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 cannula 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.

Comment

Dramatic pain relief of rapid onset was achieved by giving epidural morphine. When the 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 opiate analgesia. The time between top-ups was occasionally many hours. This has been reported by other workers.³ Possibly 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 cannulae 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.

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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.¹ Hence depression of cellular immunity has been suggested as one of the objective indices for selecting patients for nutritional treatment.² We investigated whether energy restriction and weight loss or surgery alone would affect cellular immunity.

Strikingly different results were obtained, however, from the surgical patients, of whom seven out of 10 converted from a positive response at 24 hours to a negative response at 48 hours when the operation came between these two readings.

Comment

This study showed that surgery depresses cellular immunity. This may be secondary to the increased secretion of stress hormones which occurs after trauma.⁴ Cortisol administration depresses cellular immunity within 24 hours in normal controls.⁵ We noted that energy restriction and weight loss did not depress cellular immunity. This study suggests that care should be taken in interpreting depression of skin response to recall antigens as evidence of malnutrition.

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

	No of subjects	Streptokinase/streptodornase	Mumps	Candida	Purified protein derivative	Isotonic saline
<i>Normal controls</i>						
First test ..	5	28.6 $\pm$ 14.5 (5)	22.8 $\pm$ 7.7 (5)	19.4 $\pm$ 12.8 (4)	22.3 $\pm$ 13.6 (3)	0
Retest ..	5	30.4 $\pm$ 12.6 (5)	15.0 $\pm$ 7.2 (5)	20.3 $\pm$ 5.6 (4)	22.0 $\pm$ 10.1 (3)	0
<i>Obese patients</i>						
First test ..	10	25.6 $\pm$ 14.3 (10)	19.6 $\pm$ 6.9 (9)	21.8 $\pm$ 12.4 (8)	7.4 $\pm$ 2.4 (5)	0
Retest ..	10	33.8 $\pm$ 13.3 (10)	17.4 $\pm$ 8.2 (9)	20.5 $\pm$ 1.3 (8)	10.2 $\pm$ 5.3 (5)	0

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.³

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 $\pm$ 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 to a particular antigen the reaction was still positive, usually with an increased area of induration, at 48 hours.

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