non-survivors, in accordance with the routine advocated by Skillman.[13] Fluid administration was also carefully monitored with a Swan-Ganz catheter. These factors could account for some difference in pulmonary interstitial fluid between the two groups. The mean volume of crystalloid given to non-survivors, however, was not excessive (less than 6 ml/kg/h). There was also no correlation between the postoperative PA-aO_2, total and hourly fluid gain, or amount of colloid infused.

From this preliminary study we conclude that patients who have previously received bleomycin treatment have a greatly increased risk of developing postoperative pulmonary complications. A factor that appears to lessen this risk is a reduction in the oxygen concentration administered during operation and in the immediate postoperative period. Careful monitoring of fluid replacement, with emphasis on colloids rather than crystalloids, may play an accessory part in decreasing or preventing pulmonary interstitial oedema.

References

1 Blum, R H, Carter, S K, and Agre, K, *Cancer*, 1973, **31**, 903.
2 Sonntag, R W, *et al*, *Cancer Chemotherapy Reports*, 1975, **59**, 429.
3 Haas, C D, *et al*, *Cancer*, 1976, **28**, 8.
4 Luna, M A, *et al*, *American Journal of Clinical Pathology*, 1972, **38**, 510.
5 Perez-Guerra, F, *et al*, *American Review of Respiratory Diseases*, 1972, **106**, 909.
6 O'Neill, T J, Kardinal, C G, and Tierney, L M, *Chest*, 1975, **68**, 265.
7 Iacovino, J R, *et al*, *Journal of the American Medical Association*, 1976, **235**, 1253.
8 Samuels, M L, *et al*, *Journal of the American Medical Association*, 1976, **235**, 1117.
9 Einhorn, L, *et al*, *Cancer*, 1976, **37**, 2414.
10 Daskal, Y, *et al*, *Cancer Research*, 1976, **36**, 1267.
11 Winter, P M, and Smith, G, *Anesthesiology*, 1972, **37**, 210.
12 Pontoppidan, H, Laver, M B, and Geffin, B, in *Advances in Surgery*, ed C E Welch. Chicago, Year Book Medical Publishers, 1970.
13 Skillman, J J, *Critical Care Medicine*, 1976, **4**, 55.

(*Accepted 26 April 1978*)

SHORT REPORTS

Detecting deficient energy and protein intake in hospital patients: a simple record method

Up to half of surgical patients suffer from protein-energy malnutrition.[1 2] A Danish study[3] showed that 85% of all elderly patients in an orthopaedic surgical ward were undernourished during the entire hospital stay. These abnormalities are often unrecognised.[2] Therefore a simple, inexpensive method for detecting patients who eat poorly is desirable.

Patients, methods, and results

A dietary survey was carried out on 46 consecutive patients aged over 60 admitted to an orthopaedic surgical ward. Two methods were used—(1) the precise weighing method,[4] and (2) a simple record method. A full-time dietitian was responsible for the first method, in which the intake of nutrients was calculated by a computer program based on Danish food-composition tables.[5] In the second method each patient was given a food-intake record sheet in the morning. The patient, his relatives, and the nursing staff (but not the dietitian) noted all foods and drinks taken during the day on the sheet—for example, ½ hamburger, 2 potatoes, and ¼ helping of sauce; 1 slice of rye bread with cheese; 1 cup of coffee with milk; ½ bar of chocolate; etc. Next morning the completed record sheet was sent to the kitchen, where the energy and protein intake was calculated from food-composition tables. The result was noted on the sheet and returned to the ward together with the supper.

A total of 603 one-day food-intake records were completed. Three-day records were determined as the average of three consecutive days. Nine months after the end of the test period the record sheets for the second month were also calculated by the dietitian, who did not know the results for the earlier calculations. The accuracy of the simple record method was determined by comparing the results with those of the precise weighing method. The percentile probabilities were calculated by a purely empirical method.

All the results are shown in the table.

Comment

The accuracy of one-day records was not quite satisfactory, mainly owing to a tendency to underestimate the high energy intakes. The purpose of using the simple record method in a hospital ward, however, should be to find the patients whose food intake is insufficient. The three-day records gave a correct measure of the energy and protein intake in 85-90% of patients. This degree of accuracy is satisfactory for clinical use. It can scarcely be expected that patients or staff in a busy surgical ward can record the food intake more precisely. The calculations in the kitchen from the food-composition tables were made at brief intervals by different members of the staff who never came to the ward. The results could be better if the calculations were made by a dietitian who knew the ward and had a better chance of concentrating on the work. Both in the kitchen and in the ward the routine use of the simple record method increased the interest in and the attention paid to the importance of the patient's proper food intake.

This study was supported by grants from the Medical Research Founda-

Probability of correct measurements of the energy and protein intake within the margin of ±200 kcal and ±10 g and of misleadingly high and low values (divergence more than 400 kcal or 20 g protein) obtained by the simple record method. The correlation coefficients are given in parentheses

	Assessed by	No of records	Correct assessment (%)	Misleading assessment: High (%)	Misleading assessment: Low (%)	No of records	Correct assessment (%)	Misleading assessment: High (%)	Misleading assessment: Low (%)
			Energy				*Energy intake <1500 kcal*		
One-day records	K	603	57 (0·86)	3	12	399	69 (0·76)	3	2
	D	238	64 (0·91)	2	6	166	72 (0·78)	2	1
Three-day records	K	311	66 (0·92)	1	8	208	85 (0·77)	0	0
	D	124	77 (0·93)	0	1	92	85 (0·82)	0	0
			Protein				*Protein intake <60 g*		
One-day records	K	601	64 (0·79)	3	10	421	76 (0·86)	4	2
	D	235	67 (0·88)	3	0	172	69 (0·93)	4	1
Three-day records	K	307	72 (0·86)	0	1	213	87 (0·82)	0	0
	D	119	90 (0·93)	1	0	90	90 (0·86)	1	0

K = kitchen staff. D = dietitian.
1000 kcal ≈ 4·2 MJ.

tion of the County of Vejle. I thank all the staff of the kitchen and the surgical ward who took part.

[1] Bistrian, B R, *et al*, *Journal of the American Medical Association*, 1974, **230**, 858.
[2] Hill, G L, *et al*, *Lancet*, 1977, **1**, 689.
[3] Hessov, I, *Acta Chirurgica Scandinavica*, 1977, **143**, 145.
[4] Marr, J W, *World Review of Nutrition and Dietetics*, 1971, **13**, 105.
[5] Helms, P, *Fødevaretabeller*. København, Akademisk Forlag, 1973.

Requests for reprints should be addressed to: Dr Ib Hessov, Gastroenterological Department L, Kommunehospitalet, 8000 Århus C, Denmark.

(*Accepted 6 February 1978*)

Department of Surgery, Horsens Hospital, Horsens, Denmark
IB HESSOV, MD, senior registrar

Do brachial plexus injuries occur at initial impact in motor-cyclists?

Some 77% of traction injuries to the brachial plexus occur in motor-cycle accidents.[1] Although this injury is uncommon, amputation may be necessary when the resulting paralysis is extensive and permanent.[2 3] The mechanism of injury has been regarded as mutual separation of the neck and shoulder as the motor-cyclist hits the ground, producing a traction injury to the plexus.[4]

We report here two motor-cyclists who collided head-on, with their right-hand handlebars contacting at an impact speed of about 130 kph. Both sustained severe brachial plexus injuries.

The accident and the injuries

The collision occurred on a winding country lane as the two cyclists were cutting the same corner when travelling in opposite directions (fig). Cyclist no 1, who was fully conscious after impact, remained in the saddle and travelled a further 90 metres until he came to rest against a hedge on his left side. Cyclist no 2 was thrown to the ground after impact and was found unconscious with multiple injuries 27 metres from the site of the collision.

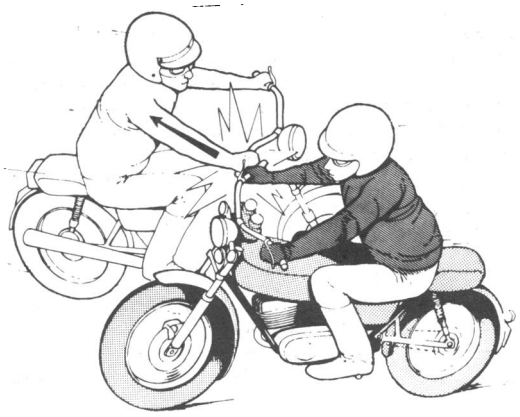

Diagram to illustrate the accident, with the mechanism of the brachial plexus injury.

The damage to both motor-cycles was consistent with a head-on handlebar collision.

On admission to hospital cyclist no 1, aged 18, was found to have an upper brachial plexus lesion with complete loss of C5-C8 motor and sensory functions. There was no soft tissue or bony injury to the arm or shoulder. Findings on cervical myelography one week after injury were normal. Neurophysiological studies performed five weeks after injury suggested a widespread postganglionic brachial plexus injury affecting C5-C8 fibres.

On admission to hospital cyclist no 2, aged 18, was found to have extensive injuries to the right arm: fractures of the neck of scapula, mid-shaft of the humerus, radius, and ulna (compound), and a complete division of the hand in the 4th web space. There was complete loss of C5 to T1 motor and sensory functions. Cervical myelography ten days after injury showed pseudomeningocoeles on the right C6, 7, 8 nerve roots, suggesting traumatic avulsion of the nerve roots.[5] The results of neurophysiological studies six weeks after injury were consistent with a widespread total brachial plexus injury.

Mechanism of injury—In cyclist no 1 the plexus must have been damaged at the moment of collision. The mechanism of injury was a longitudinal force transmitted up the right arm from the handlebar to the shoulder, causing posterior displacement of the right shoulder and thus stretching the nerve roots and trunks close to the intervertebral foramina. This stretching of the nerves would be accentuated by the momentum of the cyclist's chest, head, and neck, which continued to move forward. Cyclist no 2 had injuries consistent with the initial collision—the fractures being caused by a massive force transmitted up the arm from his hand on the handlebar; nevertheless, this mechanism remains unproved since he fell from his cycle.

Discussion

It has not been widely appreciated that in motor-cycle accidents injury to the brachial plexus may occur at the time of initial impact. This might explain why Fletcher[1] noted a "remarkable absence of actual shoulder injury and the clothing has been undamaged in this region." With an indirect force transmitted up the arm to the shoulder girdle no direct injury takes place. If injury occurs at impact a predominance of right arm injuries would be more likely in Britain, and this has in fact been our experience.

In Newcastle we have seen a sudden increase in the incidence of severe brachial plexus injuries—six cases in eight months. Possibly the increased number of motor-cycles on the road is in part responsible, but more likely the new style of crash helmet, with a chin guard (full face), is responsible, partly by preserving life when a patient would have died, and partly by increasing the momentum of the head—as the full face helmet is nearly twice the weight of the old jet type helmet. Sudden rotation of the handlebars may also be partly responsible and this needs further investigation. Should this mechanism be substantiated, it might be possible to incorporate an anti-jack knife mechanism into the front wheel of the cycle, thus protecting the cyclist (at least in one way) from a severely crippling injury.

We thank Mr D D Milne, consultant in charge, accident department, Newcastle General Hospital, for his help and encouragement and Mr Hammersley, medical artist, University of Newcastle, for the figure.

[1] Fletcher, I, *The Hand*, 1969, **1**, 129.
[2] Yeoman, P M, and Seddon, H J, *Journal of Bone and Joint Surgery*, 1961, **43B**, 493.
[3] Ransford, A O, and Hughes, S P F, *Journal of Bone and Joint Surgery*, 1977, **59B**, 417.
[4] Barnes, R, *Journal of Bone and Joint Surgery*, 1949, **31B**, 10.
[5] Shapiro, R, *Myelography*, 3rd edn, p 195. London, Lloyd-Luke, 1975.

(*Accepted 15 February 1978*)

Newcastle General Hospital, Newcastle upon Tyne NE4 6BE
T ANDREW, BSC, MB, surgical registrar
W A WALLACE, MB, FRCSED, surgical registrar (present address: orthopaedic registrar, Nottingham General Hospital)

Ultraviolet light: an effective treatment of osteomalacia in malabsorption

Intramuscular vitamin D has been the mainstay of treatment for osteomalacia in patients with malabsorption, as oral vitamin D is relatively ineffective because of poor absorption of this fat-soluble vitamin. Nevertheless, intramuscular vitamin D *BPC* has to be given regularly in large doses and may be ineffective because of poor absorption from the injection site.

The more polar metabolites such as 25-hydroxycholecalciferol (25-OHD) or the synthetic analogue 1-α-hydroxycholecalciferol are more effective when given by mouth but are expensive and require extended administration and careful surveillance for hypercalcaemia.[1 2]