

Perioperative immunological function in patients undergoing primary malignant bone tumor resection.

BACKGROUND: We have previously reported that significant immunosuppression occurs after lung, breast and colorectal cancer surgery. The aim of this study was to evaluate the duration and degree of immunosuppression in patients undergoing major resective surgery of primary malignant bone tumor.

QUESTIONS

1. What is the trajectory of the proinflammatory cytokine IL-6 in the context of oncological orthopedic surgery?
2. What are the quantitative and qualitative changes that natural killer (NK) cells and IL-2 and IL-4 undergo after oncological orthopedic surgery?

PATIENTS AND METHODS: 17 patients with primary malignant bone tumor who underwent tumor resection surgery were included. All patients had general balanced anesthesia followed by intravenous opioid-based analgesia. Blood samples were collected prior to anesthetic induction, on postoperative day 1, 3 and 5 and on first the day of surgery follow up. The function of NK cells was assessed with a lactate dehydrogenase cytotoxic assays. The plasma concentrations of interleukins (IL)-2, IL-4 and IL-6 were measured by ELISA. Data was analyzed with Friedman test. A $p < 0.05$ was considered statistically significant.

RESULTS: The median age of the patients was 24 years. 13 men and 4 women were included in the study. The prevalent tumor was osteosarcoma (53%). 8 patients (47%) received neoadjuvant chemotherapy while only 2 (12%) neoadjuvant radiation. NK function showed a significant decreased after surgery and remained low at the first outpatient follow-up ($p < 0.01$). The total number of NK only showed a slight decrease compared to preoperative levels ($p < 0.05$). Postoperative plasma concentrations of IL-2 and IL-4 were similar to preoperative levels ($p = 0.7$ and $p = 0.23$, respectively) whereas plasma concentrations of IL-6 showed a significant sustained increase during the immediate post operatory period lasting through follow up visit ($p < 0.05$).

CONCLUSION: Patients undergoing primary bone tumor resection had a decrease in the innate immune function that lasted several days postoperatively concomitant to a stress response triggered by surgical insult. Our study is limited by the small number of patients. More research is warranted to understand this perioperative immunological phenomenon.