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Acute changes in the systemic inflammatory response are associated with transient decreases in circulating 25-hydroxyvitamin D concentrations following elective knee arthroplasty.

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Introduction
There is increasing awareness that vitamin D is more than just a fat-soluble vitamin that regulates calcium metabolism. Vitamin D deficiency has recently been associated with numerous diseases including cancer and cardiovascular disease and has apparent anti-inflammatory and anti-proliferative properties.1,2 Vitamin D deficiency has also been associated with mortality in intensive care.3 There is, however, good evidence that plasma concentrations of other fat soluble vitamins fall following an inflammatory insult.4 In the current study we investigated whether plasma 25-hydroxyvitamin D (25-OHD) concentrations were altered during the evolution of the systemic inflammatory response in patients following elective knee arthroplasty.

Methods
34 patients who underwent elective knee arthroplasty and had no evidence of a systemic inflammatory response were recruited into the study. Venous blood samples were withdrawn before surgery and post-operatively at 6 and 12 hours and each morning for the next 5 days. Albumin and C-reactive protein were measured on an Adiva 1650 analyser (Bayer Corporation, Tarrytoen, NY USA). Measurement of plasma 25-OHD incorporated an automated solid-phase extraction (SPE) procedure followed by liquid chromatography-tandem mass spectrometry (LC-MS/MS).5 The lower limit of sensitivity was 4nmol/L. Within- and between-assay precision was below 10% over the concentration range of 22.5-120nmol/L. Comparisons of data from different time periods were carried out using a non-parametric ANOVA (Friedman test, SPSS software).

Results
The median 25-OHD concentration fell significantly within 6 hours and remained low for the following 5 days. The results are shown in table 1 and figure 1. Over the same time period there was a significant increase in the median plasma CRP concentrations (169 mg/l at 48hrs, p<0.001) and a significant fall in the median albumin concentrations (31 g/l at 48hrs, p< 0.001). CRP remained significantly elevated at 100mg/l on day 5.

Conclusions
The results of the present study indicate, that in apparently healthy subjects undergoing an acute inflammatory insult, plasma 25-OHD concentrations are reduced, by approximately 30%, during the evolution of the systemic inflammatory response. Plasma concentrations of 25-OHD are therefore unlikely to be a reliable indicator of vitamin D status in patients exhibiting a systemic inflammatory response.

References