Review Article

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Guideline to Different Aspects of Assessment in Alzheimer's Disease Patient

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ABSTRACT

Alzheimer's disease (AD) is the leading cause of dementia in the USA and worldwide. In this article, we have discussed the incidence of dementia, especially Alzheimer's disease dementia, and its familial association, according to the latest reports. There is a menu of instruments discovered in past decades for the behavioral, cognitive and functional assessment of an AD person. Behave-AD, E-BEHAVE-AD, E-BEHAVE-AD FW, Neuropsychiatric inventory are discussed in detail, in view of the researches conducted in their context. Global deterioration scale (GDS), Brief cognitive rating scale (BCRS), Mini-mental state exam (MMSE), Functioning and self-care (FAST) and other tools are used in the cognitive and functional assessment of an AD person. We threw light on the pros and cons of utilization of these divergent tools.

"SHADOWING MY DEMENTIA SPECIALIST AND THE WORLD OF DEMENTIA"

The world of dementia is different in plenty of ways. We see many vulnerable, dependent persons coming and going but never recovering completely. Other psychiatric conditions are completely treatable but seems like the brain has a different disposition towards the memory problems. You cannot reverse them or give that person his life totally back. All the efforts are done in stabilizing the lives and making it easier and better for the patient and the caretaker. In this article, we will discuss some interesting facts in the steps of assessment in an Alzheimer's disease patient.

Dementia is a rising public health issue. Over 10 % of individuals [1], above age 65 suffer from dementia and around 50% of individuals over age 80 experience it [1]. As the human body ages, all the systems start to wither. Likewise, human brain experiences changes. According to the latest 2017 facts, "every 66 seconds, someone in the USA develops Alzheimer's", "One in three seniors' dies of Alzheimer's or another dementia". Furthermore, Late-onset Alzheimer's disease (LOAD)i.e., Alzheimer's after the age of 65, is more prevalent in family members whose one or two siblings have suffered from it. Hence, familial history of LOAD predisposes normal persons to suffer from it later in life [2]. This was determined by the Late-Onset Alzheimer Disease/National Cell Repository for Alzheimer Disease (NIA-LOAD/NCRAD) [2].

Alzheimer's disease is staged on basis of information gathered from the caregivers, family members or the persons closely related to AD persons and by the close observation and interrogation from the AD person. This staging holds its importance in the management of AD person and in the understanding of the disease severity. This helps in taking measures to supervise the disease process. In this article, we will discuss the domains in which an AD person is investigated and the different scales which have been discovered in past decades in the light of different studies conducted. Quality of life (QOL) is a term becoming increasingly popular representing how the patient thinks about his or her illness and its outcome on his behavior and emotions [3].

Behavioral and psychological disturbances in Alzheimer's disease dementia

To assess the neurological ground of behavioral and psychological symptoms in dementia persons, a study was conducted on 40 Alzheimer's disease patients. The statistics proposed that the behavioral and psychological symptoms represent two different neuropathologic grounds. Behavioral symptoms are related to attention; however, psychological symptoms are unrelated to the cognitive abilities of the patients [4].

In another longitudinal study, conducted on 32 patients, all of whom met the criteria of AD, the emergence of psychosis and depression was investigated. 15 of these AD persons developed psychosis and 7 developed depression. Psychosis was found to be associated with rapid decline in cognition in the AD persons. It was further concluded that psychosis was a poor prognostic factor in the context of AD [5].

An Alzheimer's disease (AD) patient endures different behavioral disturbances [6], in accordance with the MMSE stage, according to Nakatsuka et al. The paranoid and delusional ideations constitute "people are stealing things" delusion i.e., as a result of not recollecting where items of daily use are placed [7]. Also, an AD patient may not perceive his house as his "home" and demand the caregiver to take him home. Occasionally, some AD patients may not recollect their caregivers or spouses very well. Similarly, AD patients might develop some understanding of their illness and establish the "delusion of abandonment" or "institutionalization". Due to the similar reasons as described above, an AD patient may think their spouse or caregiver is deceitful. Thus, AD patients can come across these and other delusions or paranoid ideations at some points of their illnesses [7].

In addition to the delusions, visual or auditory hallucinations are also a part of dementia patient's behavioral pathologic symptomatology [8]. Dementia patients can also wander away from their residence and are predisposed to getting lost in their surroundings [9]. Verbal or physical altercations are also a part of AD patient's illness. Sleep disturbance and depressed mood are other important components of AD [10].

Observational and Caregiver based behavioral assessments

It is interesting that you encounter a dementia person once, but the next time you meet the same individual, a huge percentage of moderate to severe dementia patients cannot recall who you are or where they were. The evaluation of behavior in a dementia patient is performed in two ways; a direct observation of the dementia patient by an at least 30-minute session of Empirical Behavioral Pathology of Alzheimer's disease (E-BEHAVE-AD) [6], in which only the dementia patient is individually questioned, closely observed and evaluated accordingly, and a caregiver based assessment, Behavioral Pathology of Alzheimer's disease (BEHAVE-AD) [6].

Behave-AD

Behave-AD was first published in 1987 by Barry Reisberg and associates [11]. The behave-ad scale of assessing behavior in dementia persons relies on the information provided by the carers of the dementia persons. This scale has 25 components and assesses 7 sections of behavioral disturbances. These categories of behavioral disturbance include paranoia and delusions, all forms of hallucinations, purposeless and inappropriate activities, verbal and physical altercations, multiple awakenings at night, depressed mood and fear of being left alone [11]. Behave-AD has been used in the trials conducted for the approval of Risperdal (risperidone) in the treatment of behavioral symptomatology of Alzheimer's disease. Subsequently, this scale has also been used in the approval of Namenda (memantine) and Exelon (rivastigmine) for the treatment of Alzheimer's disease [6].

E-BEHAVE-AD

In a study conducted to determine the relationship between the two scales of behavioral assessment, the BEHAVE-AD, and the E-BEHAVE-AD, the interrater reliability was assessed on 20 dementia patients. The results were statistically significant, and the E-BEHAVE-AD showed excellent interrater reliability to the BEHAVE-AD assessment scale. The E-BEHAVE-AD is the observational tool for behavioral assessment of a dementia person. It depends on the explicit observation of the dementia person, by the clinician [12].

BEHAVE-AD FW

Another more sensitive scale was developed about a decade ago, the Behavioral Pathology of Alzheimer's Disease Frequency weighted scale (BEHAVE-AD FW). The BEHAVE-AD and BEHAVE-AD FW, both assessments rely on the source-based information i.e., caregiver based information [6]. To constitute the interrater reliability of the frequency weighted component added to the BEHAVE-AD (BEHAVE-AD FW), a study was performed on 28 persons carrying a diagnosis of mild cognitive impairment (MCI) or dementia, which established that the intraclass correlation coefficient was statistically significant. This result constituted that the inclusion of frequency weighted component is beneficial in the assessment of a dementia patient [13]. Also, BEHAVE-AD FW can distinguish between cognitive and psychological delusions. For example, the delusion that house is not my real home, is a cognitive delusion and the delusion of institutionalization or abandonment is a psychological delusion [14].

Nakatsuka et al explain that the delusion of "residence not my real home" in an Alzheimer's patient spikes in persons with Mini-mental status exam (MMSE) scores of 0-9, according to the BEHAVE-AD FW scores. Similarly, the study also found that according to BEHAVE-AD FW, the delusion that "people are stealing things" spikes in AD persons with MMSE scores of 20-30 and the delusion of "caregivers being untrue or deceitful" peaks in mild AD persons and are less common in the moderate stage of AD [15].

Neuropsychiatric Inventory

Another scale to investigate behavioral disturbances in AD and other dementia persons is Neuropsychiatric Inventory (NPI), which was developed by Cummings et al in 1994. Its availability is in 75 different languages and assesses 12 different domains of behavioral disturbance. According to the studies conducted, this scale is both valid and reliable. It not only investigates the prevalence but also the degree of behavioral disturbance [16].

Incidence and assessment tools for Alzheimer's disease depression Depression is an eminent psychiatric illness manifesting in Alzheimer's disease. It is also responsible for decline in activities of daily living in AD persons, hence liable for uprising number of institutionalized individuals [17]. In an AD person the most

common instruments used for measuring depression are Hamilton depression rating scale, The Geriatric depression scale (GDS), Cornell Scale for depression in dementia, The Montgomery Asberg Depression Rating Scale and The Hospital Anxiety and Depression Scale [3].

Cognitive decline in Alzheimer's disease dementia patient

Cognitive impairment in AD follows a typical time course. The first stage of "brain aging" in a clinically normal adult goes on for decades. The next stage i.e., memory impairment in the elderly population, lasts about 15 years. Subsequent to that is Mild Cognitive Impairment (MCI) which continues approximately 7 years. Thereafter is Mild Alzheimer's disease stage, its duration is about 2 years. Then comes Moderate AD lasting one and a half years, a moderately severe AD stage with a duration of about two and a half years and a severe AD which lasts around six years [18].

The rate of decline of cognition in an AD patient depends on several factors, such as the age of onset of dementia. Those individuals in which the AD starts later in life i.e., 80 years or later, will have a slower progression of the disease compared to individuals in which AD starts earlier in life i.e., 65 years or younger. A pooled cohort study deriving results from three clinical trials was conducted. The results were based on scales such as Alzheimer Disease Assessment Scale cognitive subscale (ADAS-cog). Other scales included were mini mental state exam (MMSE), Neuropsychiatric inventory (NPI), Alzheimer Disease Cooperative Study–activities of daily living scale and Clinical Dementia Rating Scale (CDRS) [19].

Global deterioration scale

Assessment of cognitive decline in an Alzheimer's disease patient gives the family members and other caregivers a rough sketch of where the patient is in terms of his or her illness. Global deterioration scale (GDS) breaks the Alzheimer's disease into seven progressive stages of the disease. It was discovered by Dr. Barry Reisberg in 1982. Stage 1 of GDS comprises of no clinical signs or symptoms of memory loss and no subjective complaints of memory impairment by the patient [20]. The stage 2 of GDS is Age-associated memory impairment (AAMI), where a patient cannot ascertain where they have placed items of daily use or recall "names" patient knew earlier [20]. However, no occupational or social deficit is witnessed in this stage. The stage 3, Mild Cognitive Impairment, encompasses more than one sophisticated areas of deficit i.e., a patient can become lost in unaccustomed surroundings, an occupational deficit can be witnessed, retaining the learning material becomes harder, names are harder to recall, concentration deficits etc. [20]. MCI persons are mild to moderately anxious of their situation. The next, stage 4 of Mild AD is manifested by clear- cut deficiency in certain areas of personal information, contemporary circumstances and occasions, the capacity to travel or handle finances etc. An interesting fact about mild AD is a denial by the patient and withdrawal from difficult situations [20]. In stage 5, Moderate AD, the patients' needs some support for survival and are incapable of recalling their addresses, telephone numbers, names of close family members and names of institutes from which they studied [20]. They can be disoriented to time and place. The stage 6 of GDS is the moderately severe AD [20]. At this stage, AD persons might not be able to recall the names of their spouses. Now the AD persons count on someone to survive. They need help in some daily activities (which we will discuss in the section of functional incapacity). They cannot recall the major recent incidences of their lives. Sleep disturbances are common. Delusions (as discussed in the behavioral pathology section), repetitive activities, agitation and anxiousness, "cognitive abulia" i.e., diminished motivation because an AD person is not capable of carrying a thought long enough to perform an action and physical or verbal aggression are part of this stage of AD. Emotional burden on the caregiver sometimes leads to consideration of institutionalization by the family members. That is why a Home health aide becomes necessary at this stage of AD. The last stage, stage 7, the Severe AD stage, comprises of failure of verbal skills [20]. At the beginning of this stage, words and phrases are intelligible but as the stage progresses, only incomprehensible utterances and occasional spilling of forgotten words can be noticed. However, understandable speech is not witnessed. At this stage, a full-time assistance becomes significant and AD persons are either institutionalized or are provided full-time Home health aide (HHA). If the AD patient is given care and love, they do feel happy and content [20].

Brief Cognitive Rating Scale

Brief Cognitive Rating Scale [20], is a part of the GDS. BCRS takes account of cognition and functioning of a dementia person. It comprises of 5 axis. The results of these five axis are assessed by a questionnaire. The results when added together and divided by 5, it will give the stage of GDS. The first 4 axis estimate cognition and the fifth axis guesstimates functioning and self-care. The first axis assesses concentration, the second axis consists of recent memory questionnaire, the third axis of past memory, fourth axis of orientation and fifth axis estimates the level of functioning [21].

Clinical Dementia Rating Scale

Clinical Dementia Rating Scale (CDR) was published in 1993 in the journal NEUROLOGY. Washington University Alzheimer's disease research center (ADRC) holds the copyright for CDR. It constitutes a set of questionnaire involving areas such as memory, orientation, judgement and problem solving, community affairs, hobbies and personal care. These are scored from zero to questionable, mild, moderate and severe stages. The information regarding all these domains is obtained from the patient or a caretaker/ family member. CDR holds CDR global CDR score and CDR sum of boxes score (CDR-SOB) [22].

A retrospective study was conducted by Texas Alzheimer's Research Consortium to explore the validity of CDR SOB scores in comparison to CDR global scores for the staging of dementia. According to this study, CDR SOB has supremacy over CDR global scores in terms of the scope of values CDR SOB offers. CDR SOB follows changes in and amidst the stages of dementia and is more detailed [23].

Memory exams

A widely used scale for memory assessment developed by Folstein et al., in Alzheimer's disease, is Mini-mental state exam (MMSE). A score on this test less than 24 is considered abnormal. It is easy to administer and is used as a bedside test of memory assessment [24]. Another test was proven to be more sensitive is the Short test of memory status (STMS). Although MMSE is extensively used it is not very sensitive in the earlier stages of dementia. For example, Mild cognitive impairment (MCI). STMS can better predict cognitive decline in precursor stages such as MCI [25]. Although MMSE is an effective tool in the screening of cognitive decline, however, it has a few limitations such as an evaluation of advancement of Alzheimer's disease in a period less than three years becomes harder [25].

There are a few other tests usually performed to assess a dementia person for cognition. These include Abbreviated Mental Test Score (AMTS), the clock drawing test, Mini-Cog, 6-CIT, Test your memory, General Practitioner Assessment of Cognition (GPCOG), Memory impairment screen, Montreal cognitive assessment, Addenbrookes cognitive assessment, Alzheimer's disease assessment scale and Cambridge assessment of memory and cognition [3].

Functional assessment

The functional assessment of an AD person is performed at regular intervals for taking necessary steps in the management. This functional assessment is implemented by a reliable and valid scale Functional Assessment Staging (FAST). FAST is the 5th axis of BCRS. FAST is a sensitive scale that gauges the stage of AD in terms of functionality and regulates necessary measures to be taken by the family and the caretakers in the management of an AD person. For instance, in stage 1, no difficulty in performing tasks is witnessed. Misplacing objects of daily use is noticed in stage 2. Similarly, distress in traveling to new places and noticeable deficit in performance by the co-workers is seen in stage 3. When it becomes hard to carry out complicated tasks, such as handling of their own finances, stage 4 starts. Subsequently, AD persons are not able to choose their own clothes at stage 5 and in stage 6, they require assistance in toileting, bathing, walking etc. The final stage 7 demands the caretaker's full-time attention as now the AD persons are unable to perform activities of daily living [26].

Other assessments in the context of functioning include Bristol Activities of Daily Living Scale (BADLS), Barthel index, The Functional Independence Measure, Instrumental Activities of Daily Living and The Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) [3].

Conclusion

As the Alzheimer's disease patient passes through the course of his illness, necessary measures in the management of the existing stage of AD becomes significant. An AD person is evaluated behaviorally, cognitively and functionally at regular intervals. This assessment can be carried out using the different scales described above. Caregivers and family members should be informed of the current stage of illness. Medications and therapies should be accordingly altered and necessary steps in the activities of daily living are performed based on the above evaluations.

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