LETTERS TO THE EDITOR

Interleukin-10 concentration in children undergoing cardiopulmonary bypass

To the Editor:

We read with interest the article by Seghaye and associates,¹ "Interleukin-10 Release Related to Cardiopulmonary Bypass in Infants Undergoing Cardiac Operations."

We also evaluated the interleukin-10 (IL-10) concentration in 13 children (age range 1.2 to 12.7 years, average 5.1 years) undergoing cardiac operations for congenital heart disease. Arterial blood samples were obtained before, immediately after, and 30 minutes after protamine administration and then 3 hours after and 18 hours after cardiopulmonary bypass (CPB). Serum was separated immediately by centrifugation and specimens were stored at -20°C until use. The serum concentration of IL-8 was measured by means of a commercially available enzyme-linked immunosorbent assay (Sumitomokinzoku Bioassay Laboratories, Kanagawa, Japan). In our study, IL-10 concentrations before CPB (247.4 ± 205.1 pg/ml) increased immediately after CPB (349.5 ± 252.7 pg/ml, $p < 0.01$), peaked 30 minutes after protamine administration (628.5 ± 258.0 pg/ml), then gradually decreased, and there was no second release of IL-10 (Fig. 1). The course of IL-10 in our study was similar to that of IL-8 in our study and in their study.

In our study, however, there were some differences from their study. First, patients in our study were older than those in their study, whereas duration of CPB and aortic crossclamping (86.6 ± 40.2 minutes and 49.2 ± 27.8 minutes, respectively) were similar to those of their study. Second, IL-10 concentrations before CPB in eight of 13 children were already higher than 200 pg/ml with no explanation. Third, in all patients, β -methasone (3 mg/kg) was used for priming.

We cannot explain why the course of IL-10 in our study was so different from the course in their study, and we would like to investigate further.

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REFERENCE

1. Seghaye MC, Duchateau J, Bruniaux J, Demontoux S, Bosson C, Serraf A, et al. Interleukin-10 release related to cardiopulmonary bypass in infants undergoing cardiac operations. *J Thorac Cardiovasc Surg* 1996;111:545-53.

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Fig. 1. Course of IL-10 before and after CPB in 13 children. Values are expressed by mean $\pm$ standard deviation. *Significant difference in IL-10 concentration compared with baseline values ($p < 0.05$). A, Before CPB; B, immediately after CPB; C, 30 minutes after protamine administration; D, 3 hours after CPB; E, 18 hours after CPB.

Reply to the Editor:

The report by Sugita and associates, in comparison with our observation, shows some differences with respect to the mean prebypass values of interleukin-10 (IL-10) and the course of this natural antiinflammatory cytokine during and after cardiopulmonary bypass (CPB).

Although the sensitivity of the assay that was used in the study by Sugita and associates for IL-10 determinations is not specified, it seems obvious that some of the patients had abnormally elevated IL-10 levels before CPB. In accordance with other reports in adults^{1,2} we find low prebypass IL-10 concentrations in our patients. The elevated prebypass IL-10 concentrations measured by Sugita's group raise the question of whether preoperative infectious or inflammatory disease was present in some of the patients of the series investigated. Furthermore, as tumor necrosis factor- α is thought to be the main inductor for IL-10 production,³ it would be interesting to know the preoperative levels of tumor necrosis factor- α in the patients with abnormally high IL-10 concentrations as well. The preoperative administration of drugs known to enhance IL-10 synthesis (e.g., chlorpromazine, corticosteroids)⁴ should also be taken into account for the interpretation of the results reported.

In our opinion, the different course of IL-10 observed by Sugita's group with a release showing its peak in the early postoperative period could be ascribed to the administration of corticosteroids in the priming solution. Indeed, by inhibiting the release of proinflammatory cytokines during CPB and by increasing IL-10 production,¹ corticosteroids might have limited both the magnitude and duration of the inflammatory reaction induced by CPB and might have advanced the peak concentration of IL-10 to an earlier time. Finally, as we showed in our