Occasional Survey

Long-term parenteral nutrition

KARIN LADEFOGED, STIG JARNUM

British Medical Journal, 1978, 2, 262-266

Summary and conclusions

Nineteen patients (11 women and eight men) aged 20-68 received long-term parenteral nutrition, mostly at home, for six to 63 months (mean 19 months). Indications for LTPN were extensive, active Crohn's disease in three patients, intestinocutaneous fistulas in three, and short-bowel syndrome in the remaining 13 patients. Subclavian or intra-atrial (Broviac) catheters were most commonly used, for which the average life was four and seven months respectively. Complications of long-term parenteral nutrition included pneumothorax in four out of 48 subclavian vein punctures. Catheter-induced thrombosis of central veins was shown by phlebography 17 times in nine patients, and eight episodes of total occlusion occurred. Two of these patients had pulmonary infarction. Nineteen episodes of catheter sepsis occurred in 11 patients, but only one was fatal. Complications related to intestinal disease included intra-abdominal abscesses and intestinal fistulas, and disturbances of liver function. Five patients died, though in only two was death related to long-term parenteral nutrition. One of these patients died from catheter sepsis, the other had subdural haematoma possibly caused by anticoagulant treatment. Eight of the 14 surviving patients still needed parenteral nutrition. All received a disability pension, but six had an acceptable quality of life with almost normal social activities.

Despite problems such as difficulties in maintaining standardised infusion programmes, it was concluded that long-term parenteral nutrition at home is practicable and consistent with an acceptable quality of life.

Introduction

Long-term parenteral nutrition is a prerequisite of survival in a few patients who have had extensive intestinal resection, and who suffer excessive loss of water, electrolytes, and calorogenic food components through ileostomy or jejunostomy effluents. Underlying diseases are usually arteriosclerosis with mesenteric infarction or Crohn's disease requiring repeated intestinal resections. Several reports on long-term parenteral nutrition for periods of a few months up to five years¹⁻⁷ have appeared lately. Few have dealt with the clinical problems arising from or accompanying parenteral nutrition.⁸ We describe our experience

in managing 19 patients who received parenteral nutrition for six months to five years (mean 19 months).

Patients and methods

Eleven women and eight men (age range 20-68, median 44) received long-term parenteral nutrition (table I). Fifteen had chronic inflammatory bowel disease—12 Crohn's disease, two ulcerative colitis, one (case 15) unclassified—and four patients had been subjected to extensive intestinal resection because of intestinal ischaemia with mesenteric infarction. Indications for long-term parenteral nutrition were extensive, active Crohn's disease in three patients (cases 3, 6, and 7); intestinocutaneous fistulas in three (cases 4, 13, and 14); and short-bowel syndrome in the remaining 13 patients, who could not survive without parenteral nutrition. Patients with short-bowel syndrome retained a small-intestinal segment of 25-200 cm (mean 113 cm).

Infusion programme—All patients received amino-acid infusions (Aminofusin, 10% solution), electrolyte solutions (with sodium, potassium, calcium, and magnesium), and glucose. Ten patients also received fructose and 15 received sugar alcohol (sorbitol or xylitol or both). Seventeen patients received fat emulsions (Intralipid) and 10 were given electrolyte solutions containing trace elements (zinc 25 μ mol, copper 6 μ mol, manganese 50 μ mol, and iodine 1.3 μ mol daily). Usually patients received 100 g amino-acids, 50 g fat, and 100-200 g glucose daily. When fructose or sugar alcohol or both were given the total quantity corresponded to 1.7-3.3 MJ (400-800 kcal) daily. Total intravenous supply of fluids varied from 3 l/week to 4 l/day, usually 2.5-3.5 l/day. Once or twice a week vitamin A 10 000 IU, vitamin D 1200 IU, ascorbic acid 1000 mg, thiamine 9.7 mg, pyridoxine 5.3 mg, riboflavin 8.5 mg, pantothenic acid 22 mg, nicotinamide 65 mg, and folic acid 5 mg was given parenterally. Hydroxycobalamin 1 mg was given monthly, and some patients received vitamin D 100 000 IU monthly. Parenteral iron was given as needed (estimated from regular measurement of serum iron concentrations). All patients except the three with intestinocutaneous fistulas (cases 4, 13, and 14) and two with severe Crohn's disease (cases 3 and 12) were mostly treated at home.

Infusion technique—Patients were trained to set up the infusions themselves, or, in one case, with the spouse's help. Disposable infusion sets were supplied. Infusions were given by gravity flow. All patients had central venous catheters. Intracath catheters were used for subclavian vein catheterisation, and then replaced with Baby Feeding Tubes (after transection of the tip) after about a week. From June 1976 Broviac atrial catheters were used.^{9 10} All patients received anticoagulant treatment with phenprocoumon (Marcoumar). Between infusions the catheters were filled with heparin solution (1000 IU heparin/ml). Catheter dressings were changed once a week, the skin was rinsed with 3% H₂O₂, and chlorhexidine ointment applied.

Infusion time ranged from three to 12 hours a day.

Oral intake—Patients with severe Crohn's disease or intestinocutaneous fistulas were allowed only 500 ml "clear" fluids (water, effervescent drinks, tea) a day. Patients with short-bowel syndrome were advised to restrict dietary intake of fat and fluids.

Results

The total observation period for long-term parenteral nutrition was 366 patient-months. It ranged in individual cases from six to 63

Medical Department P, Division of Gastroenterology, Rigshospitalet, 2100 Copenhagen, Denmark

KARIN LADEFOGED, CAND MED, research associate
STIG JARNUM, MD, lecturer in internal medicine

TABLE 1—Clinical details of 19 patients who received long-term parenteral nutrition (LTPN)

Case No	Age (years) at start of LTPN	Sex	Height (cm)	Weight (kg)		Primary disease	Stoma or type of anastomosis	Remaining small intestine (cm)	Remaining colon	Duration of LTPN (months)
				At start of LTPN	At end of LTPN or end of study					
1	21	F	169	47	49	CD	Jejunostomy	125	Left colon	30
2	26	F	173	44	52	CD	"	150	Rectum	11
3	29	F	158	39	42	CD	Ileostomy	All except 10 cm ileum	None	10
4	30	F	167	42	46	CD	"	All except 112 cm ileum	Left colon	6
5	30	M	170	43	50	CD	Jejunostomy	170	Left colon	26
6	31	F	163	50	54	CD	Ileostomy	180	Rectum	7
7	43	M	174	48	62	CD	"	All	All	23
8	44	F	163	54	49	CD	Jejunostomy	85	Rectum	39
9	49	M	184	48	55	CD	Jejunostomy	190	All except 35 cm	23
10	51	F	159	45	60	CD	Jejunostomy	200	All	13
11	56	M	178	56	76	CD	"	150	Rectum	24
12	68	F	170	40	NK	CD	"	60	Right colon and rectum	9
13	45	M	175	45	35	UC	Ileostomy	All	None	9
14	62	F	162	51	53	UC	"	All except 55 cm ileum	Rectum	7
15	33	F	165	78	55	CD or UC	Jejunostomy	140	None	23
16	20	M	191	81	71	II	Jejunostomy	35	All	6
17	48	M	173	66	49	II	Jejunotransversostomy	25	Left colon	63
18	57	F	167	47	42	II	Jejunostomy	85	Rectum	26
19	60	M	166	53	65	II	Jejunotransversostomy	50	Left colon	11

CD = Crohn's disease. UC = Ulcerative colitis. II = Intestinal ischaemia. NK = Not known.

months (median 13 months). Fourteen patients spent 14-57 months (on average 32% of total time on parenteral nutrition) in hospital because of complications or control studies.

DIETARY MANAGEMENT OF SHORT-BOWEL SYNDROME

Attempts to persuade the 13 patients with short-bowel syndrome to restrict oral fluid and fat intake for more than a few weeks usually failed. The seven patients with the most severe symptoms (cases 1, 2, 5, 8, 15, 17, and 18) were particularly uncooperative. Six of them had jejunostomies and the seventh (case 17) a jejunotransversostomy with a remaining jejunal segment of only 25 cm. They all had effluent (case 17 had diarrhoea), volume 3-7 l/day. During admission for balance studies, when fixed amounts of fat and fluid were given, the volume decreased appreciably. The patients admitted that they ate and drank freely at home, though advised against it. Parenteral fluid and electrolyte regimens prescribed for home infusion were adjusted, mainly according to weight, blood pressure, and serum electrolyte and urea concentrations.

Gastrointestinal function tests also caused exceptionally large fluid and electrolyte losses in these patients. In one patient (case 8), who incidentally turned out to have lactose malabsorption, a lactose tolerance test produced a jejunostomy effluent of 17 l in 24 h (fig 1). An external pancreatic function test (Lundh test) produced a loss of 16 l in 24 h. A trip in to town with her family on two occasions during her admission also caused large amounts of effluent to be produced due to indulgence in fluids and fat-rich food (fig 1).

CATHETERS

A total of 98 catheters were used through seven different access routes (table II). With few exceptions only subclavian and intra-atrial catheters were used for prolonged periods. Ninety catheters were

TABLE II—Access routes of catheters in 19 patients receiving long-term parenteral nutrition and mean life of catheters

Access route	No of catheters	Mean life of catheter in months (range)
Subclavian vein	48	4.0 (<1-18)
Intra-atrial catheter (Broviac)	14	7.2 (1-17)
Inferior vena cava	6	3.1 (1-8)
External jugular vein	3	1.4 (<1-3)
Internal jugular vein	1	<1
Portal vein	1	<1
Peripheral veins (ending peripherally or in the superior vena cava)	25	1.3 (<1-20)
Total	98	

exchanged or removed for the following reasons: venous thrombosis (17 cases); occluded catheter (seven cases); septicaemia (16 cases); infection at site of catheter exit (two cases); leakage from catheter (five cases); malpositioning (11 cases); routine substitution of central catheters for peripheral catheters (13 cases); and temporary or permanent withdrawal of parenteral nutrition (19 cases). Of the eight

FIG 1—Case 8. Parenteral and oral fluid intake and fluid losses after extensive intestinal resection in a patient with Crohn's disease. Exceptionally large jejunostomy effluents on some days were due to gastrointestinal function tests (see text) and fat-rich food eaten outside hospital.

Conversion: SI to traditional units—Creatinine: 1 $\mu\text{mol/l}$ $\approx$ 0.01 mg/100 ml. Urea: 1 mmol/l $\approx$ 6 mg/100 ml.

patients who continued to receive parenteral nutrition, one had a subclavian catheter and seven Broviac intra-atrial catheters.

COMPLICATIONS OF LONG-TERM PARENTERAL NUTRITION

Four patients developed *pneumothorax* after subclavian vein catheterisation, but only one required pleural drainage. Hence, out of 48 subclavian vein punctures performed, the incidence of pneumothorax was 8% (table III).

TABLE III—Complications of long-term parenteral nutrition

	No of episodes	No of patients
<i>Complications of catheter insertion</i>		
Pneumothorax	4	4
Subcutaneous emphysema	1	1
Total	5	5
<i>Catheter sepsis</i>		
<i>Staphylococcus aureus</i>	7	6
<i>S. albus</i>	3	2
<i>Klebsiella pneumoniae</i>	2	2
<i>Pseudomonas flava</i>	1	1
<i>Candida albicans</i>	3	2
<i>C. parapsilosis</i> + <i>S. aureus</i>	1	1
<i>C. guilliermondi</i> + <i>K. pneumoniae</i>	1	1
<i>Escherichia coli</i> + <i>K. pneumoniae</i>	1	1
Total	19	11
<i>Central vein thrombosis*</i>		
Total occlusion	8	6
Total	17	9
<i>Pulmonary infarction</i>		
Total	2	2
<i>Bleeding episodes</i>		
Haematemesis or melaena or both	4	2
Intracranial haemorrhage†	2	2
Muscular haematoma	1	1
Total	7	3

*Phlebography performed on 17 patients, nine of whom had thrombosis on 17 occasions.

†Subdural haematoma (case 8) and subarachnoid haemorrhage (case 15).

Septicaemia occurred 19 times in 11 patients, in whom no focus other than the catheter could be found (table III). Sixteen of the 19 episodes of catheter sepsis occurred within the first six months of starting long-term parenteral nutrition, and one patient had three different episodes of sepsis in a month. Most cases ran a mild course: septicæmia resolved when the catheter was exchanged, and, in 15 cases, after antibiotic treatment. Only one patient (case 12) with severe Crohn's disease and multiple intestinocutaneous fistulas died in a local hospital from sepsis (*Candida guilliermondi* and *Klebsiella pneumoniae*). Sixteen of the 19 incidents of catheter sepsis occurred in patients with subclavian catheters. There was no correlation between the incidence of septicæmia and life of the catheters.

Central venous thrombosis diagnosed by phlebography occurred 17 times in nine patients. Six had eight episodes of total occlusion of central veins (subclavian vein: seven episodes; inferior vena cava: one episode). In five of the eight episodes a control phlebography performed one to 30 months later showed that the occlusion was still total. Three patients were unsuccessfully treated with heparin (10 000 IU, four times daily). Nine patients were found to have a partial occlusion. Six were treated with heparin. Eight patients underwent a control phlebography one week to eight months later, which showed disappearance of the thrombus in all six patients treated with heparin and in one untreated patient. In one case the occlusion had become total. The site of the thrombosis often coincided with the site of the catheter tip. Of the 17 incidents of thrombosis, 13 occurred in the subclavian vein, among which nine were caused by subclavian catheters, one by a Broviac catheter, one by an internal jugular catheter, and two by peripheral catheters. In addition three episodes of thrombosis in the inferior vena cava and one of portal vein thrombosis occurred. One patient (case 8) was found to have two subclavian veins on the left side, one of which became occluded together with the subclavian vein on the right side (fig 2). The incidence of central venous thrombosis was not related to the life of the catheters. In six cases thrombosis and catheter sepsis coincided.

Bleeding episodes occurred on seven occasions in three patients

FIG 2—Case 8. Phlebogram showing dilated collaterals after occlusion of subclavian vein on both sides.

(table III). Anticoagulant treatment was probably responsible for muscular haematoma in one (case 17) and possibly responsible or contributory in the others.

COMPLICATIONS UNRELATED TO LONG-TERM PARENTERAL NUTRITION

Twenty-nine of 32 complications common in Crohn's disease and after intestinal resection for Crohn's disease (intra-abdominal abscesses and intestinal fistulas) occurred within the first six months of starting long-term parenteral nutrition (table IV). Other complications, mostly related to short-bowel syndrome, were renal calculi (two out of 14 patients examined by intravenous pyelography), gall stones (five out of eight studied by cholecystography), osteomalacia (nine out of 13 patients), and "tertiary" hyperparathyroidism in two patients (cases 8 and 18) who underwent subtotal parathyroidectomy. Two patients had large ovarian cysts (cases 1 and 8). Two (cases 7 and 11) had a zinc-depletion syndrome,^{11 12} which resolved after parenteral zinc treatment.

One patient had chronic, persistent HBsAg-positive hepatitis and 15 patients had some disturbance of liver function (raised concentrations of alanine aminotransferase or alkaline phosphatase or both) on one or several occasions. Results of liver function tests were abnormal in eight of these patients before long-term parenteral nutrition was

TABLE IV—Complications unrelated to long-term parenteral nutrition

	No of episodes	No of patients
<i>Complications of primary disease or operation</i>		
Intra-abdominal abscesses	14	6
Intestinal fistulas	18	11
Total	32	11
<i>Infections</i>		
Pneumonia	9	6
Acute pyelonephritis	3	3
Osteomyelitis of spine	1	1
Herpes zoster	1	1
Candidiasis (mouth and oesophagus)	1	1
Total	15	8
<i>Endoscopic perforation of oesophagus</i>		
	2	2
<i>Other complications</i>		
Renal stones		2 (14)*
Gall stones		5 (8)*
Osteomalacia		9 (13)†
Tertiary hyperparathyroidism		2
Zinc-depletion syndrome		2
Paresis of peroneal nerve		2
Paresis of radial nerve		1
Liver disease		16

*Number of patients studied radiographically (pyelography, cholecystography).

†Number of patients studied by radiography or bone densitometry.

begun. Nine had episodes of jaundice, usually associated with other complications (abscess, septicaemia). Complications typical of long-term parenteral nutrition and short-bowel syndrome are illustrated by the longitudinal course in one patient (case 17), who received parenteral nutrition for 63 months (fig 3).

DEATHS

Five patients died after receiving parenteral nutrition for five years, nine months, three years, nine months, and seven months respectively. Causes of death were: mediastinitis due to perforation of the oesophagus during endoscopy (case 17), bronchopneumonia (case 13), subdural haematoma (case 8), septicaemia (case 12), and dehydration a few months after withdrawal of parenteral nutrition (case 14). The last three patients died in a local hospital. In only two patients was death directly related to long-term parenteral nutrition. One of them (case 8) died from subdural haematoma possibly caused by anti-coagulant treatment, and one (case 12) died from catheter sepsis.

QUALITY OF LIFE IN SURVIVORS

By December 1977 six of the 14 surviving patients had been taking food exclusively by mouth for 1, 3, 7, 25, 32, and 40 months respectively (cases 10, 11, 6, 16, 3, and 4), while eight were still receiving parenteral nutrition. Six patients were managing well (cases 1, 2, 7, 15, 18, and 19). They all retained a disability pension, but had an acceptable quality of life with almost normal social activities. The remaining two suffered from periodic depression.

Discussion

Unlike others,¹⁻⁷ we found it difficult to maintain a standardised infusion programme during long-term parenteral nutrition. Because of different intestinal absorptive capacity and several patients' reluctance to restrict oral fluid and fat intake, with ensuing large jejunostomy or ileostomy effluents, the parenteral supplies had to be prepared individually, and pre-mixed nutritional solutions⁶⁻⁷ were unsuitable. In most patients intestinal absorption gradually improved and the need for parenteral nutrition reduced proportionally. Six patients, including three with short-bowel syndrome, could take food exclusively by mouth after receiving parenteral nutrition for six to 24 months. Programmes for home parenteral nutrition often include use of infusion pumps,²⁻³⁻⁶⁻⁷ which may be combined with an alarm system²⁻⁶ or pressurised Fenwall plastic bags.⁴ We used the simpler and cheaper method of gravity flow. No case of air embolism occurred even though most of our patients preferred infusion during the night.

Central venous catheters are most commonly used in long-term parenteral nutrition.¹⁻⁷ With few exceptions,⁶⁻¹³ experience with arteriovenous shunts and fistulas has been disappointing.⁶⁻⁹ We prefer and recommend the Broviac intra-atrial catheter,⁹ which, compared with subclavian catheters, has a longer life (seven months compared with four months) and is more acceptable to patients. Since skin infections occurred only twice, we did not find it necessary to change the dressing at the catheter exit site more than once a week.⁴⁻⁶ Initially, we used heparin 100 IU/ml as a "lock," but problems with occluding catheters caused us to use a stronger solution (1000 IU/ml).² The costs per patient were calculated at \$3700 to 26 000 a year (equal to Danish kroner 22 000 to 158 000).²⁻⁴⁻⁶ They included infusion fluids and surgical and medical equipment.

The incidence of complications was high because parenteral nutrition was started soon after extensive intestinal resection or because patients were already critically ill. Thus most intra-abdominal abscesses or fistulas (or both) occurred in the first six months after starting parenteral nutrition, and 16 out of 19 episodes of catheter sepsis occurred in the same period. Catheter sepsis occurs frequently in debilitated patients.¹⁴ The life of indwelling catheters was not correlated with the incidence of sepsis.¹⁴⁻¹⁵

Necropsy findings¹⁵⁻¹⁶ have shown a high incidence of

FIG 3—Case 17. Early and late complications of severe short-bowel syndrome and long-term parenteral nutrition (LTPN).

catheter-induced thrombosis of central veins, while a few cases are reported in studies of long-term parenteral nutrition.²⁻³⁻⁵⁻¹⁰ Despite routine anticoagulant treatment central venous thrombosis occurred in half of our patients and total occlusion in one-third. This was undoubtedly because thrombosis was diagnosed phlebographically. The high incidence of thrombosis agrees with the findings of a prospective study in which phlebography was also performed.¹⁷ Remarkably we found no relation between the incidence of thrombosis and catheter life.

Gall stones and osteomalacia may have been present before parenteral nutrition was begun. Nevertheless, three patients, one of whom received steroid treatment, had progressive osteomalacia with spontaneous bone fractures during long-term parenteral nutrition. The high incidence of abnormalities of liver function in patients receiving long-term parenteral nutrition agrees with previous reports.⁴⁻⁶ A high glucose load may be implicated.⁵ Fatty liver occurs in patients receiving large amounts of glucose parenterally,²⁻⁴⁻⁶ and symptoms improve when parenteral fat is partially substituted for glucose.⁴ None of our patients had severe liver disease, though some were mildly affected. This is common in inflammatory bowel disease and probably was not due to long-term parenteral nutrition.

We conclude that home parenteral nutrition is practicable and consistent with an acceptable quality of life, though further work is needed to resolve the nutritional and technical problems.

This work was supported by grants from the Danish State Research Council (No 512-8507), P Carl Petersen's Fund, and King Christian X's Fund.

References

- ¹ Bordos, D C, and Cameron, J L, *Archives of Surgery*, 1975, **110**, 439.
- ² Broviac, J W, and Scribner, B H, *Surgery, Gynecology and Obstetrics*, 1974, **139**, 24.
- ³ Ivey, M, et al, *American Journal of Hospital Pharmacy*, 1975, **32**, 1032.
- ⁴ Jeejeebhoy, K N, et al, *Gastroenterology*, 1976, **71**, 943.
- ⁵ Rault, R M J, and Scribner, B H, *Gastroenterology*, 1977, **72**, 1249.
- ⁶ Shils, M E, *American Journal of Clinical Nutrition*, 1975, **28**, 1429.
- ⁷ Solassol, C, et al, *Annals of Surgery*, 1974, **179**, 519.
- ⁸ Dudrick, S J, and Long, J M, *Annual Review of Medicine*, 1977, **28**, 517.
- ⁹ Broviac, J W, Cole, J J, and Scribner, B H, *Surgery, Gynecology and Obstetrics*, 1973, **136**, 602.
- ¹⁰ Riella, M C, and Scribner, B H, *Surgery, Gynecology and Obstetrics*, 1976, **136**, 602.
- ¹¹ Kay, R G, et al, *Annals of Surgery*, 1976, **183**, 331.
- ¹² Weismann, K, Fischer, A, and Hjorth, N, *Ugeskrift for Laeger*, 1976, **138**, 1403.
- ¹³ Heizer, W D, and Orringer, E P, *Gastroenterology*, 1977, **72**, 527.
- ¹⁴ Sanders, R A, and Sheldon, G F, *American Journal of Surgery*, 1976, **132**, 214.
- ¹⁵ Ryan, J A, et al, *New England Journal of Medicine*, 1974, **290**, 757.
- ¹⁶ Warden, G D, Wilmore, D W, and Pruitt, B A, *Journal of Trauma*, 1973, **13**, 620.
- ¹⁷ Ahmed, N, and Payne, R F, *Medical Journal of Australia*, 1976, **1**, 217.

(Accepted 28 March 1978)

Clinical Topics

Clinical check list for diagnosis of dementia

MARJORIE HARE

British Medical Journal, 1978, **2**, 266-267

Summary and conclusions

A clinical check list for testing speech and parietal function as well as memory was used on 200 people admitted to a psychogeriatric assessment unit and repeated four to six weeks later, to see whether those with true dementias could be identified. The finding of errors in all three areas, particularly at the second test, accurately predicted cases with a poor outcome at six months follow-up. Amnesia alone was an unreliable indicator of dementia.

Introduction

The accurate diagnosis of dementia in old age should be possible because it is the only common psychiatric disease with demonstrable lesions, clear clinical signs, and a precise prognosis.¹ Nevertheless, misdiagnosis, particularly overdiagnosis, is common, by at least as much again.²⁻⁴ The usual reliance on defects in memory and changes in personality, both common in the old, may cause misdiagnosis, which is further compounded by variations in the clinical definition of dementia.

"Intrinsic brain failure,"⁵ which produces a global, irreversible, and progressive cognitive dysfunction is the definition used here, and "extrinsic brain failure," or that due to factors outside the brain (and reversible if the causative illness is treated), is called a confusional state. Alzheimer's dementia and arteriosclerotic damage of the diffuse and global, rather than focal, type have a similar prognosis, with half the patients dying within six months of admission and the other half dying within two years; they do not recover. In this study dysfunction in three cognitive areas and its progress was surveyed and the

predictive value of these findings compared with those of other diagnostic procedures.

Method

A modification of the Kew test used by McDonald⁶ to differentiate patients with true dementia from all those admitted with the diagnosis was used (see figure) to detect faults in memory (recent, intermediate, and remote); aphasia (expressive and receptive); and parietal signs (see figure). Altogether 214 alternate patients admitted to a psychogeriatric unit for patients aged over 70 were tested. The unit was an intensive unit with full supporting services and generous geriatric help. Stay for assessment and treatment was limited to four to six weeks. The initial diagnosis was made before or on admission and the final diagnosis on discharge.

The Kew test was given to all patients one to three days after admission and then again before discharge. They were followed up six months after admission, and their degree of independence was recorded; they were classified as dead, still in hospital, in sheltered accommodation, or independent at home. Patients at home but attending the day hospital every day were counted as sheltered. Four patients died at home from unrelated diseases and these were counted as having been discharged home. A total of 68 patients were referred for psychological testing, in which a battery of tests was used including the shortened Wechsler test with the block design subtest.

Results and comment

Fourteen patients were excluded because of insufficient information (usually owing to early discharge or death). The remaining 200 (132 women and 68 men) had an average age of 77 years. The results of testing and the outcome at six months are shown in table I. The number of patients with errors in all areas fell from 95 on admission to 71 at four to six weeks as those with confusional states recovered. The 71 patients who still had errors in all areas after investigation and treatment for four to six weeks had a very poor outcome; nearly half died and only one was discharged to her own home. Admission diagnosis by outcome (table II) showed that, of the 77 admitted with dementias, only 16 had died at six months and 21 had been discharged from hospital, which suggested an overdiagnosis of dementia.

Essex Area Health Authority

MARJORIE HARE, MRCPsych, locum consultant psychiatrist