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Luncheon Panel 11.08

Evaluation of Host Resistance

Moderator L.D. MacLean, Montreal (Canada)
Panelists M. Betzler, Heidelberg (FR Germany)
J.P. Minton, Columbus, OH (USA)

Several factors predispose to sepsis and related mortality in medical and surgical patients and are clinically well-recognized to include underlying neoplastic disease, diabetes mellitus, old age, hypovolemia, anemia, steroid and other immunosuppressive therapy, indwelling urinary or intravenous catheters, indiscriminate use or over-confidence in the effectiveness of antibiotics, cancer chemotherapy, cirrhosis of the liver, tracheostomy and radiation therapy. Many patients without obvious risk factors also have sepsis and related mortality develop after surgical treatment or injury.

On the other hand, many patients with predisposing factors do perfectly well even when formidable operations with contamination have been performed. Three risk factors that predict sepsis and mortality in surgical patients are skin reactivity to delayed type antigens (hypersensitivity) DTH response, age of the patient, and serum albumin concentration (1). These factors can identify a population of surgical patients at increased risk for sepsis and mortality. The population of patients who are anergic, are more frequently malnourished than reactive patients but the DTH response cannot be used to determine the malnourished state in individual patients. The lack of a DTH reaction identifies an immune defect characterized by a failure of release of lymphokines in vivo. Lymphokines from normal individuals can restore the absent response in anergic patients to specific antigens. In experimental animals made anergic by heat injury, the mortality rate from bacterial peritonitis can be significantly lowered by lymphokines.

M. Betzler pointed out, 1) that there must be a correlation between immunocompetence and the prevalence of complications and 2) if this prerequisite is fulfilled, the predicted value of the test with regard to complications is then dependent on the relationship between the immunocompetence of the population under study and the complication rate. To elucidate these correlations, a study was performed at the Department of Surgery, Heidelberg, Germany, to evaluate 10 parameters with regard to their predicted value in instances of postoperative septic complications. During the 10-month period, 302 patients were included in the study, all of whom had been consecutively admitted to the Department of Surgery for elective operations. The patients made up a general surgical population of the following characteristics - 74 patients had benign noninflammatory diseases, 188 patients had cancer and 40 patients had inflammatory bowel disease. Of all the 302 patients, 60 % were hypoergic

or anergic.

Postoperative septic complications were seen in 14 % of the 302 patients operated upon. A comparison of 260 patients without and 42 patients with postoperative complications was made. There was no significant difference in hemoglobin, leukocyte count, serum albumin level, blood sedimentation rate, age or sex. Although there was a significant difference between groups with regard to total protein, the values of both groups were within normal range. In DTH testing a significant increase was found in the rate of complications with decreasing immune reactivity. Normergic patients had a 7.5 % rate of complication, hypoergic patients had a 16.7 % complication rate and anergic patients had a 26 % rate. There was also a significant increase in the postoperative complication rate with increasing length and severity of operation. In patients undergoing severe and longlasting operations, the increase in postoperative complications was significant with decreasing immune reactivity, 8.6 % of the normergic patients, 36.5 % of the hypoergic and 37.5 % of the anergic patients had postoperative complications (2).

The results were summarized as follows

1. The surgical population included a high percentage of cancer patients. Due to this fact, the immunocompetence of the population was low with 60 % of the patients being hypoergic or anergic.

2. Several parameters including hemoglobin, leukocyte count, serum albumin level, total protein, blood sedimentation rate, age or sex did not contribute to the prediction of postoperative complications. This reflects the good general condition of the patients in this population.

3. A clear cut correlation between immunocompetence and complication rate was determined.

4. The overall complication rate was low, but with increasing severity and duration of operation and with decreasing immunocompetence, the complication rate rose to 37 %.

Conclusions

In surgical populations with a high immunodeficiency rate and a low complication rate, the predicted value of a test to evaluate immunocompetence is low. The predicted value of a positive result was 37 % of patients undergoing severe and very long lasting operations. In comparison, the predicted value of a positive result has been reported to be between 15 - 65 % by other authors. If one adds to this as separate variables, age and serum albumin concentration, the sensitivity of the test can be markedly increased (4).

It was also concluded that immunocompetence testing alone is not as good as clinical judgment (3), but if one had a specific treatment to increase immuno-

competence of patients, all agreed that this would be extremely useful and skin testing would be very widely practiced. Many laboratories are working on this very problem to improve the resistance of patients known to be immunocompromized prior to elective surgery or after trauma.

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