

The Memory Clinic – outpatient assessment when dementia is suspected

The patients who are assessed at Oslo University Hospital's Memory Clinic are young – half of them are under 65 years of age. Most are suffering from mild cognitive impairment or dementia at a very early phase while others come to get a second opinion. The assessment takes 2–3 hours and is conducted by a doctor and a nurse. It includes a clinical investigation, cognitive testing, an MRI scan with measurement of the medial temporal lobes, a lumbar puncture and single-photon-emission tomography (SPECT of the brain).

Anne Brækhus

anne.braekhus@ous-hf.no
Department of Neurology
and
Department of Geriatric Medicine

Ingun Ulstein

Norwegian Centre for Ageing and Health
Department of Geriatric Medicine

Torgeir Bruun Wyller

Department of Geriatric Medicine

Knut Engedal

Norwegian Centre for Ageing and Health
Department of Geriatric Medicine
Oslo University Hospital

According to epidemiological studies, approximately 70,000 Norwegians suffer from dementia. By 2040 numbers may have doubled because dementia is mainly caused by age-related brain diseases (1). Many people with dementia have not been assessed and have not received a diagnosis (2). More than 95 % of those affected are over the age of 65 and the largest proportion have dementia of the Alzheimer's type, vascular dementia or a combination of these (3). Those who are affected by other, primarily neurological diseases will often develop cognitive reduction/dementia as part of the clinical symptoms. This applies for example to Parkinson disease, Parkinson plus syndromes, Lewy body dementia, amyotrophic lateral sclerosis (ALS) or multiple sclerosis (4–6).

Dementia normally develops slowly. At an early stage it can be difficult to distinguish between people with memory impairment or mild cognitive impairment that does not develop into dementia, and people with beginning dementia. Cognitive reduction that often does not develop into dementia can be seen for example in cognitive impairment related to a stroke and in depression of moderate or severe degree. Approximately 10–15 % annually of those who fulfill the diagnostic criteria for mild

cognitive impairment will develop dementia, primarily Alzheimer type dementia (7).

In 1990, a memory clinic was established at the Department of Geriatric Medicine of Oslo University Hospital. The main purpose was to establish a simple, standardized and time-efficient examination for diagnosing elderly patients where there was a suspicion of dementia or cognitive impairment due to other reasons (8). Prior to 1990, patients with suspected dementia were admitted to an in-patient ward for 3–4 weeks' observation. The 'memory clinic' was a popular option and after a short period of time there was a 6-month waiting list.

Since the establishment of the Memory Clinic, the assessment procedure has undergone considerable changes adapted to the change in the patients referred. The primary health services, geriatric and geriatric psychiatry outpatient clinics have taken over the assessment of «yesterday» patients at the memory clinic, i.e. the patients with clear cognitive failure and changed behaviour, while Ullevaal's Memory Clinic accepts younger patients and patients with diffuse symptoms that may indicate dementia without this necessarily being the case.

«The number of people who develop symptoms consistent with dementia will increase considerably in the years ahead»

In this article we describe how the Memory Clinic is organized and the methods used, so as to provide an example of how a modern memory clinic ought to function. We describe two typical patients and present our thoughts on new measures and options that should be initiated by outpatient clinics.

Patient 1. A woman in the start of her 60s had suffered memory impairment for a couple of years and had undergone several episodes of confused and aggressive behaviour lasting from a few days and up to several weeks. Assessment by MRI scan at another department showed wide sulci. Spinal fluid examination showed a cell count of $11 \cdot 10^6/l$ (reference value $< 4 \cdot 10^6/l$), beta-amyloid 360 ng/l (reference value > 550 ng/l) and normal values for tau protein and phosphorylated tau. A neurological examination showed mild to moderate impairment in attention, memory and problem solving. The woman was diagnosed with Alzheimer type dementia.

She was referred to the Memory Clinic for a second opinion. Her husband described memory impairment, less initiative and psychomotor slowing. She gradually developed fine, general tremor, postural tremor (most pronounced on the left side) and bilateral intention tremor. She had reduced arm swing with her right arm when walking, but otherwise her gait was unremarkable. She scored 29 out of 30 points on a Mini Mental State Examination (MMSE), while the result of the Trail Making Test A and B lay between 1 and 2 standard deviations below the average for the age group.

Because of a somewhat unusual medical history, cells in the spinal fluid, SR of 40 and slightly elevated ANA, we assessed whether vasculitis was present, but an MRI scan of the brain with angiography was described as normal.

She also experienced cramps in her lower limbs at night, but they disappeared with the cessation of donepezil. Gradually there was an increase in tremors and sleep problems. A DaT scan (single-photon emission computed tomography for display of the basal ganglia) was conducted that showed reduced activity in the striatum bilaterally, possibly with more severe affection of the putamen on the right side than on the left. On the background of cognitive reduction consistent with dementia, the findings of the DaT scan as well as REM sleep phase distur-

bance, we consider dementia with Lewy bodies to be the most likely diagnosis (9).

Patient 2. A woman in her 40s with type 2 diabetes had experienced subjective memory impairment for a period of approximately two years. Assessment at a local hospital showed reduced cognitive function in several areas. Findings from MRI scan of the brain and from the spinal fluid were normal, and the likelihood of dementia was assumed to be small. The possibility of mental illness was assessed.

Assessment at the Memory Clinic showed reduced verbal memory and word production. An MRI scan of the brain with measurement of the temporal lobes showed temporal lobe atrophy grade 0 on the right side, grade 2 on the left side (visual scale from 0 to 4 where 0 is no atrophy and 4 is pronounced atrophy). A genetic examination showed that she had ApoE-genotype E3/E3.

A second consultation with the patient a year later was characterized by word-finding difficulty. Cognitive testing did not show pronounced memory problems but the patient herself experienced the affliction as most related to memory impairment. The diagnosis was assessed as most consistent with primary progressive aphasia, which is a variant of frontotemporal lobe dementia (10). Findings from single-photon emission computed tomography and positron emission tomography were normal.

The organization of the Memory Clinic

Personnel resources consist of 3.5 man-years for physicians, three man-years for nurses and a secretary. The doctors, who are specialists either in geriatrics, neurology or psychiatry, carry out the initial cognitive testing as well as a physical, neurological and psychiatric examination, depending on the symptoms. By appointing doctors with these three specializations we possess the expertise that is normally required for assessing the patient group. The nurses have specialist training in either geriatrics or psychiatry.

A basic consultation lasts about two hours plus the updating of the patient record. The nurse and doctor cooperate on the assessment. For some additional examinations – primarily lumbar puncture – the patients must come back for a new consultation.

Content of the examination

Medical history

and information from a family carer

Obtaining the medical history from a family member without the patient being present is an important part of the assessment. We often hear from family members that other doctors have not allowed them the opportunity to talk to the doctor on their own. Therefore out of consideration for the

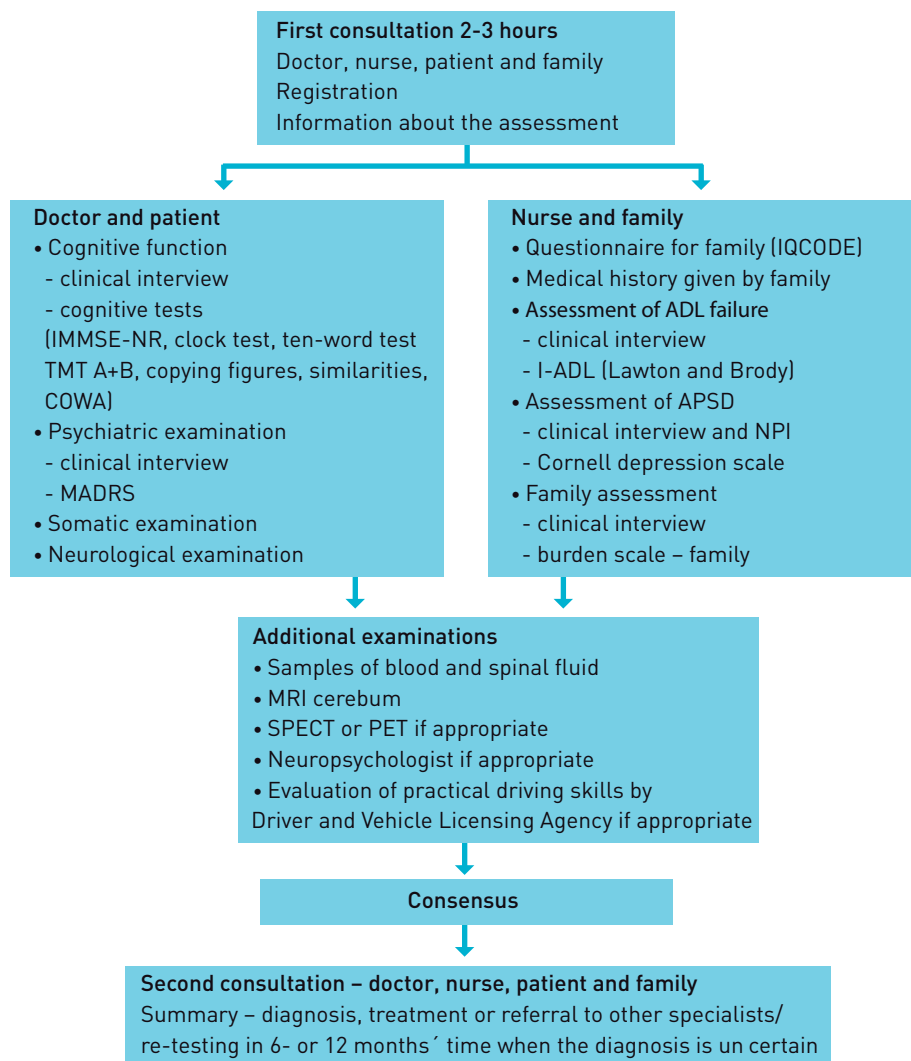


Figure 1 Procedure for assessment at the Memory Clinic. Explanations: MMSE-NR = Norwegian revision of Mini Mental Status Examination. TMT A and B = Trail Making Test A and B. COWA = Controlled Oral Word Association, MADRS = Montgomery-Åsberg Depression Rating Scale, IQCODE = Informant Questionnaire for Cognitive Decline, ADL = Activities of Daily Living, I-ADL = instrumental ADL, APSD = Behavioural and psychological (psychiatric) symptoms of dementia, NPI = Neuropsychiatric interview guide

patient, they have been unable or have not wanted to express how pronounced the symptoms are.

While the patient is being assessed by the doctor, the family member fills out various forms (fig 1) in close cooperation with a nurse. These form the basis of the doctor's interview with the family carer. Since problem areas have already been identified in the consultation with the nurse, the time spent with the doctor can be considerably shortened because the key areas for differential diagnoses and psychosocial measures can be immediately focused on,

Examination of the patient

The cornerstones of the assessment are the evaluation and testing of cognitive function, somatic status including a preliminary neurological examination and a psychiatric evaluation with an emphasis on comorbid depression. Figure 1 shows the most

important cognitive tests that are routinely used. For some patients further testing by a doctor or neuropsychologist is performed, depending on the medical problem.

Structural and functional brain examination

Several studies have shown atrophy in the entorhinal cortex and hippocampus in patients with Alzheimer type dementia (11). MRI cerebrum evaluating medial temporal lobe atrophy is therefore performed on all patients. Single-photon emission computed tomography (SPECT) and positron emission tomography (FDG-PET) are requisitioned for some patients, depending on the medical problem (12). If frontotemporal lobe dementia is suspected, SPECT is always carried out. If there is a suspicion of dementia with Lewy bodies or a Parkinson plus syndrome, SPECT with 1231 FP-CIT (DaT-scan) is requisitioned. This examination led to a diagnosis for Patient 1.

Spinal fluid examinations

After 2007, a large number of patients underwent lumbar puncture, partly for the purpose of differential diagnostics (cells, protein, glucose, protein electrophoresis and Borrelia), and partly for the analysis of the 'dementia markers' beta amyloid, total tau and phosphorylated tau (13).

Diagnostic procedures

The diagnosis is based on the diagnostic criteria in the ICD-10 classification. Diagnoses that are not described in ICD-10 are based on international consensus guidelines, such as the Lund Manchester criteria for frontotemporal lobe dementia (10) and the McKeith criteria for dementia with Lewy bodies (14). The diagnoses are made after discussion in the weekly consensus meetings in which the psychiatrist, the geriatrician and the neurologist participate. In 2007 new criteria for Alzheimer type dementia were proposed, requiring the exhibition of reduced episodic memory function as well as either medial temporal lobe atrophy shown by MRI of the brain, changes in one or more of the spinal fluid markers, typical changes in PET or a genetic mutation. However, these criteria are presently intended for research (15) and are not used in our everyday clinical work.

When the first symptoms appeared, Patient 2 had subjective symptoms and there were neurological findings, but MRI of the brain and spinal puncture were normal. The case history illustrates the importance of attributing decisive importance to the patient history and clinical findings rather than to supplementary examinations.

Driving licence assessment

An important part of the work of the outpatient clinic is to assess the patient's suitability to retain his/her driving licence. Patients are assessed with the standard battery of examinations. Some are referred to a neuropsychologist for testing and many are referred for an evaluation of practical driving skills at the Traffic Service Office in Oslo. The family is interviewed and the final decision is made on the basis of all available information.

Treatment

The treatment that is offered may or may not include medication. Drug treatment offered consists of either cholinesterase inhibitors or memantine for Alzheimer type dementia. If clear signs of depressive illness or significant depressive symptoms are exhibited, we or the patient's doctor begin anti-depression treatment before starting the anti-dementia treatment.

The patient and family are given comprehensive information, which also includes information brochures. The patient is referred to locally-based services if the primary health service has not already done so.

In addition, the patients and family are offered the opportunity to participate in conversation groups.

Clinical activities

In 2010, altogether 907 patients were assessed – 259 initial examinations, 162 patients attended for a reassessment of diagnosis 6–12 months after the initial examination, and 486 patients attended for a check-up in connection with various types of treatment. The waiting time varied between 12 and 14 weeks. In total 134 of the patients (49%) who attended an initial examination were under the age of 65. Mild cognitive impairment was the most usual diagnosis and was determined in 32% of the patients; 27% were diagnosed with subjective memory impairment while 21% received the diagnosis of Alzheimer type dementia. The remainder were distributed among other types of dementia and depression.

Dementia register

In addition to conducting a number of research projects, the Memory Clinic contributes to a large regional register of patients who are being assessed for suspected dementia. In order to improve dementia assessment in Norway and to ensure that it is more consistent, an examination protocol and database were established in 2009 in which outpatient clinics in the South-Eastern Norway Regional Health Authority that assess patients for dementia were invited to participate. The Norwegian Centre for Ageing and Health is responsible for the register. The register is expanding continually with the addition of a growing number of outpatient clinics from both the South-Eastern Norway Regional Health Authority and the Western Norway Regional Health Authority, and now incorporates 15 outpatient clinics. Biological material (blood, spinal fluid, urine and sputum) are stored in a research biobank. The advantage of participating in this register is that a large amount of data is collected within a relatively short period of time – and this facilitates a speedier evaluation of the usefulness of the diagnostic tools that are used.

Discussion

The Memory Clinic has been in operation for 20 years. During this time the assessment model has undergone a number of changes, not least adaptation to the change that has taken place in the patient population over time. Many of the patients are referred to the clinic for second and third opinions and we experience a strong demand.

Factors that can explain the viability of the model are ongoing adaptations of the battery of examinations and the involvement of doctors with different specializations. The cooperation of psychiatrists, neurologists and geriatricians is essential since dementia is situated at the intersection of

these specializations, and each group has experience with different aspects of the assessment. However, it is vital that the specialists remain in contact with their «parent» department in order to update their own specialization and to participate in discussions on challenging medical issues.

We are of the opinion that adequate time should be set aside for the initial consultation, so that almost the entire assessment can be conducted at that point. Time is also set aside for fixed weekly collaboration meetings at which many of the patients are discussed.

Another aspect of our model is the active participation of doctors in the assessment process. Doctors are responsible for most of the evaluations – conversation, somatic status and cognitive testing. This provides a broad platform for determining a diagnosis, which is particularly important in the early phase of dementia. There may be subtle changes that can be very worrying for patients, without these being identified by cognitive testing. However, the case history may arouse suspicion that «something is going on» and the patient can be followed up over time. In many cases dementia may be demonstrated several years later. Such patients form a vulnerable group, since many of them must drop out of work life and are thus dependent on receiving a diagnosis in order to claim their rights under the labour and welfare system.

The number of people who develop symptoms consistent with dementia will increase considerably in the years ahead. To meet the greater demand, perhaps a model requiring everyone to take a standard examination with a limited assessment could be introduced, while more targeted tests/examinations can be employed if the standard battery of examinations proves unsatisfactory, for example in the case of unusual symptoms, swift development or younger patients.

It is essential that the outpatient clinic is always up-to-date and uses good, internationally recognized assessment tools, for example different MRI techniques (16). Nevertheless, we continue to believe that a comprehensive medical history from a reliable family member is the most important diagnostic aid that can put the doctor on the track of the correct diagnosis (17).

Conclusion

The Memory Clinic is an outpatient facility that offers assessment on suspicion of dementia, primarily to younger people or in cases where the course of the illness is complicated or unusual. We believe that other university clinics in Norway should establish similar options.

The patients have given permission for the publication of the article.

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Anne Brækhus (born 1961)

Dr.med. and specialist in neurology. Senior consultant at the Department of Geriatric Medicine, the Memory Clinic, and the Department of Neurology, Oslo University Hospital, Ullevaal.

Conflicts of interest: None declared.

Ingun Dina Ulstein (born 1950)

PhD, psychiatrist and holds a research position at the Norwegian Centre of Dementia Research, Vestfold Mental Health Care Trust and Oslo University Hospital, Ullevaal. She has a part-time position as a senior consultant at the Memory Clinic, and is project leader for the Regional Register.

Conflicts of interest: None declared.

Torgeir Bruun Wyller (born 1960)

Dr.med., specialist in internal medicine and geriatrics, professor at the University of Oslo and senior consultant at Oslo University Hospital.

Conflicts of interest: The author has received fees for lectures on geriatric topics from Pfizer, Roche, AstraZeneca and Nycomed.

Knut Engedal (born 1946)

Professor dr.med., Head of Research at the Norwegian Centre for Ageing and Health, Department of Geriatric Medicine, Oslo University Hospital, Ullevaal, and Professor of Psychogeriatrics at the University of Oslo.

Conflicts of interest: None declared.

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