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Case Report

DIAGNOSIS AND MANAGEMENT OF MILD COGNITIVE IMPAIRMENT IN THE COMMUNITY: WHAT IS THE ROLE OF PRIMARY CARE PHYSICIAN?

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ABSTRACT
Dementia is a large and growing problem in the ageing population but often not diagnosed in its earlier stages which is Mild Cognitive Impairment (MCI). MCI represents the phase between normal ageing and early dementia. About 12% of patients with MCI develop dementia per year, usually Alzheimer's disease. It is a diagnosis given to individuals who have cognitive impairments beyond that is expected for their age and education. However, this condition does not interfere significantly with daily activities as these individuals retain their critical thinking and reasoning skills. Nevertheless, due to its complexity and vague initial presentation, many cases of MCI can be missed. Therefore, it is imperative for primary care physicians to recognise these symptoms as opposed to normal ageing memory changes, and refer these patients to the memory clinic early to confirm the diagnosis. This paper illustrates a common primary care presentation of a patient with MCI. As there is no proven pharmacological treatment for MCI, the mainstay of management is to provide lifestyle intervention and long term support to these patients in the community. Primary care physicians should work as a team with the geriatrician, allied health personnel, support groups and caregivers in providing this care.
Keywords: Mild cognitive impairment, dementia, short term memory loss, primary care, Malaysia.
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TEACHING CASE REPORT

Madam MJ, a widowed 82-year-old woman, presented to her primary care physician with gradual and progressive memory deficits of nine months duration. She claimed that the difficulty was more of remembering the names of people she once knew well. Furthermore, she was unable to remember the recipe for the dishes she used to cook. According to her daughter, she was repetitive at times. However, this elderly lady remained socially active and had good insight into her memory problem. She had a will written already. There were no symptoms suggestive of depressive illness. This lady was independent in self care, able to ambulate unassisted and also independent with shopping and driving.

She is known to have (i) hypertension on metoprolol 100 mg daily and ramipril 5 mg daily, (ii) stable angina since 2006 on aspirin 100 mg daily and clopidogrel 75 mg daily and had an angioplasty with stent inserted a year ago, and (iii) hypercholesterolemia on vytorin 10/40 (ezetimibe 10 mg /

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simvastatin 40 mg) daily. She gave a history of macular degeneration in 2003 and was under ophthalmology follow-up.

Madam MJ lived alone in a two-bedroom apartment. Her only daughter was married and lived separately from her. She had a family history of ischaemic heart disease. There was no family history of Alzheimer's disease. She had one elder sister who passed away two years ago due to old age and she was close to her brother-in-law. The prolonged illness of her brother-in-law who subsequently passed away six months ago caused stress to her. However, there was no persistent depressive symptoms or psychosis noted. This lady had no significant behavioural disturbances. She did not smoke or consume alcohol. She took a normal diet.

On examination, she was alert and conscious. This elderly lady weighed 50 kg. Her mood was normal. Her blood pressure (BP) was 120/70 mmHg and pulse rate was 76 beats per minute. Mini mental state examination (MMSE) was conducted and she scored 26/30. There was no pallor or jaundice noted. Central nervous system (CNS) examinations revealed symmetrically brisk reflexes and there were no frontal lobe signs. Her cardiovascular system (CVS), respiratory system (RS) and gastrointestinal (GIT) system were normal. Madam MJ was referred by her primary care physician to the memory clinic at the hospital for confirmation of diagnosis.

At the memory clinic, a differential diagnosis of Mild Cognitive Impairment (MCI) was made. She was advised to use a dosette/pill box and be physically active. Advice on measures to improve cognition such as doing jigsaw puzzles, playing scrabble and doing cross word puzzles was also given. She was referred for a Magnetic Resonance Imaging (MRI) of the brain and a neuropsychiatric assessment. Her next appointment was in one month time.

On review after one month, her cognition remained stable and she has remained active and independent. The MRI of the brain showed moderate small vessel disease with no disproportionate loss of volume of the medial temporal lobe. This makes the diagnosis of Alzheimer's disease unlikely.

The most likely cause of her memory difficulties was thought to be MCI based on MMSE score of 26/30 and clinical diagnosis of MCI that is elucidated in Table 4. Given her vascular risk factors and the ischaemic changes in the brain, she was advised to continue her aspirin and clopidogrel. Measures to improve her cognition were emphasized. She has declined neuropsychological testing. Her next review is in six months time and re-evaluation of her cognition is to be done at that follow-up.

Discussion:

1. How common and significant is this condition?
2. How do we make the diagnosis?
3. How do we manage this elderly lady?

INTRODUCTION

Dementia is a large and growing problem in the ageing population but often not diagnosed in its earlier stages. It is also an increasingly important aspect of primary care. Alzheimer's disease remains the most common type of primary degenerative type of dementia, accounting for 60-80% of cases.[1] This is followed by vascular dementia, Lewy body disease, frontotemporal dementia and the other types of dementia.

There are seven stages in the evolution of Alzheimer's disease pathology.[2] These stages were published in the Global Deterioration Scale (GDS) in 1982.[2] Importantly, three of the GDS stages (GDS stage 1 to GDS stage 3) occur prior to the advent of mild Alzheimer's disease.[2] These GDS staging are:

GDS stage 1: No subjective or clinically manifest decrement in cognition or cognitively based functioning.

GDS stage 2: Very mild cognitive impairment. This is the phase of forgetfulness. The patient complains of memory deficits. Subjectively experienced decrement in cognition or cognitively based functioning. There is no objective evidence of memory deficits on clinical interview. This stage is also termed as Subjective Cognitive Impairment (SCI). It lasts for 15 years before progressing to MCI.

GDS stage 3: Mild cognitive impairment (MCI). A stage in which the earliest clear-cut deficits occur and in which objective evidence of memory deficit is obtained only with intensive interview. The terminology of MCI was suggested for persons in this GDS stage 3. This stage lasts for seven years before progressing to Alzheimer's disease.

GDS stage 4: Moderate cognitive impairment is noted. There is a clear-cut memory deficit apparent in a careful clinical interview. Concentration deficit is usually elicited.

GDS stage 5: Moderate severe cognitive impairment. This is the phase of early dementia. Patients in this phase can no longer survive without some assistance.

GDS stage 6: Severe cognitive impairment. This is the middle phase of dementia. These patients may occasionally forget the name of their spouses, on whom they depend solely on survival. They are unaware of all recent events and experiences in their life.

GDS stage 7: Very severe cognitive impairment. Late dementia stage. All verbal abilities are lost. Frequently there is no speech at all, only grunting.

DISCUSSION

How common and significant is this condition?

This case illustrates a common primary care presentation of a patient with MCI. This patient falls in GDS 3 of the above classification.

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There are only very few prevalence studies of dementia in Malaysia. A community survey amongst Malays aged 60 years and above in Selangor, found that 24% were cognitively impaired.[3] Among those living in the government residential homes, the prevalence of probable dementia are higher at 36.5%.[4]

However, the literature highlighting the prevalence of MCI is scarce. About 12% of MCI patients per year develop dementia; usually Alzheimer's disease.[5] MCI remains as a diagnosis in evolution.[5] It is a controversial topic and represents the phase between normal ageing and early dementia. The diagnosis of MCI is given to individuals who have cognitive impairments beyond that expected for their age and education. Conversely, this condition does not interfere significantly with their daily activities.[6] It is considered to be the boundary or transitional stage. MCI can present with a variety of symptoms. However, when memory loss is the pre-dominant symptom, it is termed as "amnestic MCI" and is frequently seen as a risk factor for Alzheimer's disease.[7]

The Malaysian Clinical Practice Guidelines on Management of Dementia, 2009, does not recommend routine screening of elderly population for dementia at the primary care level except for patients with subjective memory complaints or if requested by an informant.[8]

Early diagnosis and intervention is useful in patients with MCI because prophylactic treatments designed to slow the progress toward Alzheimer's disease can be prescribed.[9] Therefore, it is imperative for primary care physicians to recognise these symptoms as opposed to normal ageing memory changes, and refer these patients to the memory clinic early for confirmation of diagnosis. Table 1 illustrates the differences between normal memory changes, symptoms of MCI and dementia.

Comprehensive history should be obtained in patients with subjective memory complaints. Primary care physicians should ensure they consider the four 'Ds' when considering differential diagnosis. These are dementia, delirium, drugs and depression.

Once MCI is detected, it is important for primary care physicians to refer patients to the memory clinic for confirmation of diagnosis. Table 2 summarises the reasons for referral to specialist secondary care services.

Table 2: Summary of reasons for referral to specialist care services[8]

1	Issue of diagnosis, including for second opinion	a, b
2	Difficult behaviour problems	
3	Psychiatric co-morbidity e.g. depression	
4	Treatment issues	
5	To obtain community support services	
6	Age is less than 60 years	a
7	Rapid deterioration in clinical condition	
8	Possible industrial exposure to heavy metal	
9	Genetic counselling	b
10	To involve other health care professionals in management	

a = Australian Practice Guidelines 2003
b = Royal College of Psychiatrist UK 2005

Prior to referring to the memory clinics, it is recommended that primary care physicians conduct a MMSE, assess the subjective memory complaint using the designated questionnaire, and screen for depression using the Geriatric Depression Scale (GDS).[11] Where resources are available, primary care physicians should arrange for a Computered Tomography (CT) Scan or MRI brain for patients with persistent and progressive memory problems. The recommended investigations for memory loss which includes mild cognitive impairment are illustrated in Table 3.

Table 1: Differentiating normal memory changes, MCI and dementia symptoms[10]

Typical ageing memory changes	Mild Cognitive Impairment (MCI)	Dementia
May complain of occasional short term memory loss and able to provide detailed examples of forgetfulness	Experience significant short term memory loss, but able to provide examples of forgetfulness	May complain of memory loss only if asked; unable to recall specific instances
Occasionally searches for words	Trouble remembering names of people they meet or the flow of conversation	Frequent word-finding pauses, substitutions
May have to pause to remember directions, but doesn't get lost in familiar places	Occasionally gets lost in familiar places	Gets lost in familiar places and takes excessive time to return home
Remembers recent important events; conversations are not impaired	Remembers recent important events with the help of calendars, notes and list; conversations are not impaired	Notable decline in memory for recent events and ability to converse

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Table 3: Investigations for memory loss[5]

Routine
Full blood count (FBC)
Renal profile
Erythrocyte sedimentation rate (ESR)
Liver function test (LFT)
Calcium
Thyroid function
B_{12}, folate
CT scan of brain without contrast
If indicated (recommended)*
Chest x-ray*
Fasting blood sugar levels (FBS)
Lipid study*
Fasting homocysteine level
TPHA to rule out neurosyphilis
Electrocardiogram (ECG)*
Mid stream urine (MSU)*
HIV
Special investigations (if clinically indicated)
Electroencephalogram (EEG)
Magnetic resonance imaging (MRI)
Positron emission tomography (PET)
Apolipoprotein E (E4 status confers increase risk)
Neuropsychological assessment

How do we make the diagnosis?

At the secondary care level, a more comprehensive assessment should be repeated to confirm the diagnosis. This includes history taking, mental state examination including MMSE and subjective memory complaint assessment.[8] The most commonly used cognitive assessment tool is the MMSE which is scored out of 30.[11] A score of 27-30 is considered as normal cognitive function, 21-26 is MCI, 15-20 is moderate cognitive impairment, 10-14 is moderately severe cognitive impairment and <9 is suggestive of severe cognitive impairment.[12] However, this can take up to 5-10 minutes to complete. This test remains the most common mode of assessment in both primary and secondary care for persistent and progressive short term memory loss. Those interpreting the scores of such tests should take full account of other factors known to affect performance. This includes educational level, prior level of functioning and attainment, language, sensory impairments, psychiatric illness, and physical/neurological problems. A review of medication should also be conducted to identify and minimise the use of drugs, including over-the-counter products that may adversely affect cognitive functioning.

Physical examinations and other appropriate investigations should be carried out. The second step in the diagnostic process is to perform a CT scan or MRI brain.[13] In this patient, MRI brain was done because it is a sensitive test to detect vascular abnormalities in view of her cardiovascular risk factors. Formal neuropsychological testing should also form part of the assessment in cases of mild or questionable dementia. This can be assessed via detailed neurocognitive assessment performed by the neuropsychologist. In addition to this, medical co-morbidities and key psychiatric features associated with dementia should be assessed at the time of diagnosis and at regular intervals subsequently.

In Madam MJ's case, a diagnosis of MCI was made at the memory clinic after a comprehensive assessment was done. These diagnostic criteria are illustrated in Table 4.

Table 4: Diagnostic criteria for Mild Cognitive Impairment[14]

Mild cognitive impairment is diagnosed when there is:
1. Evidence of memory impairment
2. Preservation of general cognitive and functional abilities e.g. learning, reading, speaking and writing
3. Absence of diagnosed dementia

How do we manage this elderly lady?

There is no proven pharmacological treatment for MCI.[15] This condition may represent a prodromal state to clinical Alzheimer's disease and treatments proposed for Alzheimer's disease, such as antioxidants and cholinesterase inhibitors may not be useful.[8] There is also insufficient evidence for NSAIDs and statins.[8] Several potential treatments are still under investigations.

In view of this, primary care physicians have a pivotal role in providing lifestyle intervention and long term support to MCI patients in the community. The goals of management for primary care physicians are to improve cognition and to delay progression to Alzheimer's disease. The measures to achieve this are summarised in Table 5.

Table 5: Management of Mild Cognitive Impairment by primary care physicians

Measures to improve cognition/delay progression to dementia includes the following:
1. Promoting independence in communication and activities of daily living (ADL)[16]
2. Mental exercise e.g. doing puzzles, playing scrabble, reading, learning languages and playing musical instruments[17]
3. Healthy lifestyle including physical activity and healthy diet[18]
4. Getting enough sleep[19]
5. Limit alcohol intake[19]
6. Control of vascular risk factors e.g. hypertension, hyperlipidaemia, diabetes, smoking cessation[19]
7. Regular follow-up of at least 3-6 monthly[8]

CONCLUSION

As the ageing population in Malaysia increases, primary care physicians need to have a high index of suspicion for MCI when patients present with subjective memory complaints. Primary care providers need to play a greater role in identifying, screening, monitoring and providing long term support in managing elderly patients with memory problems. Nevertheless, due to its complexity and vague initial presentation, many cases of MCI can be missed. Therefore, it is imperative for primary care physicians to recognise these symptoms as opposed to normal ageing memory changes, and refer these patients to the memory clinic early for confirmation of diagnosis.

As there is no proven pharmacological treatment for MCI, the mainstay of management is to provide lifestyle intervention and long term support to these patients in the community. If the memory further deteriorates which can be monitored with MMSE, these patients should be referred back to the memory clinics with geriatricians for further assessment. Primary care physicians should work together with the geriatrician, allied health team, support groups and caregivers in providing this care.

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