

The Memory Clinic A New Approach to the Detection of Dementia

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Memory impairment is a salient and early feature of developing dementia, but in practice is often not recognised until it has reached an advanced stage. The operation described is of a Memory Clinic opened on an experimental basis at the Geriatric Research Unit, University College London, in 1983, with the aim of identifying the causes of memory impairment in the elderly, with particular reference to the early detection of dementia. It proved possible to identify a group of people with early dementia who had previously been undiagnosed, and also to reveal deficiencies in the utilisation of existing services. Memory clinics would be a valuable addition to geriatric and psychogeriatric services.

Dementia is often not detected until the mental deterioration has reached an advanced stage. Family doctors may fail to recognise it and the general public tends to accept poor memory as a normal concomitant of ageing. Thus, in many patients the diagnosis of dementia is not made until some other condition precipitates admission to hospital.

Epidemiological studies in the elderly population have shown a remarkable consistency in the prevalence of dementia. The results have been summarised in the Report of the Royal College of Physicians on Organic Mental Impairment in the Elderly (1981); some reported on the incidence of early dementia. Although it can be assumed that patients exhibiting moderate to severe symptoms will have passed through a stage of mild dementia, the diagnosis of early deterioration in these cases has presented many problems which have not been resolved satisfactorily (Kay *et al.*, 1968; Bergmann *et al.*, 1971; Henderson & Huppert, 1984).

The detection of organic mental impairment in epidemiological studies has usually been based on mental status questionnaires (Roth & Hopkins, 1953; Hodkinson, 1974), which test for short- and long-term memory, orientation, awareness of events and ability to count forwards and backwards. Memory impairment is a salient and early feature of developing dementia, but simple tests such as these are in themselves of restricted value for diagnostic purposes (Hinton & Withers, 1971; Hare, 1978; Whitehead & Hunt, 1982).

We outline the operation of a Memory Clinic which we opened on an experimental basis in April 1983 with the aim of identifying the causes of memory impairment in the elderly, with particular reference to the early detection of dementia. The clinic was established to provide a service for patients, their carers and general practitioners. We

describe a more comprehensive approach to diagnosis than is usual, based on team investigation, and report on the first 50 patients.

Operation of the clinic

General practitioners are encouraged to refer elderly people who complain about their memory or whose friends or relatives have noticed memory problems. The team in the clinic consists of a psychologist, a physician and a psychiatrist who see the patient independently, each using his own method of assessment.

The psychologist

The psychologist usually sees the patient first to ascertain whether there is a true memory deficit. A memory problem is defined as a condition experienced by the patient which may or may not be accompanied by an objectively observed memory deficit. By means of an in-depth interview, the psychologist elicits the evidence, in terms of actual incidents of behaviour, that has led the patient to suspect that he has a memory problem, and records the earliest failures which led to this suspicion being aroused. An informant is interviewed to obtain an independent and detailed behavioural history; this is especially necessary when the patient himself cannot give an accurate account. Several factors affect the readiness with which memory problems are reported.

Two simple tests are administered initially:

A: *The Cerebral Function Test* (Silver, 1972)

This is a brief screen of various mental abilities, including memory for recently learnt material, naming, vocabulary and spatial skill. It is a short test battery which was designed to be carried out by unskilled observers and to be easily understood. To this end, the items have face validity; i.e. their meaning is obvious and the implications of failure are readily interpretable. The predictive validity of the total test score has been established by Silver and again by Ross & Horne (1977) with respect to an old person's ability to live independently. In the Memory Clinic we were not concerned

with this aspect of the test but used it as a brief neuropsychological screen for indications of language and spatial deficit, low educational level and inability to learn and retain new material. The memory component, learning a fictitious name and address and recalling it after 5 min has been described elsewhere (Priest & Woolfson 1986), whose list details the administration procedure with one exception. Prior to presentation of the target material, the patient is warned that it will be necessary to recall it after 5 min. If this warning is omitted, the nature of the task is altered and it becomes more difficult. This test is similar to that included in many screening tests familiar to geriatricians and psychogeriatricians. Many of these mini-batteries are of limited use, as they focus on memory and orientation alone, omitting screens of language and spatial ability. In the Silver test, spatial ability is tested in several ways, including that first described by Isaacs (1963) using toys. We had the test materials specially made in wood so that they looked less like toys and our patients found them perfectly acceptable.

B: The Kendrick Battery for the Detection of Dementia (Gibson & Kendrick, 1979; Kendrick et al, 1979)

This consists of two easily administered tests, for which there are normative data. The first subtest taps memory by immediate recall, i.e. immediately after exposure of the test material, which is a card displaying a number of pictures of common objects. There are four cards, the number of objects to be recalled increasing over the series. The second part tests perceptu-motor speed and patients are required to copy lines of digits as fast as possible. The instructions for administering, timing and scoring these procedures are precise. The battery has been tested for criterion validity on groups of normal and memory-impaired old people. It yields evidence of a person's definite memory deficit but does not indicate if he is below average for a person of his age and educational level. These tests can therefore offer evidence to confirm that a person's memory problem does indeed reflect an actual memory deficit, but a diagnosis of dementia should not be made on test scores alone, in the absence of other evidence and without excluding alternative causes for the memory deficit.

If the patient fails the memory component of test A and scores in the abnormal ranges of test B, more sophisticated memory assessment is redundant, but the procedures are repeated in 6 weeks to confirm the results of the first observations.

If the patient scores in the normal range on the screening tests, more demanding memory assessments are made with particular reference to dual performance tasks and delayed recall (Randt et al, 1980). At this stage, it is essential to establish a baseline of memory ability with which to compare future performance, as stability or decline in this skill is critical to establishing a diagnosis. To this end, the limits of the efficiency of the patient's memory are sought. Test instruments on which the patient easily achieves near-perfect scores risk being insensitive to any future change. In this respect, the usefulness of some computer-controlled tests that we have designed is also being assessed (Simpson & Linney, 1985).

The psychologist assigns each patient to one of three

categories according to the amount of evidence that is found after several visits. This grouping parallels the process by which a clinical diagnosis of dementia is finally made, i.e. based on memory deficit in the absence of another explanation. Characteristics of the patients in the three categories are:

Category 1: Clear evidence of memory deficit

- (a) Memory deficit on objective tests that have established cut-off points, e.g. Object Learning Test (OLT) of the Kendrick Battery.
- (b) Behavioural evidence of deficit from the reports of an informant and/or as observed during visits to the clinic.
- (c) Subjective complaints about memory problems may or may not be present according to the amount of insight retained.

Category 2: Equivocal evidence of memory deficit

- (a) Normal scores on the OLT although other memory tests may yield scores lower than expected for the person's age-group and IQ.
- (b) Behavioural evidence from an informant and/or from observations during visits to the clinic.
- (c) Subjective feelings of memory problems.

Category 3: No objective evidence of memory deficit

- (a) No clear evidence of memory deficit on testing; normal scores on OLT, and performance on other tests in the expected range for a person of this age and IQ.
- (b) No clear behavioural evidence from any source.
- (c) Subjective feelings of memory problems.

The physician

The physician attempts to identify any extra-cerebral causes of memory loss (Royal College of Physicians, 1981; Wood, 1984) and to distinguish between acute confusion, dementia and depression. He screens for focal cerebral lesions presenting as dementia, and tries to distinguish between dementia of Alzheimer's type and multi-infarct dementia, using the Hachinski score (Hachinski et al, 1975). This is an 'ischaemic score' based on the different clinical features of multi-infarct dementia and Alzheimer-type dementia. Patients with a score of 7 or more are rated as probable multi-infarct dementia; those below 4 as Alzheimer-type dementia. Exceptions to this demarcation are to be found in clinical practice, and the number and clinical extent of strokes, the amount of infarcted tissue seen on CT and the presence of pseudobulbar palsy should be taken into account, and perhaps weighted more heavily (Miller et al, 1984). In a study of elderly demented patients who came to autopsy, the score has been shown to identify accurately patients with multi-infarct dementia or with mixed pathology (Rosen et al, 1980).

A careful medical history is obtained from the patient and relatives wherever possible, a full medical examination is carried out, and in the neurological examination particular attention is paid to evidence of dysphasia and parietal lobe signs.

The laboratory investigations include a full blood count, serum glucose, urea and electrolytes, creatinine, rapid plasma reagin test and treponema pallidum haemagglutination assay (TPHA) test, and liver function and thyroid function tests. Serum vitamin B12 and folate concentrations are measured only when the mean cell volume is raised. It is recognised that the yield from these tests is low when applied as a routine in the investigation of dementia (Report of the Royal College of Physicians, 1981). Other diagnostic procedures, including CT scanning, are carried out when indicated.

Special attention is paid to the drugs that the patient is taking, since it is known that several groups of drugs can impair memory and cognitive performance in the elderly. These include hypnotics and other psychotropic drugs, anticholinergic agents and certain centrally acting anti-hypertensive drugs (Solomon *et al*, 1983).

The psychiatrist

The psychiatrist takes a history and carries out a mental state examination. The objects, are first, to diagnose any affective disorder that may be responsible for or contributing to the memory impairment; secondly, to diagnose dementia on clinical evidence—the diagnostic criteria are those of Hare (1978), based on the Kew Cognitive Map (McDonald, 1969). Thirdly, the psychiatrist assesses the overall severity of the dementia and the future provision that the patient will require; he will have the continuing clinical responsibility for the majority of the patients. In the absence of a simple rating scale of severity that takes account of all the cognitive impairments of dementia, the various degrees of severity are characterised as below. (The validity of these categories will be tested by the follow-up studies, and it is hoped that a simple and useful clinical rating scale can be provided.)

Absent	No evidence of cognitive impairment.
Equivocal	Slight memory impairment, definitely or possibly due to affective disorder.
Minimal	Definite memory impairment <i>or</i> dubious or minimal memory impairment, together with slight nominal dysphasia.
Mild	Definite memory impairment, together with definite nominal dysphasia.
Moderate	Definite impairment of both recent and remote memory, possibly with confabulation. Moderate dysphasia (including difficulty in naming simple objects) and some failure of comprehension. Possibly some parietal features (e.g. dressing apraxia). Possibly some personality deterioration (e.g. emotional lability, paranoia).
Severe	As above, but all worse in degree and with definite personality deterioration.
Profound	As above, but all worse in degree; totally dependent on others for self-care. Little coherent communication.

Main diagnostic categories

The team members meet regularly to discuss the patients they have investigated. A diagnosis is established or, if this is not possible, a hypothesis about the likely diagnosis is

formulated. The diagnostic categories for the first 50 patients (32 female, 18 male; age-range 61–90 years; mean age 75.2 years) who have been fully assessed by all three members of the team are shown in Table I.

A firm clinical diagnosis was made in 66% of patients. Of the total series of patients, 50% were dementing to some degree, and all these patients had a memory deficit in category 1. A provisional diagnosis of dementia was made in 14% of patients, and these had memory deficits in categories 1 or 2. In 10%, a diagnosis of probable affective disorder was made, and these patients had memory deficits in categories 2 or 3; the other diagnoses in 8% of patients included potentially reversible organic disorders such as polypharmacy (two patients), hyperthyroidism (one patient) and Wernicke's encephalopathy (one patient). In 10% of patients, no clinical diagnosis could be established and neither could a memory deficit be demonstrated.

Of the 25 patients who had evidence of Alzheimer dementia, the psychogeriatrician rated eight as moderately demented, 11 as mildly demented and six as minimally demented. Amongst the 16 in this group who had been referred by their family doctor, only five had already been put in touch with the psychogeriatric and community support services prior to being referred to the Memory Clinic. Neither these five nor the other clearly demented patients in this group had thus far received the level of support their condition required. These patients, with a firm clinical diagnosis of dementia, were referred to their local consultant in psychogeriatrics who provided the continuation of care. Since the Memory Clinic was established for the early detection of dementia, only those patients whose diagnosis remained in doubt were followed up in the clinic.

The memory deficit was reversible in the two patients who suffered from the effects of polypharmacy. This is illustrated by the following case reports. Drugs which can impair memory are asterisked.

Case 1 (other diagnosis; memory deficit category 2)

Miss K.A., a 78-year-old woman, was referred to the Memory Clinic in December 1983. The referral had been initiated by her relatives, with whom she lived. In 1975 she had been firmly diagnosed elsewhere as suffering from cerebral atrophy and her relatives had been attending the relatives' support group of The Alzheimer Disease Society for several years. She had equivocal evidence of memory deficit (category 2). On the Kendrick Battery for the Detection of Dementia, she scored in the normal range but close to the cut-off point in both of the subtests (memory/visuospatial speed). She had some impairment of recent memory, and her scores on the Raven's Matrices indicated that her intelligence was below average for her age.

Past medical history: hypertension; hysterectomy.

She was taking oxprenolol hydrochloride*, hydralazine hydrochloride, Lasikal, allopurinol, flurazepam*, piroxicam and medroxyprogesterone. Her medication was gradually reduced until she took only medroxyprogesterone 100 mg *b.d.* and Navidrex-K, one three times per week. She was seen at regular intervals and, as the drugs were reduced, her memory tests improved. The psychogeriatrician did not consider her demented.

Diagnosis: memory deficit due to polypharmacy.

TABLE I
Clinical consensus diagnosis

	Category 1	Memory deficit Category 2	Category 3	
Firm diagnosis				
Alzheimer-type dementia	25 (9)			} 66%
Multi-infarct dementia	3 (1)		1	
Other diagnoses	2	1 (1)	1 (1)	
Provisional diagnosis				
Probable affective disorder		3 (1)	2	} 42%
Probable dementia	3	4 (1)		
No diagnosis			5 (2)	

Notes: The vertical axis describes the clinical diagnosis and the horizontal axis the degree of memory deficit. Figures in brackets are numbers of patients for whom referral was initiated by the patient or carer. Patients with other diagnoses, provisional diagnosis or no diagnosis are being followed up (42%).

Case 2 (other diagnosis; memory deficit category 1)

Mrs M.S., a 66-year-old woman, was referred by her family doctor in August 1984 because of increasing forgetfulness. She had been diagnosed elsewhere as suffering from dementia and her CT scan had been reported as showing small diffused areas of low density.

Past medical history: in 1952 she was overweight and treated with amphetamines which caused overexcitement and resulted in her being prescribed chlordiazepoxide which she had taken since. She had also been diagnosed as having Parkinson's disease and had been started on anti-parkinsonian drugs. In addition, she had a history of depression, hypertension and more recently of low back pain. Her medication consisted of Moduretic, carbamazepine*, Diphenal* (diphenhydantoin 100 mg plus phenobarbital 25 mg per tablet), benzhexol*, Buflomedil, Hypnosedon* (a sleeping tablet), chlorpromazine*, phenobarbitone*, diazepam* and biperiden hydrochloride*. Chlordiazepoxide* had been discontinued 2 days prior to her being seen in the Memory Clinic.

On examination she was fully orientated. She had scoliosis of the thoracic spine, but otherwise there were no significant physical abnormalities. She initially had clear evidence of memory deficit (category 1). Her performance was below normal on two memory tests and she became exceedingly upset and confused when required to learn a new task. She was diagnosed as having extensive osteoporosis of the thoracic and lumbar spine and was treated with physiotherapy and paracetamol. She was gradually weaned off all other drugs and improved both mentally and physically. The psychogeriatrician did not consider her to be demented.

Diagnosis: memory deficit due to polypharmacy.

Most of the other patients, 42% of the total series, are being followed up in order to confirm or refute the original diagnosis with particular reference to the diagnosis of early dementia.

Source of referral

In the total series, 26 patients had been referred directly

* indicates drugs which can impair memory.

by their family doctors and eight from other hospital departments. The other 16 patients had referred themselves, or their carers had asked the doctor to refer them. Of those who came directly or indirectly via their family doctors, some had not sought medical advice until the disease was far advanced; in other cases the doctor did not seem to be aware of the community support available.

As Table I indicates, there were larger numbers of self-referrals in those with memory deficit category 1 than in categories 2 and 3. Moreover, the 10 self-referred patients in this group had not received any support until they came to the clinic.

Discussion

Several studies have shown that a medical care system that depends upon the self-reporting of illness is severely handicapped in terms of the early detection of disease (Williamson *et al*, 1964; Gruer, 1975). This has particularly deleterious consequences in the elderly. In a study in three general practices in Edinburgh, Williamson *et al* (1964) found that 28% of the elderly patients were demented, but that the condition had not previously been recognised in over four-fifths of the cases.

In our study, it was disconcerting to find that many patients who were clearly demented had not been referred to the appropriate community support service; it was also instructive to learn how difficult it may be for a busy family doctor to recognise an early memory deficit. It is probably hard for a doctor to acknowledge such problems in a patient whom he has known for some years and who retains a good social facade, particularly if the patient is known to be of relatively high intelligence and to have held a responsible position in society. The results give support to Thompson's view (1985) that dementia is a latent condition, often detectable only by challenge.

The introduction of a new service (e.g. the opening of a geriatric day hospital) often brings to light deficiencies in existing services. We certainly found this to be the case after the Memory Clinic had been in operation for a few months. The Report of the Royal College of Physicians on Organic Mental Impairment in the Elderly (1981) emphasises that the present *ad hoc* crisis style of management of dementia is unsatisfactory; instead there should be a readiness to seek out problems and to respond promptly to patients' needs. Criteria which diseases should fulfil if screening in the general population is to be attempted have been stipulated by Acheson (1963) and by Wilson & Jungner (1968). Recently, Cooper & Bickel (1984) have argued that the criteria also apply to the early detection of dementing disorders in old age. It is generally recognised that for screening a single sign should carry with it a high probability that the disease is present, and eliciting the sign should be simple, economical and unobjectionable to the subject. Both these criteria are fulfilled by dementia. In the Memory Clinic, we have used memory deficit as a marker for dementia, and the assessment of this deficit is based on the history, observation and simple objective testing.

Ideally there should be reasonable prospects for cure of the disease: this does apply to the mental deterioration which can result from polypharmacy and to those with 'pseudodementia' due to affective disorder. However, in the practice of geriatric medicine, cure is not in general the sole aim of treatment, but rather early detection is a preliminary to intervention aimed at reducing disability and postponing the need for institutional care. Bergmann (1979) has drawn attention to the difficulties in making the diagnosis of early or mild dementia. He emphasises the importance of defective memory and early behavioural impairment in the development of dementing syndromes. He also stresses the need for follow-up, since in one epidemiological study (Kay *et al.*, 1968) it was found that 30% of patients diagnosed as probable early dementia were not demented when reassessed 3–4 years later.

We have described a team of three different specialists each assessing the patient from a particular aspect. However, the focus of assessment should be on the different tasks involved, not on the different professionals represented in our clinic. These tasks are: the collection of evidence of memory deficit, the identification of detectable causes of this deficit, the detection of underlying depression, and the counselling and management of the patient and the carer(s). All these tasks could be carried out by one suitably qualified person, but in practice, at least two people should be involved to increase the reliability of the overall assessment.

The value of the Memory Clinic can be considered under three headings:

Practical value

It offers a facility to investigate people with memory problems and to attempt to arrive at a correct diagnosis, including the revision of the original diagnosis if found to be incorrect; to establish a diagnosis in patients suffering from the early stages of a dementing illness with a view to improving the patient's management; to treat curable causes of memory loss; and to control psychiatric symptoms.

Educational value

The general public and all health care professionals need reminding that memory failure is not a normal concomitant of old age. Older people in whom suspicion of mental impairment arises or where memory loss is a subjective or objective complaint, should be investigated. Clinics to which early cases can be referred, such as the Memory Clinic, would increase awareness that screening should be undertaken. Suitable screening tests are available and should be administered routinely by all professionals coming into contact with old people. A test which is particularly sensitive to severity of memory deficit is the ability to recall recently learnt new material after an interval (Graham-White *et al.*, 1969; Erikson & Scott, 1977). The material should contain at least five items which are to be recalled after an interval of 5 min during which the patient is prevented from rehearsing by involvement in other tasks. The patient should be warned about the need for subsequent recall. This type of test, the recall after a brief interval of a fictitious name and address, is included in many geriatric assessments, e.g. the Mental Test Score (Roth & Hopkins, 1953) and the Cerebral Function Test (Silver, 1972).

Research value

Since the clinic offers follow-up over time to selected patients, it will be possible to describe more accurately the natural history of the various dementing illnesses. A group of patients with early dementia can be identified, from which suitable subjects for trials of potential therapeutic agents may be recruited. If such an agent should be developed, it is more likely to be effective in the early stages of dementia.

Conclusion

This pilot project has brought to light deficiencies in the utilisation of existing services and has confirmed the point made in the Report of the Royal College of Physicians (1981) that a readily accessible and integrated service is essential in order to arrive at a correct diagnosis in patients with early dementia and to facilitate their management. Although one

of the aims of the Memory Clinic is to provide a service to family doctors, many people previously unknown to the health service referred themselves or were referred by their doctor only after prompting by others caring for the patient. We believe that memory clinics could be a valuable addition to the geriatric and psychogeriatric services within the NHS and so provide a better system of management for the vast number of elderly demented patients projected for the future.

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