Immunonutrition

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but such was the bewildering array of trial designs, admission criteria, follow up methods, and outcomes that it was necessary to collect and reanalyse data from individual patients. The review found that treatment in day hospitals was feasible for at least 23%, and at most 38%, of patients currently admitted to hospital and led to cost reductions ranging from 20.9% to 36.9% over inpatient care. Unexpectedly, patients at day hospitals showed a more rapid improvement in mental state than patients randomised to inpatient care, a finding not shown for any other alternative to admission. There was also evidence of increased satisfaction of patients and no evidence of an increased burden on carers. The review also highlighted recent changes of practice in acute day hospitals, with more emphasis on community follow up of non-attendees and the use of respite facilities for people temporarily too ill to return home at night.

At present, in the United Kingdom and elsewhere, the preferred alternative to hospital admission is acute home based care delivered by a specialised crisis team. According to a recent systematic review, home based care is thought to be feasible for about 55% of patients who would otherwise be admitted and seems to reduce costs and increase satisfaction.[8] Although home based care and acute day hospital care have not been compared directly, it would be surprising if the former was not cheaper given the infrastructure costs of day hospital care. Under these circumstances it might seem unlikely that acute day hospitals could stage a comeback, but the need for greater efficiency in providing psychiatric care may yet turn the tide in their favour.

In psychiatry, as in other branches of medicine, the demand for clinical care is growing as a result of new complex treatments and an increasing emphasis on safety, which in psychiatric terms usually translates into closer, or indeed statutory, supervision of community patients. In part this demand will have to be met by greater efficiency in the use of psychiatry's human resources, given the growing shortage of doctors, nurses, and psychologists.[9] In the context of this need for efficiency, experience shows that acute home based care faces two serious problems. Firstly, concerns for staff safety mean that clinicians cannot visit patients at home on their own, so that two or more clinicians end up caring simultaneously for the same patient. Secondly, these small groups of clinicians are obliged to drive through congested towns and cities, spending time bumper to bumper that could have been spent in face to face contact with patients.

By contrast, a day hospital, accessible by bus or hospital transport, seems a model of efficiency. Here, comparatively small numbers of nurses can maintain a high level of input to substantial numbers of patients, in a safe environment for one to one treatment. Doctors can be available as required, without first driving across town. Instead of a small group of clinicians treating each individual patient, a single healthcare professional can deliver a complex treatment to several patients simultaneously through group therapy. If such a day hospital can be combined with outreach services for patients who fail to attend and short term crisis beds for those temporarily too ill to be at home then it could offer a powerful alternative model to home based care. In the face of competition, day hospitals are evolving—let us hope it will not be long before the first trial of day hospital versus home based care.

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Immunonutrition

May have beneficial effects in surgical patients

The potential to modulate the activity of the immune system by interventions with specific nutrients is termed immunonutrition. This concept may be applied to any situation in which an altered supply of nutrients is used to modify inflammatory or immune responses. However, immunonutrition has become associated most closely with attempts to improve the clinical course of critically ill and surgical patients, who will often require an exogenous supply of nutrients through the parenteral or enteral routes.

Major surgery is followed by a period of immunosuppression that increases the risk of morbidity and mortality due to infection. Improving immune function during this period may reduce complications due to infection. Critically ill patients are at greater risk of adverse outcomes than surgical patients. In these patients complex variable immune and inflammatory changes occur that are only now being well defined. A biphasic response with an early hyperinflammatory response followed by an excessive compensatory response associated with immunosuppression is seen in many such patients. Here, early treatment is aimed at decreasing the inflammatory response rather than enhancing it, to abrogate the hyperinflammation and prevent the compensatory immunosuppression.

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An overview of nutrients with their key functions and effects appears on bmj.com

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Three potential targets exist for immunonutrition—mucosal barrier function, cellular defence, and local or systemic inflammation. The nutrients most often studied for immunonutrition are arginine, glutamine, branched chain amino acids, n-3 fatty acids, and nucleotides (an overview of their key functions and effects appears on bmj.com).[1–5] Combinations of some or all of these nutrients are present in commercially available enteral feeds. Parenteral formulas containing glutamine or n-3 fatty acids are also available commercially.

Individual components of immunonutrition have been reported to preserve or augment various aspects of cellular immune function and to modify the production of inflammatory mediators.[1–5]

Many clinical trials of immunonutrition in critically ill and surgical patients have been performed that used various nutrient combinations. Three meta-analyses give a fairly consistent view of the clinical efficacy of enteral immunonutrition.[6–8] All three considered only randomised controlled trials in either surgical or critically ill patients; the control was a "standard" enteral feed in all. Most trials used a combination of arginine, n-3 fatty acids, and nucleotides, whereas some used a combination of these nutrients and glutamine and branched chain amino acids or of arginine and n-3 fatty acids. The experimental feeds were often much higher in total nitrogen content and contained greater amounts of antioxidant vitamins and minerals such as vitamins A and E and selenium.

All three meta-analyses found that immunonutrition results in notable reductions in infections and in length of stay in hospital. In general the reduced infection rate and length of hospital stay are more pronounced in surgical than critically ill patients.[8 9] Despite these apparent benefits of immunonutrition, none of the meta-analyses identified a significant effect of immunonutrition on mortality either across all trials considered or within surgical or critically ill patients. It is this outcome that has caused the greatest controversy and discussion.[8 9] This is partly because one trial showed significantly increased mortality in critically ill patients receiving immunonutrition, an effect that was more pronounced in patients with sepsis. However, another study showed a reduction in mortality in critically ill patients with sepsis receiving immunonutrition.[10] This effect was much more pronounced in those patients who were less ill, and no advantage in survival was seen in patients with a higher score.[10] The reasons for the contradictory findings with immunonutrition in critically ill patients need to be understood more fully, and whether these relate to the heterogeneous nature of this patient group or to the presence or absence of specific nutrients within the immunonutrient mix needs to be addressed.

Trials have also shown some benefit from the "single" immunonutrient approach. For example, enteral provision of glutamine decreased the incidence of sepsis in premature neonates and the incidence of pneumonia, bacteraemia, and severe sepsis in critically ill patients.[2] However, in the latter study the decreased rate of infection was not associated with decreased mortality.[2] Parenteral glutamine decreased the incidence of infections in recipients of bone marrow transplantation and changed the pattern of mortality in patients in intensive care.[2] These clinical benefits of glutamine seem to be associated with improvements in intestinal integrity and in cellular immune function.[2]

An enteral feed that differed in lipid composition from the control (among other differences, it contained n-3 fatty acids, which the control feed did not[3]) was shown to decrease the requirement for supplemental oxygen, time on ventilation support, and length of stay in the intensive care unit in patients with moderate and severe acute respiratory distress syndrome.[11] Total length of stay in hospital and mortality also tended to be decreased in the treatment group, and fewer patients developed new organ failure.[11] Although several studies report potential immune benefits and anti-inflammatory effects of parenteral n-3 fatty acids,[3 6] few trials of the effect of this approach on clinical outcomes exist. Recent trials using parenteral n-3 fatty acids in surgical patients show immune benefits and anti-inflammatory effects[12] but no reduction in infection rate or mortality, although postoperative stay in intensive care and in hospital tended to be shorter in the fish oil group.[12]

Trials of immunonutrients indicate several beneficial clinical effects, particularly in surgical patients. However, doubts remain about the efficacy of this approach in critically ill patients, with contradictory findings among trials. Methodological differences among trials hamper comparisons.[8 9] Use of immunonutrition should be approached cautiously in the most critically ill patients.[8 9] Future efforts should try and define the most effective nutrients and optimal mixes for use in different patient groups.

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