Part I

Clinical rehabilitation

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The rehabilitation consultation

In a rehabilitation setting, the medical/neurological clinic should be more than a standard consultation aiming at diagnosis and medical management of the clinical condition. Beside this core function, the clinic appointment should be a chance for the patient to be assessed in the most comprehensive way. Most neurologically disabled patients will have complex problems such as medical, physical, psychological, mental health, communication, swallowing, sphincteric, tissue viability, equipment, social, financial, and probably more obscure but nonetheless crucial issues. Most members of the rehabilitation team concentrate on the management of the problem relevant to them, with relatively limited ability to appreciate the impact other disabilities are having and the complex way they can interact together to generate a management problem. For example, a patient with multiple sclerosis who presents with falls may also have a bladder problem, with urgency and frequency of micturition, plus a visual impairment and, consequently, may fall while rushing to the toilet.

The rehabilitation clinic should act as the clinical setting to look at the patient with a wide perspective. Rehabilitation physicians should have the ability to evaluate all the relevant pieces of the puzzle and to use their knowledge of the basic practice principles of other therapists/clinicians in order to 'plug' the patient into the appropriate services and to review their progress and ensure that goals are achieved.

Rehabilitation physicians should always work in direct contact with the members of their team. This will avoid lengthy paper trails, misunderstandings and, most importantly, disagreements regarding how realistic some goals are. Some clinicians adopt the model of *joint clinics*, where the patients are seen by the physician and one or two relevant members of the team. I personally find this model extremely helpful and a very efficient way to use time and resources. A patient with a gait impairment resulting from a combination of weakness and spasticity can be seen by the physician and the physiotherapist. A management plan can be formulated with the agreement

of the clinicians and the patient. If an intervention such as botulinum toxin injections is suggested, decisions about which muscles to be injected and postinjection physiotherapy can be arranged on the spot without delays or misunderstandings.

This model of service provision is very difficult to implement within the context of a standard hospital clinic service where general practitioner (GP) referrals are automatically placed into vacant clinic slots. From my experience, GP referrals are not the major source of patients in a rehabilitation clinic. It is unfair to ask GPs to determine which disciplines in the rehabilitation team the patient should see and whether medical input will be needed or not. A more appropriate approach is to encourage GPs to refer their patients to the neurological rehabilitation team and then leave it for the members of the team to determine which clinicians should see the patient. The majority of patients will probably not need a specialist medical rehabilitation input and many of them will be under neurological consultants for their primary diagnosis. An experienced member of the team can do the initial patient's assessment and then can refer to the rehabilitation medical clinic accordingly. Specific groups of patients stand out as the most in need of such a comprehensive approach as they often present with complex management issues. Brain injury, whether traumatic or secondary to other causes such as encephalitis, often presents with complex physical and cognitive issues needing a holistic approach to their management. Patients with spinal injuries are usually young with many psychological, social and vocational issues that need to be addressed in conjunction with their primary physical problems. Other conditions such as multiple sclerosis may also benefit from such an approach. Patients with cerebral palsy or spina bifida will probably need annual reviews as many of the problems they face are subtle with an insidious onset and have the potential to lead to long-term major problems such as chronic pain syndromes or renal failure. A specialist review will increase the early detection of such problems.

Management of medically unexplained conditions such as conversion syndrome, pseudo-seizures or chronic fatigue syndrome should ideally be the responsibility of a neurological rehabilitation service. Such disorders are difficult, complex and need a well-coordinated rehabilitation effort, with one or two key clinicians acting as a source of motivation, support and information for the patients.

One of the advantages of such a model of service provision is that it reduces the need for regular medical follow-ups, freeing spaces for new patients and for patients with active medical issues. Once the initial joint medical assessment is concluded, a comprehensive action plan can be formulated and copies distributed to clinicians involved and to the patient and/or carers. This management plan can act as a template for reviews in the near future, with the therapist most involved with the patient reviewing the goals. The patient

can then be brought back into the medical clinic once a new medical issue or a complex problem that warrants a medical review arises.

Many patients will be too immobile to be able to come to the clinic and will need a domiciliary visit. Again a joint visit with the therapist can achieve much more than a visit by the physician addressing only medical issues. The visit will be a good opportunity to increase the team's appreciation of the psychosocial context of the patient's presentations so that appropriate management steps can be taken.

2

The rehabilitation unit

Most neurological rehabilitation units admit patients following acute neurological damage such as brain injury, spinal injury or stroke. The standard practice is to admit patients once they are medically stable, assuming that the patient has good potential for rehabilitation. The necessity of medical stability as an essential requirement for accepting the patient for an inpatient rehabilitation programme is not only to ensure that the patient is able to tolerate therapy but also because of the relative inexperience of the rehabilitation team in dealing with acute and active complex medical issues. Rehabilitation units will certainly differ in their staffing, location and philosophy, with some units geared more towards accepting patients early on after the neurological insult and others accepting patients in after the acute stage. In the acute stage following a neurological insult such as a traumatic head injury, encephalitis or subarachnoid haemorrhage, rehabilitation needs are unique and involve mainly issues such as tracheostomy management, maintaining the range of movements in joints, management of early seizures or managing cognitive or behavioural impairments during the period of post-traumatic amnesia. It is essential that a service dealing with this stage has the expertise to manage such acute stage problems, sufficient staff, an intensity of medical input and a location that ensures immediate access to specialist medical and surgical support. A unit accepting patients at a later stage of their rehabilitation may need less intense medical input but should have different facilities such as designated large therapy areas, occupational therapy kitchens or small flats for independent living to evaluate patients before discharge.

In Greater Manchester, the neurological rehabilitation services have been configured and organised regionally to ensure that the patients' rehabilitation needs in the acute, post-acute and chronic stages are met. The regional neuroscience unit is based at Hope Hospital, Salford with an acute neurological rehabilitation ward being a part of the neuroscience department. This ward accepts patients in the acute stage following any neurological insult such as brain injury or after neurosurgical interventions for conditions such

as subdural haematomas, subarachnoid haemorrhage or brain tumour. The acute rehabilitation unit serves three million Greater Manchester residents. Once the patient is neurologically stable, he/she can be transferred to one of four intermediate rehabilitation units located in different centres: Wigan, Stockport, Rochdale and central Manchester. The acute rehabilitation unit and the four intermediate rehabilitation units function as a *service network* for issues such as clinical governance, outcome measures and lobbying for resources. Despite the persistence of inequalities in access to some aspects of community rehabilitation and in transfer waiting times, this model of service has helped greatly in the provision of neurological rehabilitation services for Greater Manchester residents irrespective of the area they live in (postcode).

Patients with chronic neurological disabilities such as multiple sclerosis or Parkinson's disease form an important clientele to the neurological rehabilitation units. Such patients are usually admitted either straight from home or they may be transferred from an acute ward following an acute admission to manage problems such as bony fractures, infections or general deterioration of functional abilities through natural progression of the primary neurological condition. The intermediate neurological rehabilitation units usually have a case mix of patients with post-acute or chronic neurological rehabilitation conditions.

The basic philosophy and ideas of rehabilitation should be introduced to the patient in the early period following admission. Concepts such as goal setting, supporting the patient to achieve independence, instead of simply providing basic care, and interdisciplinary work of the staff are all important and the patient should be able to grasp these concepts if he/she is going to be able to participate fully into the rehabilitation programme. For example, a patient accepting the philosophy of interdisciplinary work will appreciate that help during washing and dressing, transfers or meals are all integral to the physiotherapy and occupational therapy sessions; consequently, he/she would not feel disappointed about the length and frequency of the formal therapy sessions. Explicit goal setting may help another patient to appreciate the progress that he/she is making and can also help him/her to focus on a particular functional task even during evenings and weekends when formal therapy is not usually available.

The length of stay for patients can be from a few weeks to several months; consequently it is not uncommon for patients to feel low in mood and homesick. Early assessment for home leave can help to alleviate these feelings. We have also found that the role of an *activity coordinator* can greatly enhance the patients' enjoyment and improve their mood. The activity coordinator usually spends long hours with the patients and is in a very good position to pick up any subtle social, behavioural or mood problems, such as anxiety. Our activity coordinator is a valuable member of the team and her contributions in the team meetings and case conferences are invaluable as they

increase the team member's insight regarding their patients' mood or other important issues. The activity coordinator can also help in the difficult times immediately following discharge by providing an outreach service to reduce the potential for social isolation for vulnerable patients.

For many patients, discharge from the rehabilitation unit is synonymous with the conclusion of their rehabilitation and the frightening prospect of a life with their residual disability with only minimal efforts for further rehabilitation. The community rehabilitation programme should be discussed fully with the patient to reassure him/her about the future. A few patients will refuse to accept discharge as they feel that they are still able to achieve further improvement with inpatient therapy. One of the ways to demonstrate to the patient the lack of progress is to set one or two modest goals with a specific time frame to achieve these goals. Failure to achieve the goals in the agreed period can demonstrate to the patient the difficulty of achieving further improvement. For example, a patient failing to achieve good sitting balance will be unable to achieve further goals relevant to physical transfers.

Other patients might be desperate to be discharged but the plans for discharge are delayed because of the unsuitability of their discharge destination. Such patients should be identified as soon as possible and plans made for home adaptations or provision of equipment. The issues relevant to discharge should be a fixed item in the case conference agenda, with the members of the rehabilitation team using their expertise to predict the functional abilities of the patient by the time of discharge and to set the wheels in motion for a discharge plan as soon as possible.

Part II

Case studies

3

Medical issues in brain injury rehabilitation

Because of its high incidence in the young population, traumatic brain injury has become one of the major challenges from a public health perspective. The overwhelming majority of the more than one million patients attending accident and emergency departments in Britain each year will have mild head injury and will suffer mild and transient symptoms with no long-term complications. However, a minority of those patients with mild head injury will suffer significant chronic cognitive impairments that will impact on their social and/or vocational functions. Glasgow Coma Scale assessment plus the period of post-traumatic amnesia have traditionally been used to determine the severity of the head injury; amnesia of less than an hour indicating a mild head injury, for 1–24 hours indicating moderate injury and for more than 24 hours indicating severe head injury.

Clinically, neither severity of the head injury nor brain scan findings are able to indicate unequivocally the long-term prognosis, with many patients with a mild head injury and normal scans going on to develop significant cognitive or behavioural disabilities that will impact on their social and/or vocational functions while full recovery following a moderately severe head injury is occasionally seen.

Different service models have been suggested to try to screen patients with mild brain injury for cognitive impairments, with accident and emergency follow-up clinics for mild brain injury being commonly used. Accident and emergency departments provide patients with written information about symptoms of post-concussion syndrome and advise them to contact their GP if the symptoms persist.

Most brain injury rehabilitation services are geared towards the severely injured patients, as they clearly require a multidisciplinary approach for management to cater for their complex physical, cognitive and behavioural problems. Several medical complications are commonly seen in patients with brain injury. Recognition and appropriate management of these complications is an important element in the overall rehabilitation effort.

Post-traumatic seizures

A 22-year-old man sustained a severe head injury judging by post-traumatic amnesia for 10 days and a Glasgow Coma Score of 4/15 in the first 24 hours after injury. The head computed tomographic (CT) scan showed evidence of frontal contusion and the patient was managed conservatively. The patient had two generalised seizures, the first immediately after the accident while awaiting the ambulance and the second two days later. He was managed with phenytoin 300 mg daily. The patient progressed very well with his rehabilitation and two months later discontinuation of phenytoin was discussed with him and his family.

Comments

Up to 10% of patients with severe head injuries suffer from post-traumatic seizures. Patients with skull fractures, intracranial haematomas and prolonged periods of unconsciousness are particularly vulnerable. Patients with mild-to-moderate head injury will also have an increased risk of seizures. However, the risk is less than 1% for such patients.

Acute post-traumatic seizures are defined as seizure activities occurring within the first week following the head injury. Such seizures are quite harmful and, therefore, aggressive management including attempts at prevention is mandatory. Acute seizures may cause further brain damage through several mechanisms, including increased brain metabolism, increased hazardous inflammatory transmitters, including free radicals, and direct mechanical cellular damage. Phenytoin has been traditionally used to manage seizures in the acute stage. Despite the availability of several newer antiepileptic drugs with a relatively safer profile, phenytoin has several unique properties that are advantageous during such a critical period. It can be administered intravenously, thus providing an almost immediate therapeutic effect. Following that initial dose, full oral dosage can be administered without the need to build up the dose slowly. Phenytoin has also been shown to possess neuroprotective properties in animal models, most probably through its sodium channel-blocking action.

The popularity of phenytoin as an antiepileptic in the acute stages of head injury makes it very common for rehabilitation physicians to see their patients with head injuries already taking it when admitted to the rehabilitation units. Rehabilitation physicians are often concerned about the sedative side effects of phenytoin as it may accentuate the patient's cognitive difficulties. The decision either to continue or to stop phenytoin will be mainly based on the need for prophylactic antiepileptic therapy to prevent late seizures.