CAIDE Dementia Risk Score Validated in Study

The score uses age, formal education, sex, physical activity, blood pressure, and BMI to predict risk.

BY JAMES BUTCHER
Contributing Writer

SALZBURG, AUSTRIA — A risk score that predicts the likelihood of a middle-aged person developing dementia within 20 years has been independently validated in an ethnically diverse population, according to data presented at an international conference on Alzheimer's and Parkinson's diseases.

The Cardiovascular Risk Factors, Aging and Dementia (CAIDE) risk score originally was created using data from the CAIDE study, a population-based study of 1,409 individuals in a Finnish population in the 1970s (mean age 50.4 years). When the Finnish subjects were reexamined in 1998, 61 of the subjects were diagnosed with dementia.

Study participants with dementia were found to be older at the midlife examination (mean age 53.4 years vs. mean 50.2 years), less well educated (6.7 years of formal education vs. 8.7 years), and had more vascular risk factors—such as high blood pressure, high total cholesterol, and high body mass index, as well as a history of smoking—present at midlife than did participants without dementia.

Dr. Miia Kivipelto of the Aging Research Center at the Karolinska Institute, Stockholm, used the data from the CAIDE study to create a score that could predict the risk of developing dementia in later life.

The CAIDE dementia score uses age, years of formal education, sex, systolic blood pressure, body mass index, total cholesterol, and physical activity to determine an individual's likelihood of developing dementia within 20 years. (See table.) The risk of dementia was found to be 1% for patients with a score of 0-5; 1.9% for patients with a score of 6-7; 4.2% for those with a score of 8-9; 7.4% for a score of 10-11; and 16.4% for patients with a score of 12-15 (Lancet Neurol. 2006;5:735-41).

"When the cutoff was set at 9 points or more, the sensitivity was 0.77, the specificity was 0.63, and the negative predictive value was 0.98," said Dr. Kivipelto at the conference.

Rachel Whitmer, Ph.D., an epidemiologist working at the Kaiser Permanente Division of Research, Oakland, Calif., validated the CAIDE dementia risk score in a sample of 9,480 long-term members of Kaiser Permanente's integrated health care delivery system, of whom 1,011 developed Alzheimer's disease or vascular dementia.

The study sample was ethnically diverse (474 Asian, 1,401 black, and 7,605 white) and included people from a wide demographic range.

According to Dr. Whitmer, she obtained results similar to those of Dr. Kivipelto by using the CAIDE score on the Kaiser Permanente sample.

In addition, Dr. Whitmer added more variables to the dementia risk score, including obesity, smoking, pulmonary function, and depression, but found that these did not improve the score's predictive value.

However, the addition of diabetes as a variable improved the predictability of the score for Asian patients, but not for black or white study patients.

"It seems like we're really onto something here," said Dr. Whitmer. "It replicated really well and is so predictive in such a different population." ■

Risk Score for Predicting Dementia in Later Life

	Risk Score
Age	
<47 years	0
47-53 years	3
>53 years	4
Education	
≥10 years	0
7-9 years	2
0-6 years	3
Sex	
Female	0
Male	1
Systolic Blood Pressure	
≤140 mm Hg	0
>140 mm Hg	2
Body Mass Index	
≤30 kg/m^2	0
>30 kg/m^2	2
Total Cholesterol	
≤6.5 mmol/L	0
>6.5 mmol/L	2
Physical Activity	
Active	0
Inactive	1

Source: Lancet Neurology

Imaging Compound May Help Track Alzheimer's Progression

BY JAMES BUTCHER
Contributing Writer

SALZBURG, AUSTRIA — The investigational Pittsburgh B compound that binds to cerebral β-amyloid and is visible on positron emission tomography maintains its promise as a way to distinguish the elderly patients presenting with memory problems who will go on to develop Alzheimer's disease from those who won't progress.

A series of presentations at an international conference on Alzheimer's and Parkinson's diseases suggested that the ligand Pittsburgh B (PIB) compound, although still at the research stage, may also prove to be an invaluable biomarker to track disease modification in clinical trials.

Kerryn Pike, a research officer at Austin Health, Melbourne, presented the results of a study that examined the relationship between amyloid burden and cognitive function.

The researchers studied 108 individuals with varying degrees of cognitive impairment: 38 of the participants were healthy aging controls (mean Mini Mental State Examination [MMSE], 29.1), 34 had mild cognitive impairment (mean MMSE, 26.3), and 36 had mild Alzheimer's disease (mean MMSE, 22.1).

The average age of the participants was 72 years, and there was no significant difference in age among the three groups. All the individuals were given neuropsychological tests, including the MMSE, California verbal learning test second edition, Rey complex figure test, digit span, verbal fluency, Boston naming test, and digit symbol coding tests.

The researchers calculated a composite episodic memory score and a composite nonmemory cognition score from these neuropsychological tests for each participant. The participants also had a PET scan after being given an intravenous dose of the radiotracer ^{11}C-PIB. A "positive" PIB test was noted in 26% of the 38 healthy aging controls, 59% of the 34 patients with mild cognitive impairment (MCI), and 97% of the 36 patients with Alzheimer's disease (AD), suggesting that they had amyloid deposited in their brains. "About a quarter of healthy elderly are known to have amyloid plaques at autopsy," noted Ms Pike.

Two of the MCI patients have gone on to develop AD and the researchers plan to follow up the cohort over the coming years.

Individuals with MCI who had a positive PIB test did much worse in the neuropsychological memory tests than did participants with MCI who were negative for amyloid deposition (–2.95 standard deviations from control values vs. –1.1 standard deviations). "This suggests to us that amyloid deposition is a very early pathological process that affects memory specifically," said Ms Pike.

Indeed, those people with mild cognitive impairment who were PIB positive did almost as badly in the memory tests as did the patients with Alzheimer's disease (–3.22 standard deviations from control values). The researchers found a correlation of 0.72 between amyloid load and memory score.

In addition, participants with MCI who were PIB positive were significantly older than the PIB-negative participants (73.6 years vs. 66.1 years), and the 6 nonamnestic MCI participants were significantly younger than the 28 amnestic MCI participants (mean 63.7 years vs. 71.9 years).

"All our nonamnestic MCI participants were PIB negative and this suggests to us that they have different underlying pathology such as frontotemporal dementia, which doesn't have amyloid plaques," said Ms Pike.

In a separate presentation, Dr. David Brooks, professor of neurology at Imperial College School of Medicine, London, presented data from a case series of 13 patients with dementia with Lewy bodies (DLB) and 13 patients with Parkinson's disease dementia (PDD) who were imaged using PIB.

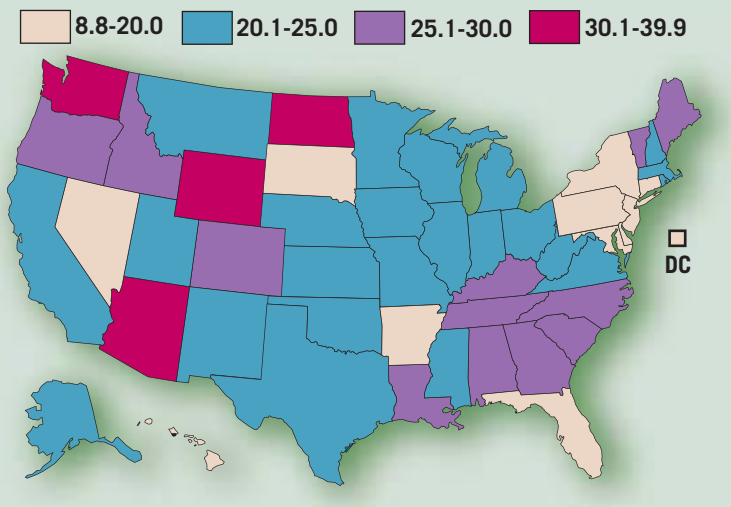
The patients with DLB had a mean MMSE of 21, compared with 20 in the patients with PDD. The mean Unified Parkinson's Disease Rating Scale score was 31 in the patients with DLB and 35 in the patients with PDD.

Amyloid levels were raised in 11 of the 13 patients with DLB, although those levels were not as high as those seen previously in patients with AD.

By contrast, only 2 of the 13 patients with PDD showed an increased amyloid burden, suggesting that PIB could potentially be used in the differential diagnosis of PDD and DLB. ■

DATA WATCH

Rates of Alzheimer's Deaths by State
(age-adjusted per 100,000 population)



Source: 2003 data, Centers for Disease Control and Prevention

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