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Correction: Jacobsen G, Hals A. Medical investigator's views about ethics and fraud in medical research. September/October 1995, pages 405–9. On page 407, second paragraph of the left hand column, the sentence beginning on line 4 should read: 'Whereas one in ten agreed that they found the evaluation and comments from the committee to be of little use or benefit, . . .'

Correction: Benatar SR. Change and coping with change. September/October 1995, pages 436–41. Reference 13 should, instead, read: Ray JL, *Global politics*, 4th edn. Boston: Houghton Mifflin, 1992—and reference 18 should be replaced by: Rosenblum N (ed). *Liberalism and the moral life*. Cambridge: Harvard University Press, 1992.

Recent advances in rehabilitation medicine

Rehabilitation is aimed at minimising the disadvantage experienced by an individual as a result of functional impairment or disability following disease. It also addresses the impact of the social and environmental consequences of disease. Rehabilitation medicine is a new specialty although the concept of rehabilitation is not. Previously this work was undertaken within the fields of rheumatology, physical medicine, neurology, and orthopaedic, general medical and limb fitting services. In some patients, primarily those with neurological and musculoskeletal disease, the interaction of impairments with social and environmental dimensions can be complex. Effective management requires co-ordination between the patient, carers, and the medical, therapy, nursing, psychology and social services. The management of patients with complex disabilities is undergoing change with the introduction of new treatments, awareness of needs of patients and carers, and new models of care. This conference, entitled 'Medical priorities in the rehabilitation of adults with complex disabilities' given at the Royal College of Physicians on 2 February 1995, reviewed these changes. It dealt with medical priorities in rehabilitation for patients with specific diseases, and recent advances in areas pertinent to rehabilitation medicine.

Medical priorities during recovery

Stroke (Dr Derick Wade, Rivermead Rehabilitation Unit, Oxford)—A stroke rehabilitation service has to respond to the needs of patients and their families and demonstrate effective use of resources. Accurate diagnosis, identification of causative factors, documentation of impairments and identification of coexisting diseases is paramount. Acute interventions such as anticoagulation, thrombolysis or the use of neuroprotective drugs to minimise damage may be possible in the future. Common problems such as dysphagia and adverse effects of drugs on the central nervous system should always be identified. It is important to determine as early as possible what the patient was able to do before the stroke and the individual's social situation. Standardised assessments of physical function (Barthel Index), cognitive function (Short Orientation and Memory Assessment) and speech (Frenchay Aphasia Screening Test) should be made as well as

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assessment of nutritional state and skin. These assessments focus the rehabilitation programme, monitor progress and predict outcome. If a specialist stroke rehabilitation service is to succeed and improve, its quality must be monitored. This is possible with the *Stroke Audit Package* produced in 1994 by the UK Stroke Audit Group and the Royal College of Physicians.

Urinary incontinence at 3 days after a stroke predicts the level of care necessary at discharge. One study showed that for patients with urinary incontinence at the time of admission to a rehabilitation ward the outcome was significantly worse with regard to length of stay and placement at discharge [1]. The relationship between the various types of incontinence and outcome has not been established.

Head injury (Professor Lindsay McLellan, Rehabilitation Research Unit, University of Southampton)—Patients with severe head injury and concurrent trauma to other organs present a considerable challenge to several specialties during the acute phase; they undergo a slow and prolonged recovery and require many months of inpatient rehabilitation treatment. Maintaining the morale of the patient, carers and the multidisciplinary team is important but rash promises about outcome must be avoided. The medical priorities during the early phase of rehabilitation are to control seizures (preferred drug is carbamazepine), to prevent infection and limb deformity and to maintain adequate nutrition; if oral intake remains inadequate at 4–5 days after injury, a gastrostomy feeding tube rather than nasogastric tubes should be used. The cognitive effects of severe head injury are far more disabling than the physical effects; they require full assessment and careful attention throughout the patient's hospital admission and after discharge. Speech and language must be carefully assessed as communication problems reduce the effectiveness of any strategies to improve cognitive deficit. Aggressive and violent behaviour may be a manifestation of cognitive deficit; it can be modified by the environment and by the approach of the hospital staff which should be consistent. Neuropsychological support is invaluable in establishing the degree and nature of cognitive problems and establishing programmes. Sedation is rarely the answer to behavioural problems and not infrequently makes them worse. Appropriate single room accommodation is vital, as is regular consultant involvement. Violent behaviour in the early phase of rehabilitation is less likely to persist (follow-up 3–4 years) if the individual is treated in a specialist rehabilitation unit (unpublished data). The patient's family is often under considerable stress, so during all phases of the rehabilitation process, including those when the patient is on ITU, the carers need to have clear and precise information. Lack of information can lead to misunderstanding, anger and social isolation.

During the discussion the importance of maintaining

adequate nutrition was again emphasised. Despite the potential effects of anti-epileptic drugs on cognitive function, the speaker felt that the effect of seizures outweighed the risks from the drug therapy during the early phase.

Amputees (Dr Linda Marks, Disablement Services Centre, Stanmore Hospital)—Successful amputee rehabilitation involves liaison between three teams: hospital-based amputee rehabilitation team (HART) consisting of the surgeon, physiotherapist and nursing staff; the centre-based amputee rehabilitation team (CART) consisting of rehabilitation specialist, physiotherapists, occupational therapists, nurses and prosthetists; the community team. Before amputation advice and counselling is important for all, especially younger patients. The surgeon fashions the stump so that it is optimal for prosthetic limb use. For below knee amputation this means attention to the shape of the stump, with minimal redundant soft tissue at the end to allow good fit into the socket. For above knee amputation attention must be paid to stump length, to allow 'space' for the prosthetic knee joint. During the post-operative phase attention should be paid to stump oedema (with the use of appropriate elasticated stump support), stump pain and phantom limb sensation. Early walking, between 7 and 10 days after the amputation, reduces stump oedema, gives psychological support to the patient and allows the patient to weight-bear which also improves proprioception. A comprehensive assessment at the prosthetic stage optimises quality of life after amputation. Not all amputees can use a prosthesis; energy expenditure while walking can be tripled by the use of a prosthetic limb, so coexisting disease (eg heart disease, chronic bronchitis) must be recognised. Cognitive impairment has to be assessed if fitting a prosthetic limb is to be safe. For patients who are unable to walk cosmetic limbs can improve self image provided they accept that they cannot weight-bear through these limbs. Selection of the right prosthetic components is vital. There have been considerable advances in components and materials, the most recent innovation being the microprocessor-controlled 'intelligent knee joint' which monitors speed of walking and adjusts the rate of swing of the prosthetic limb accordingly. Continued follow-up is required to assess whether the initial prosthetic limb needs to be modified, and to monitor the clinical state of the patient with particular attention to the integrity of the other limb.

In some patients phantom limb pain may be improved if pre-operative pain is reduced. Prosthetic limbs can improve the quality of life in elderly patients, so age alone should not be a bar to successful prosthetic limb use.

Cardiac disease (Dr Iain Todd, Astley Ainslie Hospital, Edinburgh)—Cardiac rehabilitation in the 1990s implies a holistic approach to the management of

coronary artery disease and not simply an exercise programme for the myocardial infarction patient. The World Health Organisation definition of cardiac rehabilitation includes secondary prevention, taking into account psychological and social as well as physical consequences of coronary artery disease, and the preservation of function. It suggests that cardiac rehabilitation should not be the isolated domain of the rehabilitation specialist but integrated into cardiology and should be available to all patients with coronary artery disease from the time of diagnosis. Although treatment of impairment is emphasised in modern coronary disease management, this may not lead to a reduction in disability or handicap, since psychological morbidity can be increased by concentrating on impairment alone. Cardiac rehabilitation programmes have shifted from being purely exercise based to include patient education, stress and anxiety management, and patient-defined goals. Secondary prevention is a vital part of a successful programme. Correcting misconceptions about cardiac disease is often necessary through written information and personal interview.

The safety of exercise programmes was questioned but the speaker indicated that their safety has been established in several studies.

Medical priorities for static or deteriorating neurological disorders

Disabled school leavers (**Dr Anthony Ward**, Haywood Hospital, Stoke-on-Trent)—The difficult transition from childhood to adulthood is particularly formidable for those with physical disabilities. The expectations of disabled individuals and their parents and teachers are invariably low, and great uncertainty is caused by the organisational chasm between the paediatric and adult health and social services; a formal handover between these services is essential. To embark on a chosen occupation, disabled young people must learn the necessary skills, have stable health, adequate education, necessary aids to diminish handicap, and the appropriate information. One-third of people using this service will have cerebral palsy, one-tenth spina bifida, and a small proportion have juvenile arthritis. Neurological rarities can form a significant part of the case load. Medical problems likely to occur with any of these diseases (eg renal failure in spina bifida) must be competently managed, including appropriate monitoring and prophylactic treatments. Promotion of good health and sexual counselling must be offered, as well as access to other rehabilitation services (eg orthotics and special seating). Consultants are required to coordinate planning and execution of treatment which bridges rehabilitation, education, employment and social services. Rehabilitation staff should encourage development of personal autonomy along with social skills. Preliminary results show that intervention by specialised teams for

disabled young adults is useful [2,3]. Few health districts have all these services, so there is a need to establish them more widely.

One difficulty in delivering needed service to these young people is their natural reluctance to be involved with 'hospitals'. Therefore there should be a community based team able to offer assessment and treatment in the individual's own environment.

Motor neurone disease (**Professor Richard Langton Hewer**, University of Bristol)—From a rehabilitation perspective, management of motor neurone disease can be divided into four stages. At the diagnostic stage it is important to explain the diagnosis clearly to both the patient and the spouse. A second opinion should be offered without hesitation if the patient requests it or the diagnosis is uncertain. During the second phase, in which there is deterioration without major disability, it is important to avoid unnecessary hospital visits and focus on difficulties with employment and driving. Patients may want information about current research and drug trials. The third stage is characterised by major disability. People may require therapy and environmental control equipment (eg to enable them to switch on a light unaided). Attention to pain, which can be present in up to 64% of patients, and treatment of constipation and muscle spasms are important. Strategies for managing dysphagia (eg by posture control, appropriate neck position and consistency of food) must be available to the community staff as well as the carer. Percutaneous endoscopic gastrostomy feeding should be considered if dysphagia occurs early in the illness. During the terminal stage symptomatic relief is the primary aim; small doses of opiates are recommended to relieve distress and pain. Admission to hospital may be required for symptom control and to provide respite for the carer.

Throughout every stage, all staff involved must know how to assess and manage the disability caused by the disease and intervene without delay; they therefore need continuing training and education. Information and support must always be available to patients and carers, ideally from a key worker.

Parkinson's disease (**Professor Christopher Ward**, University of Nottingham)—Parkinson's disease has psychological as well as physical effects. Drug and physical therapy should aim to alleviate handicap by not only improving activities of daily living but preventing falls, postural deformity and malnutrition. Rehabilitation should involve prevention of psychological and physical complications while providing appropriate treatment. Patients and their families value community based staff and this helps to improve their psychological well-being, which is also affected by the quality of information, advice and support given at the time of diagnosis.

Emotion, sleep disturbance and sexual functioning are important factors in the overall activity of the

individual and should merit equal attention with all the other problems.

Spinal injury (Dr Jagdish Chwala, Rookwood Hospital, Cardiff)—In the UK most spinal injuries are managed conservatively. The aim of early treatment is to minimise further neuronal injury and to manage immediate medical complications such as autonomic disturbance and sensory and motor loss. Surgical intervention directed at stabilising the spine after injury may improve neurological function although there have been no controlled studies of this. Intravenous high dose methylprednisolone given within 8 hours of injury is probably the most effective of the various steroid regimes used. Rehabilitation starts during the acute stages of injury. Good bladder management is one of the main factors affecting outcome. Intermittent catheterisation is the preferred method of managing retention and incontinence. If a permanent indwelling urinary catheter has to be used, every effort must be made to remove it within 8 weeks of injury. Spasticity must be treated promptly to prevent contractures, by measures such as regular passive movements, antispastic medication and orthoses. Respiratory problems occur frequently. These patients need to be turned regularly, to prevent atelectasis as well as pressure sores, even when using pressure-relieving mattresses. Deep venous thrombosis occurs in up to 70% of patients; prophylactic use of anticoagulants is appropriate in those particularly at risk through obesity, dehydration, lower limb injuries or muscle hypotonia. It is necessary to be aware that life-threatening autonomic disturbance may occur during the first stages of mobilisation.

Multiple sclerosis (Dr Alan Thompson, The National Hospital, London)—Multiple sclerosis often starts in persons aged 25–30 years and, although it has little effect on mortality, patients can be considerably disabled (28% wheelchair bound within 10 years and 40% within 20 years). The needs of the patient depend on a number of factors including stage of disease, severity of disability, degree of support and individual psychological make-up. Fifty per cent of patients are likely to develop cognitive impairment; it is important to recognise that this can interact with physical management. Bladder dysfunction is common; assessment and appropriate management (drugs, continence advice) can considerably enhance quality of life. Recently intravesical capsaicin has been used to control refractory bladder disturbance, with encouraging results [4]. Multidisciplinary assessment and the identification of potential functional improvement allows treatment to be focused on the needs of the patient in a comprehensive and flexible way; to this end the rehabilitation service should ideally be community based but with easily accessible inpatient rehabilitation services.

The discussion centred on β interferon which slows

relapse rate and the appearance of new lesions as shown by magnetic resonance imaging. It is not yet known if it will decrease disability; as it does not arrest the disease, investment in rehabilitation is still of paramount importance. The drug cost is also likely to influence prescribing.

Medical priorities for musculoskeletal disorders

Although the numbers of people suffering acute back pain are far greater than those with inflammatory arthropathies, the rheumatologist sees far more inflammatory disease than back pain. Concentrating on the medical advances in rheumatology, **Dr David Scott** (King's College Hospital, Dulwich) recommended early specialist referral and early use of disease modifying agents for people with inflammatory joint disease. He emphasised adequate control of symptoms in order to minimise handicap. Support by a multidisciplinary team was advocated for non-inflammatory rheumatic disease. The Clinical Standards Advisory Group recommended in December 1994 that the focus of care for patients with acute back pain should move to the first few weeks of pain, that most episodes should be treated in the community and that each purchasing authority should have a specific contract for back pain rehabilitation.

During the discussion the important role of psychology and psychiatry in the management of back pain was raised. The issue of resources for the proposed shift of care was also discussed.

Recent advances

New cognitive strategies (Dr Barbara Wilson, MRC Applied Psychology Unit, Cambridge)—It was emphasised again that in head injury the cognitive problems cause more handicap than the physical problems. Recent developments in practical management strategies for specific cognitive problems were highlighted. An exciting concept is that of errorless learning. People with pure amnesia often have relatively normal implicit learning and learning ability; they learn better when prevented from making mistakes. This technique is also effective to a lesser extent in those with frontal lobe damage. With all such patients, trial and error learning should be avoided; don't even let them guess your name! Electronic memory aids are seldom successful since people forget them and cannot learn to program them, but the problem may be overcome if the complex programming is carried out by someone else, leaving a simple system for the patient to use. Patients with unilateral neglect but with some voluntary activity in the affected arm can be helped by performing a task (such as squeezing a ball) with the affected arm in the affected hemispace. Attentional deficits improve by the use of such a self-alerting programme, and patients can eventually take over the alerting routine from therapists; measures of

attention and neglect improve while other cognitive deficits do not. Problem solving training (by breaking down the task to be learned into smaller components) improves the ability to perform tasks in patients with frontal lobe damage. Self-monitoring training is also being studied in selected patients in the community to increase control of behaviour and inhibition of aggressive outbursts.

It was generally agreed that both the occupational therapists and clinical neuropsychologists have a role in the psychological assessment and planning of treatment. The need to pass on skills and strategies developed from research was emphasised. Pharmacological intervention to enhance memory is not used at present.

Neural prostheses (**Professor David Rushton**, The Royal London Hospital)—A neural prosthesis is a device, often implanted, intended to restore, replace or mimic the function of an injured part of the nervous system; they are not necessarily 'electrical' but can be pumps such as ventricular-peritoneal shunts. Implants have applications in routine use (eg cardiac pacemakers), in specialised centres (eg phrenic nerve stimulators) and in research (eg for functional electrical stimulation of ankle dorsiflexors in foot drop). Such devices represent a considerable investment for both the patient and the health services, but they can improve length and quality of life; however, they must be assessed for beneficial effect on disability and handicap, and not only the correction of disordered physiology. Neural prostheses used in neurological disease are at present available only in specialised centres or as part of research. Rehabilitation services need to be aware of these devices so that patients can make an informed choice; motivation is important when selecting those who would benefit. Many prostheses are suitable for only a few patients, whereas others, such as gracilis slings for anorectal incontinence, should become widely available after further development.

The need for careful assessment of patients was re-emphasised, as was the importance of developing mechanically reliable prostheses.

Recent advances in the secondary prevention of disability

Control of spasticity and contractures (**Professor Michael Barnes**, University of Newcastle-upon-Tyne)—The treatment of spasticity aims to improve function, prevent complications, alleviate pain and improve ease of care. Attention to posture and seating is the first step in managing spasticity. Physiotherapy, pharmacological intervention, the use of orthoses and serial plastering are also important in subsequent treatment. Drug therapy, such as baclofen which acts at the spinal level and dantrolene which acts on muscle, can be effective but may produce systemic side effects; these two drugs may be used simultaneously as they are synergistic.

Newer antispastic drugs such as tinazidine, which is not marketed in the UK, are as effective as baclofen but produce less drowsiness. Regional and local control of spasticity using nerve blocks can be very effective. Local nerve blocks can be used in the lower limbs, but they are done less often in the upper limbs because of the high incidence of anaesthesia following the procedure. For selected patients (those without bladder or bowel control) an intrathecal block can provide effective control of spasticity. Sensation will be impaired below the level of the block, increasing the risk of pressure sores. Surgical disruption of nerve roots can also be useful in refractory lower limb spasticity. Intramuscular botulinum toxin has been used successfully for local relief of both upper and lower limb spasticity, without causing sensory disturbance. It is expensive and its effect usually lasts for less than 6 months, but it can be a valuable adjunct to other treatments.

The discussion centred on the use of botulinum toxin as the treatment of choice in the upper limb as it does not cause sensory disturbance. Treatment for spasticity should only be carried out if there are clear benefits to the patient.

Wheelchairs, seating and corrective orthoses (**Dr Robin Luff**, Disablement Services Centre, Dulwich)—The speaker emphasised the importance of good communication between team members, patients and families in achieving good seating. Symmetrical seating improves the patient's posture, reduces the size of the wheelchair, improves function and offers adequate pressure relief. A good chair should provide support for the back, legs and feet and have a firm base. Even if the person already has contractures such that ideal seating is not achievable, it is always worth trying to correct posture and improve comfort and reduce risk of pressure sores. Chairs that are uncomplicated and easy to handle are most likely to meet with the approval of patients and carers.

Chailey Heritage have shown that good seating and the use of standing frames and sleeping frames prevent secondary complications.

Osteoporosis (**Dr Cyrus Cooper**, MRC Environmental Epidemiology Unit, University of Southampton)—Osteoporosis was recognised nearly 150 years ago, but the relative contributions of bone strength and trauma to fracture rate have only been recognised more recently. Fractures associated with osteoporosis usually follow falls. Simple measures such as a plastic hip protector can reduce fracture rate by as much as a half even in the most vulnerable group [5]. Since bone strength is proportional to bone density, the maintenance of adequate bone mineralisation is particularly important in patients with reduced mobility. Health promotion (stopping smoking, taking exercise, and possibly encouraging the use of hormone replacement therapy) is an important part of this management as

well as pharmacological intervention with bisphosphonates in suitable patients. The combination of preventing falls, maintaining bone mineralisation and reducing the risk of bone fracture with appropriate medical management is important in all age groups.

Summary

- Recognise all impairments, including the cognitive and the emotional
- Determine the relationship between impairments and function
- Make accurate, comprehensive assessment
- Keep patients and carers well informed
- Integrate hospital and community based rehabilitation
- The team approach is vital.

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