Alzheimer Disease Assessment for Adults with Intellectual Disability

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Dr. Alois Alzheimer (1864 – 1915)
Neurocognitive disorder (DSM-V)

- The primary clinical deficits is in cognitive function (vs. cognitive deficits due to mental illness).
- Impaired cognition has not been present since birth or very early life; it represents a decline from a previously attained level of functioning (vs. neurodevelopmental disorders)
- Some NCD conditions affect younger individuals (e.g., TBI, HIV)
- Some NCD conditions affect a single domain of cognitive functioning (e.g., stroke).
- Dementia usually affect older adults and cause a broader range of cognitive functioning

Dementia in the elderly

- Alzheimer’s disease  60-75%
- Dementia with Lewy Bodies 10-25%
- Vascular dementia  ~10%
- Frontotemporal dementia ~10%
- Others ~5%
Diagnostic criteria of Neurocognitive Disorder due to Alzheimer Disease (DSM-V)

- Clear evidence of decline in memory and learning and at least one other cognitive domain (based on detailed history or serial neuropsychological testing).
- Steadily progressive, gradual decline in cognition, without extended plateaus.
- No evidence of mixed etiology (i.e. absence of other neurodegenerative or cerebrovascular disease, or another neurological, mental, or systemic disease or condition likely contributing to cognitive decline).
- Probable AD/possible AD: probable if there is evidence of a causative AD genetic mutation from either genetic testing or family history.

Epidemiology of AD

(Alzheimer Facts and Figures, 2014)

- One in nine people aged 65 years and older (11%) has AD.
- Of those with AD, the vast majority (82%) are age 75 years or older.
- About 1/2-1/3 of people aged 85 years and older have AD.
- While other major causes of death have decreased, Alzheimer deaths have increased.
Percentage changes in causes of death (all ages) between 2000-2010

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>Percentage Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast cancer</td>
<td>-2%</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td>-8%</td>
</tr>
<tr>
<td>Heart disease</td>
<td>-16%</td>
</tr>
<tr>
<td>Stroke</td>
<td>-23%</td>
</tr>
<tr>
<td>HIV</td>
<td>-42%</td>
</tr>
<tr>
<td>Alzheimer's disease</td>
<td>+88%</td>
</tr>
</tbody>
</table>

Senile Plaque
Neurofibrillary Tangles

1,100-1,400g → below 1,000g
Age is the major risk factor for AD

- 85+ years, 38%
- 75-84 years, 44%
- 65-74 years, 15%
- <65 years, 4%
The oldest of the old

- People who make it through their nineties without developing AD are actually at a lower risk than people in their eighties (Perls, 1998).
- Half of the people who died between 95 and 99 have brain-infarcts, whereas only 22% of the people who died over 100 have infarcts.

Genetic factors in AD

- Some gene mutations are determinant (e.g., Presenilin-1, Presenilin-2, APP): families with these mutations are very rare (<1% of cases of AD)
- Some genes increase the risk of AD (e.g. ApoE4, TOMM40)
Apolipoprotein-E

It involves with the transport of cholesterol and phospholipids in the brain

<table>
<thead>
<tr>
<th>Genotype</th>
<th>% of Population</th>
<th>% of those with AD</th>
</tr>
</thead>
<tbody>
<tr>
<td>ε2/2</td>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>ε2/3</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>ε3/3</td>
<td>60</td>
<td>35</td>
</tr>
<tr>
<td>ε3/4</td>
<td>21</td>
<td>42</td>
</tr>
<tr>
<td>ε4/4</td>
<td>2</td>
<td>16</td>
</tr>
</tbody>
</table>

ApoE and AD

- 65-80% of all AD patients have at least one ε4 allele.
  - ε3/4 2-3 fold increased risk of AD
  - ε4/4 10 fold increased risk of AD
- For individuals with ID from DS—the risk associated with APOε4 in DS appears to be lower than what is associated with AD (Rohn et al. 2014).
Down syndrome

- Free trisomy 21--three full copies of the 21st chromosome (95% of cases)
- The amyloid precursor protein (APP) gene is present on chromosome 21.
- The overexpression of the APP is related to the deposition of amyloid in the brain.

Gender and Racial risk for AD

- Almost 2/3 of individuals with AD are woman; primarily explained by the fact that women live longer than men.
- African-Americans and Hispanics (primarily Caribbean-Am) are more likely to have AD than whites; primarily they have a higher risk for HBP and diabetes.
AD brain vs. AD symptoms

- Nun Study (Snowdon et al, 1997)
  AD brain + small infarcts: 93% dementia
  AD brain + no infarcts: 57% dementia
- Bennett et al. (2006)
  1/3 of individuals ages 82-85 who met neuropathological criteria for AD did not have clinical symptoms of dementia

Protective Factors ??

- Mediterranean diet
- Cognitive activities
- Exercise
- Active life style
- Etc.........
Prevent Risks

- Stroke
- Cardiovascular risk factors (HBP, diabetes, obesity)
- High cholesterol
- Head trauma
- Low education
- Life style (smoking, inactivity etc)

Type II Diabetes Mellitus (T2DM) & AD

- Risk for AD doubles after developing T2DM
  - Ott et al., Neurology, 1999;
  - Arvanitakis et al, Archives of Neurology, 2004

- T2DM is present in 80% of AD patients
  - Janson et al, Diabetes, 2004
What is normal …

What is NOT

The continuum of Alzheimer’s disease

- Preclinical
- MCI
- Dementia

Cognitive function

Aging

Years
Seattle Longitudinal Study (Schaie, 2006)

- Decline is not likely until very late in life
- Decline is most evident in speed of response.
- Cohort effects account for more of the variance in different ages.
- Individual differences in what skills decline as well as the extent of such decline are substantial.

Normal aging Study (Devenny, et al, 1996)

- Annual evaluations of a group of 91 adults with DS and 64 adults with other forms of ID over a period of up to 6 years (mean IQ 50s)
- Normal ageing would include small, incremental declines in performance on tests of short term memory; slight decline in short term memory (less than 1% per year) was associated with increasing age in adults with DS, but not with their peers.
- Selective reduction of psychomotor speed, with the preservation of other cognitive abilities
- Declines in functioning were not characteristic of the participants
- Adults with DS may be experiencing premature but otherwise normal ageing.
Alzheimer Disease in elderly with DS

- Adults with DS have higher risk of developing AD compared to adults with ID from other etiologies. They tend to develop AD at younger ages than adults with ID from other etiology.
- Nearly all adults with DS over 35 years of age exhibit some of the key neuropathological changes characteristic of AD.
- The non-fibrilized types of amyloid plaques which have been shown to be so pervasive in even relatively young adults with DS appear to be unrelated to the disruption of neural systems (Wisniewski & Silverman, 1996).
- It was speculated that the brain mechanisms of AD among individuals with DS may be different from that of general population.

Alzheimer Disease in elderly with DS (cont)

- Dementia occurs in people with DS in 9.4 % in the age group 30-39 which increases to 54.5 % in the age group 60-69 (Prasher et al. 2015).
- The risk of developing AD among adults with DS is much lower than previously thought.
- For people with ID of non-DS causes aged 65 or older, the incidence of dementia is up to five times higher than in the general population, peaks at age 70-74 (Strydom et al, 2013).
- The average age of onset for clinical manifestations of AD in individuals with DS is between 51 and 54 years of age, and in individuals with ID from other causes tends to be over 65.
- The evidence for gender and the level of ID as potential risk factors is inconclusive (Bush et al. 2004).
Alzheimer Disease in elderly with DS (cont)

- Men with DS were three times as likely to develop AD (Schnupf et al, 1998)
- Prevalence rates of AD did not differ among different levels of ID. Age was a strongest risk factors and was not influenced by gender or severity of ID (Strydom et al, 2009).
- In DS patients the early, selective accumulation of Abeta peptides is independent of the ApoE genotype, but the APOe4 predisposes to various causes of premature death (Folin et al, 2003).

Memory impairment of AD

- Memory loss is a predominant symptom in individuals showing decline.
- The memory decline occurs before other areas of cognitive impairment.
- The presence of AD would represent a distinct departure from the course of normal ageing in these individuals (Haxby & Shapiro, 1992).
- **20% or more** below an individual's highest previous total recall score during two consecutive test sessions (Krinsky-McHale et al, 1997)
Memory impairment of AD (cont)

- Declines in memory may occur earlier than more global behaviors, such as those identified by informant-based scales.
- Higher functioning individuals with ID have been known to display a relatively long pre-clinical period in which the memory decline occurred several years prior to a diagnosis (Devenny et al. 2000).
- There is a relatively long pre-clinical period in which this memory decline occurs that can be detected by testing (Devenny, et al, 2002).
- Any decline on cognitive tests must be accompanied by documentation of changes in everyday functioning before the declines can be considered diagnostic.

Non-memory impairment of AD

- Impaired orientation and visuospatial memory at the beginning of the study, and praxis and language function deteriorates later (Oliver et al, 1998).
- All individuals with possible AD declined on questions of orientation to time and on object naming (Devenny, et al, 1996).
Frequently-cited AD-related behaviors

- Changes in vegetative function (urinary incontinence, sleep disturbance, becoming tired easily, eating too much or little)
- Gait disturbance
- Confusion (wandering, difficulty finding their way around, lack of boundaries)
- Mood changes (irritability, agitation, restlessness, aggression)
- Deterioration of self-care skills (difficulty with dressing and washing)
- Difficulty with communication

Maladaptive behaviors of AD (cont)

- Obnoxious behaviors (e.g., lying, reacting poorly to frustration or criticism, demanding excessive attention, impudent attitude towards authority)
- lack of boundaries (e.g., takes others' property, disrespecting others' personal space)
- overestimating own abilities
- Maladaptive behaviors were significantly elevated prior to the occurrence of subsequent adaptive decline. (Urv, et al, 2003).
Maladaptive behaviors of AD (cont)

- Decreased mood, restlessness and disturbed sleep were found to be more common in the DS group, whereas aggression was more common in the group without DS (Cooper & Prasher, 1998).
- Dementia status did not influence any of the measures of aggression except for the self-abusive behavior (Cosgrave et al., 1999)

Maladaptive behaviors of AD (cont)

- Cosgrave and colleagues (1999) found no relationship between AD and the prevalence of behavior disturbances
- Zigman and colleagues (2002) reported that only 16% of individuals with DS who displayed functional decline had a formal diagnosis of AD: age-related medical concerns unrelated to AD, like arthritis, Parkinson’s disease, or cardiovascular problems may play an important role in the decline in adaptive behaviors.
- Disability level and comorbidity can explain 10% of the ADL score variation, whereas dementia conditions can only explain 3% of the ADL score variation based on the caregiver’s report (Lin et al, 2014)
Maladaptive behaviors of AD (cont)

- A diagnosis of dementia should be discouraged if observable behavioral changes are not accompanied by evidence of cognitive decline, and it will require consideration of all possible causes of functional decline, including those that are treatable (Working Group, 1996).

Guidelines for Dementia-related Health Advocacy for Adults with Intellectual Disabilities and Dementia of the National Task Group on Intellectual Disabilities and Dementia Practices (Dec 2014)
NTG’s guidelines

1. Provide caregivers with information on differential risk factors and signs associated with dementia in adults with ID.
2. Increased caregivers’ awareness of symptoms (raise the index of suspicion) associated with dementia.
3. Ensure that life history and functioning information is retrieved, reconstructed, or developed when possible.
4. Initiate cooperative continuing education programs in aging and ID for local health care practitioners and ancillary personnel.

NTG’s guidelines

5. Increase practitioners’ understanding of the likely symptoms and presentation of dementia by adults with ID.
6. Establish a regional directory of practitioners who are experienced with examining adults patients with ID.
7. Assist caregivers through organizational support with finding health care providers who are knowledgeable and experienced with assessing adults with ID.
8. Establish a ‘dementia specialist’ or ‘dementia team’ on an agency or regional basis who/which can assist caregivers with gathering information and obtaining a referral for a dementia assessment (as well as consult within follow-ups).
NTG’s guidelines

9. Improve communication between caregivers and practitioners by training and instituting a process for dementia-related health advocacy amongst caregivers.

10. Establish follow-up processes with assigned clinicians or advocates so that families have access to personnel who can help advise them.

11. Provide training or education materials to caregivers on communication with health personnel.

12. Implement innovative approaches to health assessment as part of the planning and organizing of local dementia capable services.

The Working Group for the Establishment of Criteria for the Diagnosis of Alzheimer Disease (AD) in Individuals with Intellectual Disability under the auspices of the International Association for the Scientific Study of Intellectual Disability (IASSID) and the American Association on Mental Retardation (AAMR) 1996
The Working Group’s guidelines

- While some age-associated changes are normal (e.g., changes in stamina and sensory abilities), gross mental deterioration is not.
- Some behavioral changes may look like AD, but may be the result of other causes and may be reversible.
- The differential diagnostic process should be essentially the same as that used in the general population, except for modifications made to accommodate differing cognitive skills.
- The individual’s own abilities and level of functioning (i.e., his or her baseline of performance) should be the basis for evaluating subsequent changes.

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The Working Group’s guidelines

- All adults with ID should be evaluated using standardized procedures at least once before 40 years of age to all adults with DS and before 50 years of age to adults with ID from other causes in order to establish baseline levels of performance when healthy.
- Longitudinal administration of tests is an absolute necessity to make a diagnosis of dementia (every 1-5 years depending on age and risk for dementia), and as soon as possible when dementia is suspected.
The Working Group’s guidelines

- It is imperative to obtain information from informants who are familiar with the individual’s current everyday behavior, and preferably, with past behaviors.
- A diagnosis of dementia should be discouraged if observable behavioral changes are NOT accompanied by evidence of cognitive decline.

The Working Group’s guidelines:
Dementia evaluation

- Interview with the patient and informants
- Behavior rating scales
- Cognitive tests
- Physical assessment (pulse rate, respiration rate, blood pressure, body temperature, and level of alertness etc)
- Neurological examination
- Laboratory tests (CBC, CMP, thyroid stimulating hormone, free T4, Vitamin B12 Level, folate, urinalysis, sedimentation rate, and CT of brain)
The Working Group’s Dementia Battery
(Informants’ rating scales)

- Dementia Questionnaire for Mentally Retarded Persons
- Dementia Scale for Down Syndrome
- Reiss Screen for Maladaptive Behavior
- Scales of Independent Behavior-Revised
- AAMR Adaptive Behavior Scale-Residential and Community
- Stress Index

The Dementia Questionnaire for Mentally Retarded (DMR) and the Dementia Scale for Down Syndrome (DSDS) have widely been used to evaluate dementia in individuals with ID. It appears that the Dementia Questionnaire may be slightly more effective. The Dementia Questionnaire Sum of Social Scores subscale is the variable that best predicted AD.
The Working Group’s Dementia Battery: Direct assessment

- Test for Severe Impairment
- Stanford Binet Sentences
- Fuld (modified) test
- Spatial Recognition Span
- Autobiographical Memory
- Orientation
- Boston Naming Test
- McCarthy Verbal Fluency
- Simple Commands
- Purdue Pegboard test
- Developmental Test of Visual Motor Integration

Performances on the memory tests recommended by the “Working Group”

<table>
<thead>
<tr>
<th>Variables</th>
<th>Controls (n=31)</th>
<th>Patients with AD (n=13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autobiographical memory *</td>
<td>9.74 ± 2.24</td>
<td>8.38 ± 2.57</td>
</tr>
<tr>
<td>Orientation *</td>
<td>9.74 ± 4.15</td>
<td>7.08 ± 3.20</td>
</tr>
<tr>
<td>TSI-total</td>
<td>20.83 ± 1.84</td>
<td>19.85 ± 3.18</td>
</tr>
<tr>
<td>TSI immediate memory</td>
<td>2.55 ± 0.62</td>
<td>2.38 ± 0.87</td>
</tr>
<tr>
<td>TSI-delayed memory</td>
<td>0.55 ± 0.51</td>
<td>0.77 ± 0.44</td>
</tr>
<tr>
<td>OMT immediate recall</td>
<td>4.43 ± 2.49 (n=25)</td>
<td>4.14 ± 2.48 (n=6)</td>
</tr>
<tr>
<td>OMT-immediate recognition</td>
<td>18.54 ± 2.06 (n=25)</td>
<td>16.67 ± 3.20 (n=6)</td>
</tr>
<tr>
<td>OMT-delayed recognition</td>
<td>18.63 ± 2.24 (n=25)</td>
<td>18.00 ± 2.53 (n=6)</td>
</tr>
</tbody>
</table>

* p <0.05

Score distribution of Autobiographical Memory test (Pyo GY et al. 2010)

Item analysis of the Autobiographical Memory test

<table>
<thead>
<tr>
<th>Items</th>
<th>Controls (n=35)</th>
<th>Patients with AD (n=16)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>First name</td>
<td>100.0</td>
<td>100.0</td>
<td>0.322</td>
</tr>
<tr>
<td>Last name</td>
<td>100.0</td>
<td>94.7</td>
<td>0.322</td>
</tr>
<tr>
<td>Birthday-month</td>
<td>70.0</td>
<td>78.9</td>
<td>0.347</td>
</tr>
<tr>
<td>Birthday-date</td>
<td>70.0</td>
<td>63.2</td>
<td>0.406</td>
</tr>
<tr>
<td>Birthday-year</td>
<td>47.5</td>
<td>26.3</td>
<td>0.102</td>
</tr>
<tr>
<td>Age</td>
<td>32.5</td>
<td>15.8</td>
<td>0.301</td>
</tr>
</tbody>
</table>
Score distribution of Orientation test
(Pyo GY et al. 2009)

ORIENTATION TEST

- What is today’s date?
- What day of the week is this?
- What month is this?
- What year is this?
- What is the name of the place you live at?
- What city do you live?
- What state do you live?
Item analysis of the Orientation test

<table>
<thead>
<tr>
<th></th>
<th>Controls (n=35)</th>
<th>Patients with AD (n=16)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Month</td>
<td>80.0</td>
<td>50.0</td>
<td>0.013</td>
</tr>
<tr>
<td>Week</td>
<td>65.0</td>
<td>33.3</td>
<td>0.016</td>
</tr>
<tr>
<td>Date</td>
<td>37.5</td>
<td>16.7</td>
<td>0.080</td>
</tr>
<tr>
<td>Year</td>
<td>50.0</td>
<td>16.7</td>
<td>0.011</td>
</tr>
<tr>
<td>The current location</td>
<td>77.5</td>
<td>27.8</td>
<td>0.000</td>
</tr>
<tr>
<td>City</td>
<td>77.5</td>
<td>50.0</td>
<td>0.023</td>
</tr>
<tr>
<td>State</td>
<td>65.0</td>
<td>38.9</td>
<td>0.040</td>
</tr>
</tbody>
</table>

Picture Recognition Memory Test
### Picture Recognition Memory Test

![Images of a hat, scissors, and glasses]

### Construct validity of the Picture Recognition Memory Test (Pyo et al. 2007)

<table>
<thead>
<tr>
<th>Variables (score range)</th>
<th>Controls</th>
<th>Patients with AD</th>
<th>d†</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRMT-Immediate (0-15)**</td>
<td>11.25±3.89 (n=20)</td>
<td>5.40±2.76 (n=10)</td>
<td>1.64</td>
</tr>
<tr>
<td>PRMT-Delayed (0-15)**</td>
<td>11.20±4.12 (n=20)</td>
<td>5.10±2.89 (n=10)</td>
<td>1.62</td>
</tr>
<tr>
<td>TSI-Total (0-24)</td>
<td>20.21±2.37 (n=19)</td>
<td>18.80±5.79 (n=10)</td>
<td>0.37</td>
</tr>
<tr>
<td>TSI-Memory (0-4)</td>
<td>3.29±0.77 (n=19)</td>
<td>2.67±1.03 (n=10)</td>
<td>0.72</td>
</tr>
<tr>
<td>OMT-Recall (0-10)</td>
<td>5.20±2.30 (n=10)</td>
<td>3.67±0.58 (n=3)</td>
<td>0.73</td>
</tr>
<tr>
<td>OMT-Immediate Recognition (0-20)</td>
<td>17.70±2.50 (n=10)</td>
<td>14.33±1.53 (n=3)</td>
<td>1.43</td>
</tr>
<tr>
<td>OMT-Delayed Recognition (0-20)</td>
<td>18.00±2.63 (n=10)</td>
<td>17.67±1.53 (n=3)</td>
<td>0.13</td>
</tr>
</tbody>
</table>

** p <0.001
Demographic characteristics of the participants

<table>
<thead>
<tr>
<th></th>
<th>Normal controls (n=38)</th>
<th>AD patients (n=19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>35.03±12.23</td>
<td>30.32±10.13</td>
</tr>
<tr>
<td>Functional level*</td>
<td>6.06 ±1.46</td>
<td>4.34 ±1.38</td>
</tr>
<tr>
<td>Age</td>
<td>51.58 ±6.01</td>
<td>54.06 ±9.85</td>
</tr>
<tr>
<td>Moderate/Severe</td>
<td>19/20</td>
<td>7/12</td>
</tr>
<tr>
<td>Men/women</td>
<td>36/2</td>
<td>12/7</td>
</tr>
<tr>
<td>DS/other causes</td>
<td>12/26</td>
<td>9/10</td>
</tr>
</tbody>
</table>

*p=0.001

Comparison of the PRMT scores by the diagnostic groups and the etiologies of ID (Pyo et al, 2010)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Etiology of ID</th>
<th>Controls</th>
<th>Patients with AD</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRMT-Immediate</td>
<td>DS</td>
<td>14.83±0.41 (n=6)</td>
<td>4.17±2.79 (n=6)</td>
</tr>
<tr>
<td></td>
<td>Other etiologies</td>
<td>9.71±3.69 (n=14)</td>
<td>7.25±1.50 (n=4)</td>
</tr>
<tr>
<td>PRMT-Delayed</td>
<td>DS</td>
<td>14.67±0.82 (n=6)</td>
<td>4.67±3.08 (n=6)</td>
</tr>
<tr>
<td></td>
<td>Other etiologies</td>
<td>9.71±4.08 (n=14)</td>
<td>5.75±2.87 (n=4)</td>
</tr>
</tbody>
</table>
Score distribution of PRMT-Immediate

Score distribution of PRMT-Delayed
Case 1. 53-year old man with moderate ID from Down Syndrome

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picture Recognition Test-Immediate</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Picture Recognition Test-Delayed</td>
<td>14</td>
<td>7</td>
</tr>
</tbody>
</table>

Case 2. 47-year old man with moderate ID from Down Syndrome

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picture Recognition Test-Immediate</td>
<td>12</td>
<td>11</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Picture Recognition Test-Delayed</td>
<td>13</td>
<td>9</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

Case 3. 48-year old man with severe ID from Down Syndrome.

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2006</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picture Recognition Test-Immediate</td>
<td>8</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Picture Recognition Test-Delayed</td>
<td>7</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Treatment

![Graph showing change in cognition over 3 years](image)
Disease-Modifying Treatment

- At the present time, there is no treatment that has been proven to slow or stop AD.
- We have no “DMT” to prescribe or recommend to patients

-Dr. Tom Ala (5/19/15) at the 8th annual Scientific Conference for Healthy Brain Aging-

Treatment of Alzheimer’s

- Cholinesterase inhibitors: Inhibit the breakdown of acetylcholine
  - donepezil (mild-mod-severe AD)
  - rivastigmine (mild-mod AD)
  - galantamine (mild-mod AD)
Treatment of Alzheimer’s

- memantine (Namenda®)
  - An NMDA-receptor antagonist
  - Approved for moderate-to-severe AD
  - Approved for use with or without a cholinesterase inhibitor

Donepezil

- Only one double blind, placebo randomized controlled study has reported (Prasher, 2002).
- 6 DS participants in the donepezil 10mg group and 14 DS participants in the placebo group for 24 weeks
- 37% of treatment group and 14% of placebo group reported improvement.
- 50% of Donepezil group and 20% of placebo group reported adverse events.
- In the first six weeks of the study, the treatment group deteriorated in psychiatric behaviors before recovering to a level just over baseline at the end of the study period.
Donepezil

- People with DS have an increased incidence of cardiovascular disease including slow heart rates. Donepezil has a tendency of reducing the heart rate.
- The optimum dose in patients with DS may be lower than the recommended regular dose (Kondon, 2005).

Rivastigmine, Memantine, Galantamine

- No randomized controlled trials with a placebo group
Thank You!!