperatively. This temperature difference is presumably attributed to the postoperative inflammatory response in the operated knee. In conclusion, this study demonstrates the temporal patterns of serum IL-6, CRP, ESR, and knee skin temperature in osteoarthritis patients undergoing TKA. A sustained elevation in serum IL-6, CRP, ESR, and skin temperature must raise the concern of early complication in postoperative total knee replacement.

DISCUSSION:
Infection following TKA is a major concern for medical practitioners. Elevated CRP, ESR, and skin temperature can raise concern that infection may be present after surgery. The present study has revealed that there is a significant elevation in IL-6 and CRP. In comparison, ESR differs in the temporal pattern of postoperative level after TKA. ESR had slower temporal changes and less folder changes. Serum IL-6 and CRP correlate with a high degree of inflammatory activity with a more rapid increase and a faster return to normal values than ESR, suggesting that IL-6 and/or CRP measurements could be more favorable than ESR measurements in determining the presence of infection during early postoperative period. This study has also shown that the skin temperature of the operated knee is significantly raised following surgery and remains elevated at 24 weeks postoperatively. This temperature difference is presumably attributed to the postoperative inflammatory response in the operated knee. In conclusion, this study demonstrates the temporal patterns of serum IL-6, CRP, ESR, and knee skin temperature in osteoarthritis patients undergoing TKA. A sustained elevation in serum IL-6, CRP, ESR, and skin temperature must raise the concern of early complication in postoperative total knee replacement.

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REFERENCES: