THE CONSEQUENCES OF UNDERNUTRITION IN THE ELDERLY

P.S. LIPSKI

Summary

Undernutrition must be recognised as a major health problem for elderly people in hostels, in institutions and in the community. Undernutrition in the elderly has a high morbidity and mortality. It is associated with an increased length of hospital stay, may lead to an impaired immune response, recurrent infections, pressure sores and is associated with fractured hip in the elderly. Occult undernutrition is frequently associated with multiple medical problems and may be an important factor leading to hospital admission in elderly patients suffering from a wide range of often non-specific complaints. A better awareness of such nutritional problems in the elderly is crucial to their early identification and treatment. Recent nutritional intervention studies suggest that we can improve the health outcomes of undernourished elderly patients.

I. INTRODUCTION

Up until recently, the topic of nutrition in the elderly has aroused little scientific interest and has had a low profile in most medical schools. However recent data suggest that undernutrition in the elderly is a major health problem contributing to enormous morbidity and mortality in the elderly. It is the dietitian's and clinician's role to identify elderly patients at risk of undernutrition, to look for reversible factors and reduce dependency and morbidity. Frequently, as in other geriatric syndromes, the causes for undernutrition are multi-factorial (Lipski 1993).

II. PREVALENCE OF UNDERNUTRITION

Nursing home residents and those elderly people in institutions or those receiving supplementary meals are a heterogeneous group and are characterised by a higher prevalence of significant disability. There is a high prevalence of undernutrition in nursing home patients with some studies reporting well over two thirds of their residents being undernourished (Steidmann et al. 1978; Vir and Love 1979; Abasi and Rudman 1993; Ferguson et al. 1993; Lipski et al. 1993). A study by Lipski et al. (1993) found that 68% of nursing home residents in the north of the UK did not have sufficient average daily protein intakes to satisfy even basal metabolic demands. In contrast there is very little data at present on the nutritional status of community living, functionally independent, elderly in Australia. Much of the prevalence data for undernutrition in community living elderly comes mainly from the UK and USA. Prevalence figures for undernutrition in community elderly range from 2% to 80% depending on the study (Stanton and Exton-Smith 1970; Department of Health and Social Security 1979; Lehmann 1989; Yearick et al. 1980).

Prevalence of undernutrition of acute geriatric medical hospital inpatients is reported to vary from 4% up to 50% depending on population studies and methodology used (McEvoy et al 1983; Kemm and Allock 1984; Roubenoff et al. 1987; McWhirter and Pennington 1994).

Protein-energy undernutrition is common in demented elderly patients (Asplund et al. 1981; Bucht and Sandman 1990). Elderly patients with Alzheimerís disease are at particular risk of developing undernutrition due to multiple factors including a hypercatabolic phase resulting in

Central Coast Area Health Service, Gosford Hospital, Gosford New South Wales 2250

increased energy requirements, poor food intake, impaired swallowing, impaired taste thresholds, dyspraxia (loss of co-ordination), agnosia (sensory losses), mood and behavioural disorders, physical dependency with feeding and adverse drug reactions (Sandman et al. 1987; Grey 1989).

In the period before acute disease and hospital admission, recently hospitalised elderly patients may have reduced energy and nutrient intakes. Early nutritional assessment might reduce the prevalence of undernutrition in these individuals and improve their health outcomes (Mowe et al. 1994).

Protein-energy undernutrition is probably the most serious form of undernutrition in the elderly person. Although there are no uniform accepted diagnostic standards for this condition a depressed serum albumin, documented history of significant and involuntary weight loss, arm muscle circumference, tricep skinfold thickness or body weight below established population standard are used as indicators of possible protein energy undernutrition. Up to 85% of nursing home residents may fall within the high risk group requiring more thorough evaluation of their nutritional status (Rudman et al. 1987; Shaver et al. 1980).

III. RISK FACTORS FOR UNDERNUTRITION

Disability and undernutrition are strongly related, and as in most geriatric syndromes are multi-factorial in aetiology (Figure 1).

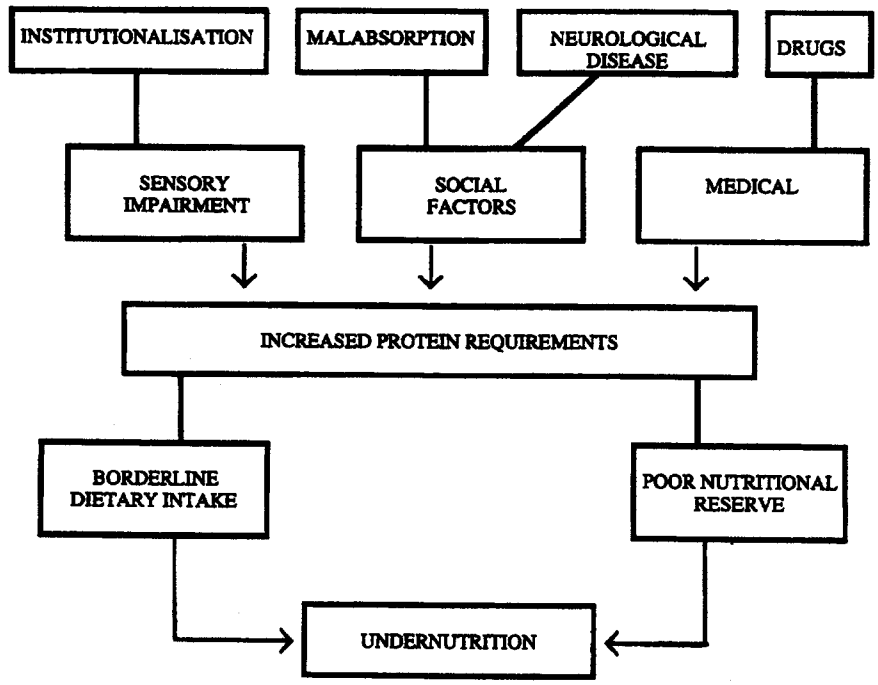

Figure 1. Multi-factorial causes of undernutrition in the elderly.

The large community study of elderly in the UK from the Department of Health and Social Security (1979) found that chronic medical conditions were significantly associated with undernutrition in community living elderly. These included chronic bronchitis and emphysema, history of gastric surgery, cognitive impairment, dysphagia and being house bound or edentulous. The importance of the social role of food, food preferences, quality and presentation of food served should not be underestimated for institutionalised elderly. Immobility in elderly people is associated with high protein turnover and negative protein balance, particularly during periods of stress such as infection and subsequent recovery (Lehmann et al. 1989). These sick immobile

elderly people can rapidly develop negative protein balance particularly if dietary intake is also inadequate. They may in fact require as much protein as younger active people (Young 1990). It is very important that undernutrition in the elderly is not attributed to poor intake alone, unless strong evidence exists for this. Underlying active medical problems and adverse drug reactions must be sorted out and treated first. Many drugs can cause nausea and suppress appetite. Polypharmacy and drug toxicity can contribute to undernutrition in the elderly. Protein energy-undernutrition should be considered in any nursing home resident who develops acute medical problems.

Impaired appetite is often associated with reduction in taste and smell which occur in up to 50% of healthy elderly people (Spitzer 1988). Being house-bound is associated with an inadequate diet in both calories and protein (Stanton and Exton-Smith 1970; DHSS 1979).

IV. CONSEQUENCES OF UNDERNUTRITION

Undernutrition is a risk factor for sepsis in elderly inpatients compared with better nourished elderly patients (Potter et al. 1995). The poor prognosis of undernutrition has only been recently recognised. In one study, the 90 day fatality rate of elderly patients with anthropometrically defined undernutrition admitted to a geriatric assessment ward was 50% compared with 16% among the better nourished (Friedman et al. 1985). In another study 18% of severely malnourished fractured femur patients died, compared with 4% of well nourished patients, a difference not due to associated illness or age (Bastow et al. 1983). It is now well documented that undernourished elderly have a higher morbidity and mortality. Protein-energy undernutrition appears to be a strong independent risk factor for in-hospital morbidity (Sullivan and Walls 1994). Serum hypoalbuminaemia has also been shown to be a strong predictor of 90 day mortality and extended length of hospital stay (Ferguson et al. 1993). It has been reported that one of the best predictors of mortality within 1 year of hospital discharge of elderly patients is the percent of usual body weight lost in the year previous to hospital admission followed by the sub-scapula skinfold thickness (Sullivan et al. 1991). Although there seems a strong correlation between these indicators of protein energy undernutrition and increased risk of morbidity and mortality, a cause and effect relationship is not fully established. These abnormal nutrition indicators may reflect the effects of age, functional disability or underlying multiple co-morbidities in the elderly. We need to examine to what extent non-nutritional factors such as the severity of co-morbid conditions are the cause of poor nutrition and poor clinical outcomes.

Undernutrition is associated with pressure sores and recent data suggests that interleukin-6 cytokines produced by tissue cells of damaged areas together with serum cortisol may aggravate undernutrition and induce hypercatabolism in elderly patients with pressure sores (Bonnefoy et al. 1995). Undernutrition has been associated with impaired immune responses including reduction in delayed cutaneous hypersensitivity, impaired T cell number and responses to mitogen, anergy and lymphopenia as well as impaired response to vaccination and immunisation (Chandra 1990; Chandra 1991). Undernutrition is now strongly associated with fractured neck of femur in the elderly (Bastow et al. 1983: Stableforth 1986). Anthropometric and biochemical assessments confirm that elderly patients with hip fractures are very commonly undernourished on admission. This undernutrition is more severe than that observed amongst the general elderly population (Dreblow et al. 1981). Elderly Parkinson's disease patients tend to lose weight in spite of an increased caloric intake. This may reflect an increased metabolic rate similar to that during the hypercatabolic phase of Alzheimer's disease (Davies et al. 1994).

Undernutrition has been associated with longer length of hospital stay for geriatric inpatients (Robinson et al 1987; Axelsson et al 1989; Rich et al 1989; Nyswonger and Helmchen 1992). Reduced nutrient and energy intakes may increase the occurrence of undernutrition and increase the risk for hospitalisation of at risk elderly people (Mowe et al. 1994).

V. NUTRITIONAL ASSESSMENTS

There is no single diagnostic tool. The diagnosis of undernutrition is complex and requires detailed clinical history and examination, anthropometry, haematology and biochemistry. A range of dietary assessment methods are available and although several have been validated none are perfect. If the aim is screening to identify high risk subjects with nutritional problems, then the method least likely to influence food recording or consumption itself is required and the use of a food frequency list is recommended (Schlettwein-Gsell 1989). Serum albumin levels, although non-specific are a useful screening tool for protein energy undernutrition. Lymphopenia is a useful non-specific index for protein energy undernutrition with which to monitor treatment progress.

VI. INTERVENTIONS

Early nutritional intervention is important to prevent the complications of undernutrition in the elderly. The Australian Nutrition Screening Initiative is a new developed screening tool that will help identify independently living elderly at risk of undernutrition (Lipski 1995). Nutritional screening needs to promoted in the community to identify those elderly at risk before they enter acute hospital care so that their health outcomes can be improved. Early enteral nutrition may be a factor in shortening length of stay in acute stroke patients (Nyswonger and Helmchen 1992). It is now fairly well established that fractured neck of femur in elderly patients is a disease of undernutrition and that health outcomes are significantly better when supplemental feeds are offered to increase protein and energy intake (Stableforth 1986). In a recent study of dietary supplementation in elderly patients with fractured neck of femur the clinical outcomes were significantly better in the supplemented group during rehabilitation and the rates of complications and deaths were also significantly lower in the supplemented patients. Six months after the fracture, the rates of complications and mortality were significantly lower in the supplemented patients. This group's mean duration of hospital stay was significantly shorter (Delmi et al. 1990). High energy foods may help to initiate oral re-feeding in selected elderly patients with anorexia and malnutrition who refuse to eat meals or supplements (Winograd and Brown 1990).

There are very few studies looking at the effect of nutritional supplementation after acute illness in the elderly. A recent study (Woo et al. 1994) showed that elderly patients with chest infections given nutritional supplementation showed improvement in anthropometric measurements, in thiamine and piridoxine status and better level of functional ability after three months. The addition of nutritional supplementation did not result in a significantly reduced intake of ordinary diet.

During hospital admission, factors other than eating problems may be important for undernutrition in elderly patients with stroke. Poor nutritional status in stroke patients may be associated with impaired functional status, poor nutritional status on admission, as well as swallowing disorders which are frequently under-recognised (Axelsson et al. 1989). A recent study suggests a weight increase of at least 5% of body weight in previously undernourished nursing home elderly patients is associated with a decreased incidence death and may reduce morbidity events (Keller 1995).

Vitamin supplementation may improve immunity and decrease the risk of infection in independently community living elderly but more work needs to be done in this area (Chandra 1992).

Percutaneous endoscopic gastrostomy (PEG) tube feeding is a major advance in the treatment of the undernutrition in the elderly. PEG tube feeding seems well tolerated in the elderly and has less complications than nasogastric tube feeding (Allison et al. 1992). Complex ethical issues arise with the decision to use long term PEG tube feeding particularly in disabled nursing home patients. At present the data is lacking about the efficacy of long term enteral nutritional support of nursing home patients.

VII. CONCLUSION

Undernutrition in the elderly is a major health problem and has very negative health outcome implications. Nutritional assessment is multi-factorial and management requires a multi-disciplinary approach. Underlying medical problems and adverse drug reactions must be identified and managed. Poor nutritional status must not be blamed on poor nutritional intake unless there is very good evidence for this. Ongoing education for health professionals regarding undernutrition in the elderly and nutritional screening of elderly people needs to be promoted. Nutrition screening should become a routine part of the medical and health assessments of the elderly.

REFERENCES

ABASI, A.A. and RUDMAN, D. (1993). J. Am. Geriat. Soc. 41: 117.
ALLISON, M.C., MORRIS, A.J. and PARK, R.H.R. (1992). J. Roy. Soc. Med 85: 147.
ASPLUND, K., NORMARK, M. and PETTERSSON, V. (1981). Age Ageing 10: 87.
AXELSSON, K., ASPLUND, K. and ERIKSSON, S. (1989). J. Am. Diet. Ass. 89: 1092.
BASTOW, M.D., RAWLINGS, J. and ALLISON, S.P. (1983). Lancet 1: 143.
BONNEFOY, M., COULON, L., BIENVENU, J., BOISSON, R.C. and RYS, L. (1995). Age Ageing 24: 37.
BUCHT, G. and SANDMAN, P. (1990). Age Ageing 19: S32.
CHANDRA, R.K. (1990). Age Ageing 19: S25.
CHANDRA, R.K. (1991). Am. J. Clin. Nutr. 53: 1087.
CHANDRA, R.K. (1992). Lancet 340: 1124.
DAVIES, K.N., KING, D. and DAVIES, H. (1994). Age Ageing 23: 142.
DELMI, M., RAPIN, C.H., BENGOA, J.M., DELMAS, P.D., VASEY, H. and BONJOUR, J.P. (1990). Lancet 335: 1013.
DEPARTMENT OF HEALTH AND SOCIAL SECURITY. (1979) 'Nutrition and Health in Old Age'. Rep. Health Soc. Subj. 16. (HMSO: London).
DREBLOW, D., ANDERSON, C.F. and MOXNESS, K. (1981). Mayo. Clin. Proc. 56: 51.
FERGUSON, R.P., O'CONNOR, P., CRABTREE, B., BATCHELOR, A., MITCHELL, J. and COPPOLA, D. (1993). J. Am. Geriat. Soc. 41: 545.
FRIEDMAN, P.J., CAMPBELL, A.J. and CARADOCK-DAVIES, T.H. (1985). Age Ageing 14: 149.
GREY, G.E. (1989). J. Am. Diet. Ass. 89: 1795.
KELLER, H.H. (1995) J. Am. Geriat. Soc. 43: 165.
KEMM, J.R., AND ALLOCK, J. (1984). Age Ageing 13: 21.
LEHMANN, A.B. (1989). Age Ageing 18:3 39.
LEHMANN, A.B., JOHNSTON, D. and JAMES, O.F.W. (1989). Age Ageing 18: 148.
LIPSKI, P.S., TORRANCE, A., KELLY, P.J. and JAMES, O.F.W. (1993). Age Ageing 22: 244.
LIPSKI, P.S. (1993). Mod. Med. 36: 108.
LIPSKI, P.S. (1995). Aust. J. Ageing. In press.
McEVOY, A., DUTTON, J. and JAMES, O.F.W. (1983). Br. Med. J. 287:7 89.
McWHIRTER, J.P. and PENNINGTON, C.R. (1994). Br. Med. J. 308: 945.
MOWE, M., BOHMER, T. and KINDT, E. (1994). Am. J. Clin. Nutr. 59: 317.
NYSWONGER, G.D. and HELMCHEN, R.H. (1992). J. Neurosci. Nurs. 24: 220.
POTTER, J., KLIPSTEIN, K., REILLY, J.J. and ROBERTS, M. (1995). Age Ageing 24: 131.
RICH, M.W., KELLER, A.J. and SCHECHTMAN, K.B. (1989). Am. J. Cardiol. 63: 714.
ROBINSON, G., GOLDSTEIN, M. and LAVINE, G.M. (1987). J. Parent. Ent. Nutr. 11: 49.
ROUBENOFF, R., ROUBENOFF, R.A., PRETO, J. and BALKE, C.W. (1987). Arch. Int. Med. 147: 1462.