Depression of cellular immunity as an index of malnutrition in surgical patients

Increasing attention has been paid to nutritional support of surgical patients. The main problem is to identify malnourished patients. Association between protein-energy malnutrition and reduction in cellular immunity has been reported in catabolic patients. Hence depression of cellular immunity has been suggested as one of the objective indices for selecting patients for nutritional treatment. We investigated whether energy restriction and weight loss or surgery alone would affect cellular immunity.

### Subjects, methods, and results

We studied five normal controls, 10 obese women, and 10 patients admitted for elective surgery. The protocol was approved by the Northwick Park Hospital ethical committee. The subjects were injected intradermally with 0.1 ml each of mumps skin test antigen USP, streptokinase-streptodornase (10 U and 2.5 U respectively) tuberculin purified protein derivative (10 U), and candida extract (0.33%). Isotonic saline (0.1 ml) was used as control. Response was assessed by measuring the induration at the site of injection by the ball-point technique.

The table gives the results obtained by testing and retesting three weeks later five normal and 10 obese subjects. In every case subjects who had a positive response (more than 5 mm induration) on first test were also positive on retest. There was no significant difference in the area of induration on retesting, and the response was not affected by energy restriction and mean weight loss of 6.3±1.6 kg in the obese patients.

To investigate the effect of surgery on cell-mediated immunity 10 surgical patients were tested the day before operation. The area of induration was read 24 hours after injection, immediately before operation, and again at 48 hours after injection, after the operation. Five normal controls were also tested and the reaction read at 24 and 48 hours. When a control subject gave a positive reaction at 24 hours but a negative reaction at 48 hours the reaction was still positive, usually with an increased area of induration, at 48 hours.

### Comment

Dramatic pain relief of rapid onset was achieved by giving epidural morphine. When this morphine was not preceded by local anaesthetic severe pain was momentarily felt in the limb. Patients were able to get a near-normal night's sleep and found that walking was much easier as weight could be borne on the more comfortable foot. This degree of analgesia was obtained without the side effects of systemic opiates analgesia. The time between top-ups was occasionally many hours. This has been confirmed by other workers. Probably this was a placebo effect, but this seems unlikely as severe pain, present for many days, was often considerably alleviated. A sympathectomy effect from the lignocaine is unlikely to be responsible for pain relief as maximum symptomatic improvement cannot be expected so quickly in chronic ischaemia. In addition the dose given was probably too small to cause sympathetic blockade or indeed analgesia. No untoward side effects were observed—in particular, no hypotension or respiratory depression occurred. We were disappointed that the canulae could not be retained for longer periods, but this is difficult in ambulant patients. The increased preoperative activity and alertness may allow the patient to be better prepared for surgery.

2 Snyder SH. Opiate receptors and internal opiates. Sci Am 1977;236: 44-56.

(Accepted 26 November 1980)

University Hospital, Queen's Medical Centre, Nottingham NG7 2UH
D J LAYFIELD, FRCS, anaesthetist
R J LEMBERGER, FRCS, surgical registrar
B R HOPKINSON, CHM, FRCS, consultant surgeon
G S MAKIN, CHM, FRCS, consultant surgeon

### Delayed sensitivity reactions to four antigens in normal and obese subjects tested and retested after three weeks. Results expressed as mean (± SD) area of induration in mm. Figures in parentheses are numbers of subjects giving positive response (area of induration over 5 mm)

<table>
<thead>
<tr>
<th>No of subjects</th>
<th>Streptokinase/streptodornase</th>
<th>Mumps</th>
<th>Candida</th>
<th>Purified protein derivative</th>
<th>Isotonic saline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28±6-4±15±9 (5)</td>
<td></td>
<td></td>
<td>22±7±7±10±3 (5)</td>
<td>19±3±12±4 (4)</td>
</tr>
<tr>
<td>Normal controls</td>
<td>30±8±12±6 (5)</td>
<td>15±6±7±2 (5)</td>
<td>20±3±5±6 (4)</td>
<td>22±0±10±1 (3)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>25±6±14±3 (10)</td>
<td></td>
<td></td>
<td>19±6±9±19 (9)</td>
<td>7±4±2±4 (5)</td>
</tr>
<tr>
<td>Obese patients</td>
<td>33±8±13±3 (10)</td>
<td>17±4±8±2 (9)</td>
<td>20±5±1±3 (8)</td>
<td>10±2±5±3 (5)</td>
<td>0</td>
</tr>
</tbody>
</table>


(Accepted 19 November 1980)

Clinical Research Centre, Harrow HA1 3UJ
K S NAIR, MRCP, KabiVitrum research fellow
J S GARROW, FRCP, consultant physician

**BRITISH MEDICAL JOURNAL** VOLUME 282 28 FEBRUARY 1981

698 2-6 days (range 1-5 days). The mean interval between top-ups was 12 hours (range 4-30 hours). Ten patients thought their symptomatic foot was warmer. Of the eight canula tips sent for bacterial culture, all were sterile. Seven of the nine patients who received grafts experienced good pain relief as a result of surgery. Two patients with poor "run-off" and gangrene were unimproved and subsequently underwent major amputation.