

ity with this drug was some 10 times greater.<sup>9</sup> Drug interactions particularly with fibrates or drugs that interfere with cytochrome p450, the main isoenzyme involved in the metabolism of statins, seem to account for most instances. Reassuringly, fatal rhabdomyolysis due to statins is now rare and occurs in less than one per million prescriptions.<sup>10</sup> Inflammatory myopathy (“myositis”) is rarely a cause of rhabdomyolysis, and although routine muscle biopsy may show fibre necrosis and degeneration, it may be entirely normal.

A history of recurrent episodes, a family history of attacks, or episodes precipitated by exertion or starvation, increases the probability of a genetically determined metabolic myopathy. Of these, carnitine palmitoyl transferase II deficiency is probably the commonest, but rhabdomyolysis can occur with any of the glycolytic enzyme deficiencies, with fatty acid oxidation disorders, and with many of the mitochondrial cytopathies. Susceptibility to malignant hyperthermia may also account for some cases. However, many cases of recurrent myoglobinuria are deemed idiopathic (Meyer-Betz disease). No doubt they represent undiagnosed or as yet undefined forms of metabolic myopathy.<sup>2-3</sup>

The immediate consequences of rhabdomyolysis include hyperkalaemia, which may cause fatal cardiac dysrhythmia, and hypocalcaemia due to calcium binding by damaged muscle proteins and phosphate.

Acute renal failure results from renal vasoconstriction, intraluminal myoglobin cast formation, and haem protein nephrotoxicity.<sup>11</sup> No randomised trials of treatment have been conducted, but by consensus the fundamental management principle is intravascular volume expansion by using saline and sometimes mannitol to maintain urine output at more than 200-300 ml/hour, with careful monitoring of sodium and calcium concentrations. Alkalinising the urine by using sodium bicarbonate can reduce the risk of tubular obstruction by myoglobin casts. However, myoglobin is also intrinsically nephrotoxic and can precipitate acute tubular necrosis through iron dependent inhibition of oxidative phosphorylation and iron independent inhibition of gluconeogenesis.<sup>12</sup>

In some experimental models, haem protein cytotoxicity could be blocked by iron chelators and glutathione,<sup>11-12</sup> but this has not been evaluated clinically. Dantrolene sodium blocks the release of calcium from the sarcoplasmic reticulum and can reduce calcium mediated myolysis. Occasionally fasciotomy may be required to prevent irreversible peripheral nerve injury by muscle swelling in tight fascial planes.<sup>2-3</sup> Disseminated intravascular coagulopathy is rare in uncomplicated rhabdomyolysis but may occur in more complex cases—for example, with associated sepsis. When renal failure ensues despite these measures, continuous haemofiltration or haemodialysis will be required. The prognosis should be excellent providing the causative mechanism for the rhabdomyolysis is identified and reversed where possible.

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## Acute psychiatric day hospitals

*Are not in fashion, but evidence shows that they provide feasible and effective care*

Acute day hospitals are among the earliest forms of psychiatric community care, but they are definitely not in fashion. In the NHS Plan they are not targeted for investment,<sup>1</sup> whereas in the United States, under managed care, they have been in steady decline since the 1980s.<sup>2</sup> Yet acute day hospitals did not fall from favour because they were ineffective, and emerging social trends may yet restore them to favour.

Day hospitals were invented in Russia in the 1930s, spread to America and Europe in the 1940s and 1950s, and reached their peak in the 1970s, when they provided the main alternative to hospital admission.<sup>3</sup> Paradoxically, the success of acute day hospitals as an alternative to inpatient care was a major factor in their

decline, since it begged the question of whether hospital care was necessary at all. In the 1980s new radical approaches to community care, such as assertive community treatment and acute home based care, made day hospitals look old fashioned, stigmatising, and, worst of all, expensive.<sup>4</sup> As day hospitals began their fall from grace, hard questions were asked about their evidence base, which experts admitted was perplexing.<sup>5-6</sup>

However, a recent systematic review has shown that the answers to the hard questions were better than generally believed.<sup>7</sup> The evidence for acute day hospitals was not lacking, but it was complex. The review identified nine randomised controlled trials of acute day hospital treatment including 2268 patients;

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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.<sup>8</sup> 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.<sup>9</sup> 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.



An overview of nutrients with their key functions and effects appears on [bmj.com](http://bmj.com)

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