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Cognitive rehabilitation: assessment and treatment of persistent memory impairments following ECT

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Abstract Few tests address the types of memory problem commonly reported after electroconvulsive therapy (ECT). Here, we focus on the importance of neuropsychological assessment in ECT-treated patients and describe a number of tasks that may be useful in measuring the everyday memory problems of such patients with ongoing memory difficulties. At the time of writing, no attempts have been made to rehabilitate patients who experience persistent adverse cognitive effects, but clinicians should be aware of the potential beneficial role of cognitive rehabilitation in the treatment and management of these effects.

In a recent issue of APT, Robertson & Pryor (2006) drew attention to a number of issues regarding the assessment of cognitive function in patients treated with electroconvulsive therapy (ECT). In particular, they highlighted the paucity of tests that are sensitive and relevant to the specific memory problems commonly reported after ECT. Here, Mangaoang & Lucey return to this problem, discussing neuropsychological assessment in ECT-treated patients.

Electroconvulsive therapy (ECT) has been used for many years, but it remains one of the most controversial psychiatric treatments. In recent years, a considerable amount of research has attempted to highlight the efficacy and safety of ECT, in addition to emphasising the overall improvements in current ECT techniques, equipment and standards (Sharma, 2001; Chung, 2002; UK ECT Review Group, 2003; Prudic *et al*, 2004). However, there also exists a growing body of research consistently reporting the adverse cognitive and psychological consequences of ECT among a substantial minority of patients (Johnstone, 1999; Service User Research Enterprise, 2002; Koopowitz *et al*, 2003; Rose *et al*, 2003; Scott, 2005).

Although discrepancies exist between clinician-led or hospital-based studies and those undertaken in collaboration with patients regarding the nature and extent of adverse side-effects, there is a general consensus that memory loss (Box 1) is the most frequently and consistently reported side-effect following ECT (Rose *et al*, 2003). There have been many conflicting accounts of the severity and duration of the memory and other cognitive difficulties (Weeks *et al*, 1980; Squire *et al*, 1981; Templer & Veleber, 1982; Squire & Slater, 1983; Lisanby *et al*, 2000; Brodaty *et al*, 2000), but to date there has been a distinct lack of routine neuropsychological assessment of individuals receiving ECT at any stage during their treatment.

Designing an assessment battery that is sensitive to the nature of the everyday problems experienced by patients with memory and/or cognitive disability is challenging, and standard neuropsychological tests may not adequately reflect the levels of impairment experienced by patients on a daily basis (Robertson & Pryor, 2006). Thus, the use of novel, personally relevant memory tasks such as those described below may be warranted.

Furthermore, no attempts have been made to provide any form of memory rehabilitation or cognitive retraining to patients who experience persistent memory and other cognitive problems in these areas following ECT. Here we argue that cognitive rehabilitation could be offered to such patients as a means of addressing these difficulties in a constructive way.

The importance of assessment

What is striking from the literature in this area is the lack of routine, formal assessment of patients' neuropsychological performance following a course of ECT, despite the long-known risk to memory

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functioning (Squire & Chace, 1975; Squire *et al*, 1975; Freeman *et al*, 1980; Squire & Slater, 1983; Robertson & Pryor, 2006). Furthermore, the lack of consistency in the types of measures used to assess patients has made it difficult to clarify the extent and duration of the reported cognitive problems and the impact they may have on the individual's overall quality of life and sense of self.

In Ireland, for example, there is no published research on the long-term effects of ECT on cognitive functioning among Irish patients. The failure to conduct such assessments means that there may be a significant delay in detecting patients who have experienced a marked decline in memory function.

Guidelines

The importance of assessing and monitoring patients' cognitive function throughout their treatment has been recognised in guidelines on the commissioning of ECT services within the National Health Service (NHS) (Royal College of Psychiatrists, 1995, 1999), and the ECT Accreditation Service (ECT Accreditation Service, 2005) includes assessment and monitoring of cognitive function as standards required for accreditation of a clinic. However, there has been a relative neglect to include such measures in routine clinical practice. It appears that even when they have been explicitly recommended (Freeman *et al*, 1980; Salford Community Health Council, 1998 ; Royal College of Psychiatrists, 2005) patients who report persistent memory loss have not been systematically followed-up or referred for neuropsychological assessment. As a result, their progress or deterioration over time in terms of cognitive performance has not been monitored.

Monitoring patients' self-reports of adverse side-effects to ECT has also been recommended by the Royal College of Psychiatrists (1995, 2005) and the National Institute for Clinical Excellence (NICE, 2003). Benbow & Crentsil (2004) have shown the importance of measuring such experiences during treatment, as it allowed the ECT staff to take immediate action to try to relieve the problems. For instance, if patients reported persistent confusion or memory difficulties, staff could change from bilateral to unilateral ECT or increase the interval between treatments.

Longer-term implications

The failure to adequately provide neuropsychological assessments to patients receiving ECT means that the impact of additional, subsequent episodes of depression and/or future courses of ECT on overall cognitive functioning remains unknown (Robertson & Pryor, 2006). Establishing a baseline of functioning before an individual's first ECT treatment is extremely important in terms of its association with 'cognitive reserve'. This concept refers to individual differences in factors such as education and occupation, which may be protective against ECT's adverse effects on memory functioning (Legendre *et al*, 2003).

The Society for Cognitive Rehabilitation (SCR; Malia *et al*, 2004) recommends that a combination of standard and novel tasks to assess current cognitive status should be administered to patients. Objective and subjective self-report questionnaires and collateral information from family or caregivers should be used, and the assessment battery should provide sufficient information to form hypotheses about the underlying cognitive impairments and deficits that interfere with the individual's cognitive functioning. These recommendations concur with Robertson & Pryor's (2006) proposal that ECT-treated patients who report ongoing memory disability should be referred for neuropsychological assessment. The purpose of this is both to determine their general cognitive abilities and to measure specific cognitive functions, such as attention, concentration and information processing, that may be related to memory functioning in everyday life (Ponds & Hendriks, 2006).

Making use of assessments results

Rather than merely describing problems, the results of neuropsychological assessments should be explained in terms that the patient can understand and explicitly related back to the functional problems that have been identified (Mateer *et al*, 2005). They should be interpreted in a holistic way that takes account of the individual's personality and emotional characteristics and used to inform decisions about preparing a suitable rehabilitation programme (Malia *et al*, 2004).

Neuropsychological assessment of memory

There are many factors to consider in the neuropsychological assessment of patients receiving ECT. These include the selection or development of appropriate testing materials, the timing of testing sessions (Robertson & Pryor, 2006) and the effects of factors such as mood, metamemory and memory self-efficacy on performance (Mateer *et al*, 2005; Ponds & Hendriks, 2006). Additional problems, such as limited access to neuropsychology services, financial and time constraints, may have an impact on the number and frequency of assessment sessions that can be undertaken.

Design of appropriate tests

Although Robertson & Pryor (2006) recommend that patients who have had ECT should be assessed with the kind of neuropsychological tests that are used for patients with known or suspected brain injury, they acknowledge some of the problems associated with these traditional, standardised tasks. The main challenge appears to be designing tests that are sensitive to the memory and other cognitive demands placed on patients in their everyday lives. This task is made even more difficult by the realisation that patients with memory disability may not be able to give reliable self-reports of their memory functioning (Cronholm & Ottosson, 1963; Robertson & Pryor, 2006). Rose *et al* (2003) note that neuropsychological assessment of the extent of memory loss in ECT patients has tended to focus on the ability to form new memories (anterograde memory, Box 1), whereas patients have commonly reported the loss of autobiographical memory (retrograde amnesia, Box 1) following ECT (Coleman *et al*, 1996; Peretti *et al*, 1996; Donahue, 2000). However, loss of autobiographical memory does not appear to have been adequately investigated (Robertson & Pryor, 2006). Furthermore, alternative versions of tests may be required to reduce practice effects over repeated assessments.

Box 1 Memory

Autobiographical memory Store of knowledge of past experiences and personal facts of one's life

Episodic memory Store of personal experiences that are tied to particular times and places

Semantic memory Memory for meanings and general (impersonal) facts

Topographical memory The ability to orient oneself in a familiar environment as well as to learn and remember the layout of a new environment

Anterograde amnesia The loss of the ability to form new memories

Retrograde amnesia The loss of autobiographical memory for the period before a certain event, e.g. ECT

Long-term memory The part of the memory system where information is stored over long periods of time or indefinitely

Short-term memory The part of the system where information is stored very briefly (about 30 s)

Timing of testing

As mentioned above, encouraging patients who are undergoing a course of ECT to give self-reports of any adverse side-effects can be beneficial in terms of allowing staff to take immediate actions to reduce or relieve these effects (Benbow & Crentsil, 2004). However, in many studies the premature assessment of memory and overall cognitive functioning following ECT has led to inaccuracies and underestimations of patients' impairment (Squire & Slater, 1983; Weiner *et al*, 1986; Coleman *et al*, 1996; Peretti *et al*, 1996; Donahue, 2000; Rogers *et al*, 2002; Robertson & Pryor, 2006). It may take a number of months for patients to gain a more stable view of permanent changes in their memory and cognition (Weiner *et al*, 1986; Coleman *et al*, 1996; Donahue, 2000).

A further problem relates to the ambiguity of meaning in the phrase 'short-term memory loss'. Does it refer to type of memory or duration of loss? Robertson & Pryor (2006) recommend that the phrase 'temporary memory loss' should be used when referring to duration. Patients who interpret short-term memory loss in terms of duration may not be inclined to complain about memory difficulties, believing that they are to be expected and will resolve within the 'short term'. This may lead to an underreporting of memory problems among patients who are assessed only a few days or weeks after the completion of ECT and highlights the importance of scheduling follow-up assessments after the 6-month time point (Service User Research Enterprise, 2002; Robertson & Pryor, 2006).

Effects of mood and emotional valence on performance

Many studies have shown that individuals who are depressed are more likely to recall negative events than positive or neutral ones (Teasdale *et al*, 1980; Parrott & Sabiny, 1990; Williams *et al*, 1988; Lemogne *et al*, 2005). The performance of people without depression on tasks measuring memory and cognition may also be influenced by their current mood. Recently, Beatty *et al*'s (2006) study involving healthy adults showed the significance of both current mood and emotional valence (the subjective emotions associated with an event) on participants' ability to recall events they had experienced over the past year. Therefore, any assessments of cognitive and memory functioning in patients who have received ECT should take account of the individual's mood at the time of testing and also whether they perceive the event recalled as positive, negative or neutral.

Box 2 Memory self-efficacy and meta-memory

Memory self-efficacy refers to the degree of belief one has in one's ability to generate the motivation, cognitive resources and courses of action required to deal competently with the demands of using one's memory.

The concept is strongly linked to Mateer *et al*'s (2005) theory of *metamemory*, which is defined as an awareness of one's own memory processes, knowledge and use of memory strategies, self-perceptions of one's memory abilities and beliefs about the functioning of ones' own memory.

Memory self-efficacy and metamemory

According to Ponds & Hendriks (2006), patients' complaints about their memory do not necessarily reflect memory deficits; furthermore, there may be large discrepancies between the severity of memory disturbances as measured by memory tests and the impact of these problems in daily life. Finding only moderate correlations between self-reported memory problems and objective results on standardised neuropsychological assessments, Ponds & Hendriks introduced the idea of memory self-efficacy (Box 2) to explain this discrepancy. They argue that an individual's beliefs and perceptions about their memory may be extremely influential in determining their level of engagement and performance during memory assessment. The belief that one has a poor memory may lead to increased dependence on others, avoidance of memory challenges, and a pattern of helplessness and demoralisation when faced with memory difficulties (Elliot & Lachman, 1989). Additional evidence of the impact of self-perceived memory capacity on control of memory efficiency (Cavanaugh & Poon, 1989; Hertzog *et al*, 1990; Jonker *et al*, 1997) supports the argument that neuropsychological assessments of patients who have had ECT should take account of the patient's own metamemory or sense of memory self-efficacy.

Novel tasks for measuring everyday memory

A few years ago one of us (M. M.) was involved in a study of the effects of surgery for temporal lobe epilepsy (Mangaoang *et al*, 2004). The study team developed tasks for assessing aspects of everyday memory functioning and spatial representation in patients after surgery (Box 3). These have since been administered to large numbers of healthy control individuals of all ages and to people with chronic major depression (McMackin *et al*, 2005). These tasks, which are outlined in this section, might be considered for use with patients following ECT.

Sensitivity to the nature of the patients' memory problems

Episodic and autobiographical memory

The Mundane Memory Questionnaire specifically measures personally relevant episodic memory of typical daily events over the previous four consecutive days. Participants are asked to indicate (by circling either 'yes' or 'no') whether they recall a particular event, for example, watching television or eating lunch. If the event is recalled, they are asked to give additional information such as what programmes they watched or what food they ate. If participants are unable to provide additional details, they are asked to proceed to the next question.

This measure was extremely sensitive to the types of everyday memory problem experienced by the patients in our study of temporal lobe epilepsy (Mangaoang *et al*, 2004). It differs from questionnaires such as the Everyday Memory Questionnaire (Sunderland *et al*, 1984), the Prospective and Retrospective Memory Questionnaire (Smith *et al*, 2000) and the Cognitive Failures Questionnaire (Broadbent *et al*, 1982) in that it does not require patients to rate their own memory performance, thereby taking account of the observation that some people with memory problems cannot accurately rate the level of their impairment.

Box 3 Novel tasks that could be used to measure everyday memory functioning in patients receiving ECT

- Mundane Memory Questionnaire
- Everyday Memory Interview
- Adapted Autobiographical Memory Interview
- Memory Characteristic Rating Scale
- Measures of mood and metamemory or memory self-efficacy
- Nine-point mood rating scale
- Five-point memory rating scale
- Tasks measuring topographical memory and way-finding ability
- Landmark Recognition Task
- Landmark Location Task
- Virtual Map Task

(Mangaoang *et al*, 2004)

The Everyday Memory Interview is based on an interview used by Eldridge *et al* (1994) in their assessment of the role of schemas in autobiographical memory. In a tape-recorded interview, the participant is asked to describe, in as much detail as possible, their typical day, yesterday and a day in the previous week, in counterbalanced order (to control for order effects or bias) . The interview is scored by focusing on the number of basic activities that are recorded for each of the target days. Discourse analyses of the interview content can also be undertaken to measure the frequency of repetition of events, pragmatic problems and the use of verbal tics.

The merit of both the Mundane Memory Questionnaire and the Everyday Memory Interview is that they measure the ability of patients to recall personally relevant events, are straightforward to administer and are free from practice effects. Modified versions of the tasks could also be completed by patients' caregivers or spouses, should collateral information be desired.

Semantic and phenomenal characteristics

Although both episodic and autobiographical memory have been widely researched, very few studies have used tasks that are concise, distinguish between semantic and episodic information, and control for emotional valence. Semantic information consists of general knowledge: things we know without any connection to personal experience, whereas episodic information refers to details such as time, person, place and emotions about specific personally experienced events. Levine *et al*'s (2002) Autobiographical Memory Interview separates the semantic from episodic details of events. Beatty *et al* (2006) adapted and extended this measure to show how the recall of specific personally relevant events over the previous 12 months was influenced by whether participants construed the events as positive, negative or neutral. The transcribed interviews were analysed in terms of the number of specific episodic details recalled for each type of event, thereby controlling for the emotional valence of the event. This interview can be extended to include events from the less recent past, in order to gain a thorough appreciation of the extent of a patient's retrograde amnesia.

Beatty *et al* (2006) also used the Memory Characteristic Rating Scale (adapted from Johnson *et al*, 1988) in conjunction with Levine *et al*'s (2002) Autobiographical Memory Interview to measure the phenomenal characteristics of the different events. The Memory Characteristic Rating Scale uses a seven-point Likert scale to rate the vividness with which participants can recall specific aspects of an event, such as visual and auditory details. This combination of tasks facilitates examination of the association between the emotional valence of an event and the vividness with which different characteristics can be recalled.

Topographical memory

The effects of ECT on topographical memory, way-finding and spatial representation are largely unknown. We can find only one self-report of such deficits (Anonymous, 1965). Assessments of patients who have received ECT do not appear to consider the possibility of such impairments, despite their impact on everyday life. In our work on temporal lobe epilepsy (Mangaoang *et al*, 2004; Roche *et al*, 2005), we developed a number of tasks (the Landmark Location, Landmark Recognition and Virtual Map tasks) to measure the ability of patients with left or right unilateral hippocampal damage to recognise photographs of well-known Dublin landmarks and to accurately name their location on a modified map of the city. Patients also described in writing the routes they would take to get from one landmark to another on a map of a virtual city. These tasks were extremely sensitive to the everyday way-finding problems experienced by many of the patients, particularly those with right-sided hippocampal damage (Mangaoang *et al*, 2004) and could potentially be used to identify whether patients treated with ECT experience similar difficulties.

Sensitivity to metamemory and mood

In considering metamemory and memory self-efficacy (Box 2), the study team used a simple memory rating scale, asking patients to rate their own perception of their current memory functioning at the time of assessment on a five-point Likert scale (1 = 'very bad', 5 = 'excellent').

Patients' self-reported symptoms of depression can be assessed using the Beck Depression Inventory (Beck *et al*, 1996). Alternatively, McMackin *et al* (2005) have used a mood rating scale that asks patients to rate their mood state at the time of assessment on a nine-point Likert scale (1 = 'worst you've ever felt', 9 = 'best you've ever felt'). Either instrument could be easily incorporated into an assessment battery for patients receiving ECT.

Potential role of memory rehabilitation and cognitive retraining

Although reports have claimed that about one-third of people receiving ECT experience persistent memory loss (Service User Research Enterprise, 2002; Rose

et al, 2003; Scott, 2005), it is unclear whether patients receive treatment or assistance from psychiatrists or other mental health professionals to deal with this disability. We do know that some patients turn to sources of help outside psychiatry (e.g. self-help groups) for support (Johnstone, 1999). This failure to attempt to rehabilitate patients may reinforce the negative public image of ECT specifically and psychiatry in general.

Adopting existing techniques: brain trauma

The importance of carrying out detailed neuropsychological assessments of patients following ECT in order to identify persistent cognitive problems was recognised over a decade ago (Calev, 1994). Unfortunately, however, even when cases of severe and persistent memory loss are highlighted in the literature, no study has recommended or attempted to provide any kind of rehabilitation or follow-up care. Documenting persistent and severe deficits in memory and cognition is not enough; patients need to be helped to adjust to the major effects that such disabilities may have on their everyday lives. Robertson & Pryor (2006) recommend that tests assessing neuropsychological function of brain-injured patients be used for ECT-treated patients. We would argue that the cognitive rehabilitative techniques that are used with brain-injured patients should also be considered for use with patients experiencing memory and/or other cognitive disability following ECT.

During the past 20 years, the course and nature of cognitive difficulties after brain injury and the key components of rehabilitation have become better understood. The significance of personal background, the range of emotional responses to injury and its consequences, and the role of coping skills in long-term adjustment are now more readily accepted (Mateer *et al*, 2005).

Cognitive rehabilitation therapy

Cognitive rehabilitation therapy is 'a systematic, functionally oriented service of therapeutic cognitive activities and an understanding of the person's behavioural deficits' (Malia *et al*, 2004). Its aim is to achieve functional changes by reinforcing or strengthening previously learned patterns of behaviour, or establishing new patterns of cognitive activity or mechanisms to compensate for impaired neurological systems (Bergquist & Malec, 1997). Cognitive rehabilitation therapy has a large evidence base and has been widely researched among patients with acquired brain injury.

Memory rehabilitation

Recently, Ponds & Hendriks (2006) have described what appears to be the first formal attempt to offer a rehabilitation programme focusing on memory to patients with epilepsy. However, no attempts have yet been made to extend such treatment to patients who experience memory deficits following ECT.

What rehabilitation could achieve

Designing a rehabilitation programme for patients with memory or other cognitive disability associated with ECT would constitute the first step towards treating these deficits rather than merely reporting them. Such a programme would also acknowledge the individual's difficulties and the challenges they face in coping with the demands of everyday life.

How it could be done

Baseline and post-treatment neuropsychological assessments could be used to clarify the nature and extent of cognitive difficulties. From there, appropriate steps towards memory rehabilitation and cognitive retraining (see below) could be undertaken in individual and/or group sessions, and could be extended to include the individual's family or caregivers. Follow-up assessments of progress would allow any changes in cognitive status to be measured and also to monitor the transfer of acquired skills to other areas of functioning such as the social and occupational domains of the individual's life. In this way it would be possible to determine whether the rehabilitation programme was having a beneficial effect on the patients' overall quality of life.

Ultimately, successful practical attempts to address the impact of cognitive disabilities on the lives of patients treated with ECT would be welcomed not only by the patients themselves but also by their relatives and caregivers. The provision of such a service might also improve potential patients' attitudes towards ECT, by reassuring them that, should they develop a persistent cognitive problem following treatment, some form of structured treatment and assistance would be made available to them. This might help the decision-making process for patients who are considering ECT as a treatment option.

Design of a successful rehabilitation programme

There are many factors to consider in the design of a cognitive rehabilitation programme. These include understanding that rehabilitation is a collaborative

process, recognising the importance of including family and/or caregivers and being sensitive to the impact that a patient's level of awareness, metamemory, mood and motivation can have on their ability to take part in a programme. Premorbid personality and psychological functioning are also extremely important. Therefore, cognitive rehabilitation should involve work on the patient's psychosocial skills such as coping, anxiety control , self-esteem, self-concept, motivation, locus of control and adjustment (Malia *et al*, 2004).

Existing programmes

Mateer *et al* (2005) believe that a combination of neurorehabilitation, pharmacotherapy and cognitive–behavioural therapy is often needed. Thus, many programmes incorporate multiple interventions such as attention training, memory compensations, skills training, feedback on performance, psychoeducation, stress management, confidence-building and psychotherapy aimed at increasing self-awareness, acceptance and adjustment.

Cognitive rehabilitation programmes that take into account the emotional as well as the cognitive aspects of the injury appear to offer patients the best chance of adapting to their altered situations (Mateer *et al*, 2005). Being aware of the patient's emotional well-being is extremely important as it may help identify the development of cognitive distortions such as catastrophic thinking (in which the individual imagines the worst possible outcome of events and situations). Catastrophic thinking can occur when an individual has a distorted belief about the implications of a cognitive error or episode of forgetfulness (Mateer *et al*, 2005). For example, a patient may interpret normal lapses of memory as confirmation of a memory impairment that will never improve. They may have difficulty in distinguishing between a normal memory lapse and a cognitive error that commonly results from a genuine brain impairment and this may reduce the individual's ability to cope. Cognitive appraisal and beliefs of self-efficacy are increasingly recognised as being crucial to an individual's ability to manage stress (Lachman *et al*, 1992; Mateer *et al*, 2005).

Recommendations for successful rehabilitation

Approaches to successful cognitive rehabilitation consider both general and specific aspects of the patient's difficulties (Box 4). The general aspects focus on psychoeducation covering the effects of brain damage and cognitive difficulties, the impact of personality changes and emotional reactions, and the perception of cognitive disorders (Malia & Brannagan, 2004; Ponds & Hendriks, 2006). Aspects specific to memory rehabilitation address the types of memory problem that should be targeted for treatment and the best strategies that could be used (Ponds & Hendriks, 2006). Treatment plans should be given to the patient, caregivers or family members and the appropriate hospital staff. Progress on the treatment plan should be reviewed regularly (Malia *et al*, 2004).

Box 4 Recommended elements of a cognitive rehabilitation programme for patients experiencing memory disability following ECT

- Comprehensive neuropsychological assessment
- Feedback to patient and family/caregiver
- Development of a treatment plan
- Consideration of emotional and cognitive aspects of memory disability including metamemory and mood
- Psychoeducation for patient and family/caregiver
- Strategy learning focusing on compensation
- Transfer of acquired skills to all domains of patients' life
- Regular reassessments to monitor progress
- Follow-up assessment to measure the impact of the intervention on overall quality of life

Psychoeducation

At the earliest possible stage, patients should be fully informed of their cognitive problems and their likely prognosis in terms of cognitive function (Malia *et al*, 2004; Mateer *et al*, 2005). Education should take place both in formal educational groups for patients and their carers/families and during regular individual contact with the patient, and it should be seen as an ongoing process (Malia *et al*, 2004). Group sessions should focus on understanding specific brain injuries and what rehabilitation is all about, cognitive and emotional problems following brain injury, how to cope with the changes experienced and developing a new sense of self.

The Society for Cognitive Rehabilitation (Malia *et al*, 2004) states that the aim of psychoeducation is to help the patient develop appropriate self-awareness, self-esteem, confidence, feelings of personal control and a trusting, working relationship

with the therapist. It believes that the importance of education cannot be overemphasised: without good awareness, much of what is subsequently offered will have no enduring effects on the individual's life in the outside world.

At present, very few patients and families are informed about the consequences of acquired cognitive deficits for future life or the possibilities to train or restore memory (Ponds & Hendriks, 2006). Creating a realistic perspective about the impact and possibilities for improvement of memory problems is the first important step in every memory treatment programme. Mittenberg *et al* (1996) showed that giving head-trauma patients a booklet on recovering from head injury had a significant positive effect on the number, duration and severity of reported symptoms (headache, memory, fatigue, concentration difficulties, anxiety, depression and dizziness) at 6-month follow-up.

It is crucial to give patients information on ECT during the consent process (Robertson & Pryor, 2006). Moreover, if the results from neuropsychological assessments indicate a need for intervention, patients should also be given psychoeducation or information booklets such as those given to head-injured patients, as these can be extremely beneficial in helping to alleviate the distress experienced by patients with mild brain damage. The information may also help patients adjust to any persistent cognitive difficulties they experience.

Rehabilitation techniques and strategies

The aim of rehabilitation is not restoration but compensation (Malia *et al*, 2004). This can be achieved through the use of internal or external rehabilitation strategies and modifications to the environment. Strategies adapted for use with people who have epilepsy have been shown to improve many aspects of their lives, including attention and memory, emotional regulation and psychosocial functioning (Ponds & Hendriks, 2006). Cognitive rehabilitation should improve the individual's ability to function as independently as possible in the least restrictive setting and its end result must be to improve quality of life and real-life skills (Malia *et al*, 2004).

Studies investigating memory rehabilitation have focused on alleviating many different aspects of memory difficulties. These include both general memory problems such as learning and retrieval, and specific problems with orientation, dates, names, faces, routes or appointments (Wilson *et al*, 2001; Boman *et al*, 2004; Ávila *et al*, 2004). Rose & Brooks (2003) have highlighted the potential role of virtual reality paradigms in memory rehabilitation.

According to Ponds & Hendriks (2006), two general approaches are currently used in memory rehabilitation: drill and practice, and compensatory strategies.

Drill and practice

The patient is encouraged to practice repeatedly specific memory tasks. This leads to an improvement on these tasks only; there is no transfer of benefits to general memory.

Compensation

This second approach involves teaching the patient compensatory internal and/or external strategies for coping better with everyday memory problems. Internal memory strategies comprise verbal and visual techniques. These encourage the patient to focus on linking isolated items, via associations, and on enriching the 'to-be-remembered' information with additional retrieval cues. The success of internal memory strategies may be due to the deeper level of processing and the elaboration of information that this brings about (Ponds & Hendriks, 2006). External memory strategies include devices that are used to store information (e.g. a calendar, diary, voice recorder or portable electronic organiser) or remind people to perform a particular activity at a specified time (Wilson *et al*, 2001; Hart *et al*, 2004; Kapur *et al*, 2004; Kirsh *et al*, 2004).

External strategies also include rearranging or making modifications to the individual's environment, for example always keeping important items such as keys, wallet or purse and diary together in a labelled drawer in the kitchen (Ponds & Hendriks, 2006). Clearly, internal strategies require greater cognitive capacity and insight than external strategies because the strategy has to be remembered at the very time the individual is becoming overwhelmed with the demands of a task (Malia & Brannagan, 2004).

Process training

Strategy teaching is an integral part of what is known as 'process training' in cognitive rehabilitation (Malia *et al*, 2004). Process training attempts to stimulate poorly functioning neurological pathways in the brain in order to maximise their efficiency and effectiveness. It aims to overcome damage by using both new, undamaged pathways and old partially damaged ones. Process training involves comprehensive assessment and an analysis of the results of this using a practical cognitive model. Regular reassessment should be undertaken to ensure that the patient is moving towards the agreed functional goals, and the results should determine the direction and progress through the process-training exercises.

Evidence shows that the use of process-training materials designed on the basis of neuropsychological theories and arranged into a structured programme can lead to gains in the majority of patients (Boman *et al*, 2004). Studies have also highlighted the benefits of using computerised assessment and rehabilitation tools in memory process training (Moore *et al*, 2001; Tam & Man, 2004; Cappa *et al*, 2005).

Why is post-ECT rehabilitation so uncommon?

There are many reasons why no one has yet tried to introduce cognitive rehabilitation for patients who report persistent cognitive difficulties after ECT. Until recently, there appears to have been a general reluctance among psychiatrists to admit that ECT could cause memory or other cognitive problems that are severe, persistent and disabling. Even when patients show significant impairments in memory functioning, there has been considerable debate regarding the extent to which these may be attributable to ECT as opposed to factors such as depression (Robertson & Pryor, 2006). There has also been a failure to acknowledge the effect these consequences on the patient's sense of self (Johnstone, 1999).

The delay in implementing in routine clinical practice the guidelines and recommendations for the neuropsychological assessment of patients at any stage during programmes of ECT has been a significant contributory factor. Furthermore, when patients receiving ECT have been assessed, the focus has generally been on documenting deficits rather than suggesting how to treat them. It is possible that psychiatrists have limited knowledge about the types of cognitive problem experienced by patients, how they affect their lives and what could be done to facilitate the recovery of cognitive functions or compensate for persistent deficits. They may also be unaware of the potential role of rehabilitation, what it involves and how it may inform the treatment and management of patients under their care.

However, the main reason for the near absence of post-ECT rehabilitation may be the lack of specialist neuropsychological services available to ECT psychiatrists and treatment teams (Robertson & Pryor, 2006). A psychiatrist may well recognise the merit of rehabilitation programmes but have no one to whom the patient can be referred. In Ireland, neuropsychology services are severely underdeveloped, particularly outside of Dublin. Therefore, the lack of suitably qualified personnel with expertise in this area is a significant problem. Multidisciplinary team approaches that include psychiatrists, neuropsychologists, occupational therapists, social workers and community liaison officers may be an integral part of best practice recommendations in cognitive rehabilitation, but in reality such services may not be available.

Conclusions

All patients should undergo cognitive assessment before their first ECT session. Subsequent comprehensive neuropsychological assessments should be routinely undertaken if patients report memory and cognitive disability following ECT. Assessments should take into account baseline (pre-treatment) functioning and should use tasks that are sensitive to the nature of the patient's everyday problems and that take account of the influence of patient's current memory, sense of memory self-efficacy and mood. Reassessment should be scheduled after a sufficiently long interval (more than 6 months after treatment) so that persistent cognitive and memory deficits can be identified. Furthermore, patients' self-reports of adverse side-effects, particularly those concerning deterioration in memory and cognition while undergoing a course of ECT, should be properly investigated by staff in the ECT clinic (NICE, 2003; Benbow & Crentsil, 2004).

It should now be clear that documenting neuropsychological deficits is not enough; a specific programme of cognitive rehabilitation should be designed and made available to all patients with persistent cognitive difficulties following ECT, and details about this treatment should be included with the information that patients receive prior to treatment. This programme should incorporate methods of training and strategy learning of known efficacy that aim to generalise skills to all domains of the patient's life. Clinicians should be aware cognitive rehabilitation appears to be most successful when patient's physical, psychological, social and vocational well-being are considered together and when the programme is extended to include the family or caregivers (Mateer *et al*, 2005).

Cognitive rehabilitation following ECT offers a constructive way of treating and managing the most commonly reported side-effect, which is currently left untreated. Over time, this acknowledgement of the presence and impact of cognitive disability in ECT-treated patients, together with the education of patients, families and mental health professionals about ways to deal with these difficulties, would lead to better overall adjustment by patients and the development of a new sense of self.

Declaration of interest

None.

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MCQs

1 Patients currently referred for ECT complete routine neuropsychological assessments:
a following the course of ECT treatments
b prior to receiving the first ECT treatment
c 3 months after the last ECT treatment
d 6 months after the last ECT treatment
e patients do not routinely complete neuropsychological assessments at any stage during treatment.

2 The following are not necessary in neuropsychological assessment of patients receiving ECT:
a the Eysenck Personality Inventory
b recommendations for treatment or rehabilitation of impairments
c tasks measuring 'real-world' functioning
d collateral information from the patient's family or caregivers
e measurement of factors influencing a patient's 'cognitive reserve'.

3 Tasks that require patients to self-rate their own memory functioning include:
a the Landmark Recognition Task
b the Mundane Memory Questionnaire
c the Autobiographical Memory Interview
d the Prospective and Retrospective Questionnaire
e the Everyday Memory Interview.

4 Cognitive rehabilitation is least successful when it focuses on:
a compensation for deficit rather than restoration of function
b the cognitive and emotional aspects of brain injury
c including the patient's family or caregivers in the rehabilitation process
d the drill and practice approach
e the generalisation of acquired skills to the social and vocational domains of the patient's life.

5 Cognitive rehabilitation techniques have been adapted and used for:
a patients with acquired brain injury
b patients with permanent memory and cognitive disability following ECT
c patients with intellectual (learning) disability
d patients with temporary memory and cognitive problems following ECT
e all of the above.

MCQ answers

1	2	3	4	5
a F	a T	a F	a F	a T
b F	b F	b F	b F	b F
c F	c F	c F	c F	c F
d F	d F	d T	d T	d F
e T	e F	e F	e F	e F