SERUM C-REACTIVE PROTEIN LEVELS AFTER TOTAL HIP AND KNEE ARTHROPLASTY

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Any operation induces an elevation in the level of serum C-reactive protein (CRP). After hip and knee arthroplasty the maximal values are seen on the second and third postoperative days, after which the CRP decreases rapidly. There is no difference between patients with cemented or uncemented prostheses. Major postoperative complications may cause a further increase in CRP levels at one and two weeks.

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Tissue damage at operation induces an elevation of the level of serum C-reactive protein (CRP) during the following two or three days. If no complications occur it then decreases rapidly (Aalto et al 1984; Larsson, Thelander and Friberg 1992). If there are complications the behaviour of the CRP level is uncertain.

We examined the records of patients who had had replacement arthroplasty of the hip and knee between 1989 and 1994 to assess the pattern of change in the CRP level in the presence of complications and to establish whether cemented or uncemented prostheses produced any differences in the level.

PATIENTS AND METHODS

Between 1989 and 1994 we performed 422 primary total replacement arthroplasties of the hip and knee at the Lahti City Hospital. We excluded 28 patients with rheumatoid

arthritis and 21 with recent fractures. Of the remainder, 100 had some minor and major complications after operation. There were three patients with wound infections, 12 with systemic infections, nine with deep-vein thrombosis, 24 with prolonged wound exudates, 17 with haematomas and a further 35 with various medical problems. This left 273 'uncomplicated' patients. The mean age of the patients was 67 years (35 to 88).

The age, gender and weight of the patients, the blood loss during and after the operation, and the amount of blood transfused were recorded. The daily temperature of the patients was also noted. Prophylactic antibiotics were given to 85 patients before operation, to 95 for one to two days and to 93 for more than three days.

Before operation the CRP level was normal in all patients (<10 mg/l). Further measurements were usually made on the third and tenth days after operation. If an abnormally high CRP level was recorded, or if a complication was suspected, further measurements were made.

RESULTS

Of the 373 patients in the whole group there were slightly more complications after cemented prostheses (hip 27%, knee 29%) than after non-cemented implantation (22% and 24%, respectively).

The 75 percentile curve of the CRP level in patients with 'uncomplicated' arthroplasties showed little variation, but in those with cemented knee prostheses it was slightly higher (Fig. 1). The highest values were recorded on the second and third postoperative days.

The CRP curves were identical in different ages and genders. The use of antibiotics, the amount of bleeding during and after the operation and blood transfusions had no effect. In heavy patients the peak of the CRP level lasted one day longer than that in lighter individuals.

The 75 percentile CRP curve of the 'complicated' group was different (Fig. 2). The descending part of the curve was later and there were peaks at one and two weeks after the operation. There was a slight elevation of body temperature in the first few days after operation, but this was almost the same in each group.

There were no deep prosthetic infections in any of the patients.

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Fig. 1

The normal 75 percentile curve of the CRP level after hip and knee arthroplasties.

Fig. 2

The 75 percentile curve of the CRP in the normal and 'complicated' groups.

DISCUSSION

The levels of C-reactive protein rise after infection and tissue destruction. After major operations the level increases with a peak after two to three days followed by a rapid fall. The measurement of the CRP level has proved to be useful after replacement arthroplasty (Shih, Wu and Yang 1987; Sanzén and Carlsson 1989).

We have constructed curves for the 75 percentile which included 75% of the 'uncomplicated cases'. The CRP levels were similar to those reported in previous studies (Aalto et al 1984; Choudhry et al 1992; Larsson et al 1992), with a rapid fall to near normal after ten days. If the value remains

high or there is a new rise a serious complication should be suspected. Such rises were seen on days 7 to 8 and 13 to 14 and were caused by systemic infections and by thromboses. The presence of a major haematoma delayed the fall of the primary peak. Prolonged exudation with or without bacterial growth did not alter the curve. Similar findings were seen after revision arthroplasties.

A pronounced rise of the CRP level on the second and third postoperative days after a major orthopaedic operation is normal, but a further rise at one and two weeks suggests the presence of a serious complication (Yoon et al 1993).

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