SOF Analysis Plan Submission Form

Date: 4/13/11

Investigator’s Name: Gail A. Kang, MD

Clinical Center: UCSF

Sponsor (if not a SOF investigator): Kristine Yaffe

Telephone:  
e-mail: gkang@memory.ucsf.edu

Other investigators who will be working on this analysis: Gail A. Kang, M.D., Bruce Miller, M.D., Kristine Yaffe, M.D., Ph.D, Howard Fink

Analysis Plan Title: Longitudinal Course of Cognition in Women Diagnosed with Parkinson’s Disease

Data sets to be used: See attached

Primary variables to be used in the analysis: See attached

Do you plan to submit an abstract based on these results? ☑ YES ☐ NO
If YES, when is the abstract due?
Movement Disorder Society meeting or American Academy of Neurology meeting.

Who will perform the analyses?
 ☑ Coordinating Center
 ☐ Other local analyst, please specify:

Please attach a 1-2 page description of your analysis plan. Please include the following:
1) Short background/rationale for addressing the research question
2) Brief description of statistical methods
3) Mock tables

E-mail this completed form (as an attachment) to Dana Kriesel (dkriesel@sfcc-cpmc.net).
Longitudinal Course of Cognition in
Women Diagnosed with Parkinson’s Disease

Background

Parkinson’s disease (PD) has been traditionally defined by the motor abnormalities of resting tremor, bradykinesia, rigidity and postural inability. However, in recent years, it has become increasingly recognized that non-motor symptoms can often times be just as bothersome and potentially disabling as the motor symptoms of PD. Cognitive deficits represent one of the most common non-motor manifestations of PD. 25% of PD subjects meet criteria for Mild Cognitive Impairment (MCI)(1). Based upon a systematic review of epidemiological studies, the prevalence of PD dementia (PDD) is between 24-31% (2). It has been commonly reported that older PD patients have a higher risk of developing cognitive deficits(3). This pattern appears to be most marked in the oldest old population with one study finding that 90% of women over the age of 90 years met criteria for PDD (4).

There have been surprisingly few studies assessing the longitudinal course of cognition in Parkinson’s disease. A small number of studies have compared the longitudinal course of cognition in PDD to other types of dementia. These studies have been of relatively short duration (range 1 year – 8 years) with limited evaluation time points (5-7). Studies with longer follow-up time and a greater number of data points may provide a better sense of the typical trajectory of PD patients with cognitive deficits. In addition, the majority of studies performed on the cognitive course in PD has focused exclusively on the Norwegian population (4, 6, 8-10) and may not be entirely applicable to the American population.

Several lines of research have suggested that there are gender differences in PD symptomatology and disease course. Results from various studies have suggested that in comparison to men with PD, women are more likely to display a delayed onset of certain motor symptoms (11), have an initial tremor-dominant PD motor phenotype (12) and experience a slower rate of motor progression (13). It has been speculated that women may experience less severe motor symptoms initially and may have slower progression in contrast to men diagnosed with PD due to estrogen providing some type of neuroprotection (14, 15).

There are a few cross-sectional reports that have reported women’s scores on cognitive screening evaluations to be better than men’s scores (13) (16). Longitudinal studies on cognition in PD have had a tendency to analyze the results without evaluating for possible gender differences; one exception is a longitudinal study that included cognitive
testing on PD individuals over a ten year time course and reported that in comparison to men, women had more rapid decline on a visuospatial and fluency task(17).

The dataset from the ongoing Study of Osteoporotic Fractures (SOF) provides the unique opportunity to better assess the trajectory of cognitive deficits in older women in the United States diagnosed with PD who have been followed for an extended period of time (maximum follow-up 20 years) and who were evaluated with regular focused cognitive evaluations (Trails B and MMSE) periodically. Analysis of this data will assist in better understanding of the general cognitive course in women with PD. In addition, this dataset will allow for analysis of the role that certain factors may play in modulating the progression of cognitive deficits in women with PD.

Specific Questions for Analysis

1) What is the trajectory on the Trails B and MMSE measures among women diagnosed with PD compared to those not diagnosed?

2) How does a diagnosis of PD influence risk of developing MCI or dementia at Year 20?

3) Does a slower decline in performance on Trails B and MMSE in women with PD predict longer survival time?

Variables

**Demographic Variables**

1) Age
2) Education level
3) Race
4) Residence type

**Medical History and Examination Variables**

5) Blood pressure
6) Body mass index
7) Vascular risk factors
8) Geriatric depression scale

**Cognitive Test Variables**

1) Modified Mini Mental State Examination (mMMSE)
2) Trails B

Year 20 data:

MCI or dementia neuropsychological tests
Brief Analytic Plan

PD will be defined by subjects’ self-report of a physician diagnosis; this question was asked at each SOF repeat visit. Trajectories will be modeled with an inflection point for diagnosis of PD if made at one of the SOF visits after baseline. Repeated measures regression analysis will be used and will include all time points in the study for which Trails B and mMMSE will be performed (up to a maximum observation period of 20 years). Multivariate models controlling for the dependent nature of observations of the same individual through time will be created that will adjust for factors previously shown to be associated with cognitive function (age, race, education, status). Logistic regression analysis will be conducted to determine if a diagnosis of PD (ever) is associate with risk of MCI or dementia. All analyses will be performed using SAS statistical software with a p value set at <0.05.

Timeline:

Spring/Summer 2011 – data analysis

Fall 2011 – abstract writing

Fall/Winter 2011- drafting and completion of manuscript

Table 1: Baseline Characteristics of Women with PD Diagnosis vs. Women without PD Diagnosis at Visit 9

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<tr>
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<th>PD Diagnosis</th>
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<td>Age</td>
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<td>Educational Level</td>
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<td>Race (breakdown by percentage of each race)</td>
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<td>Residence Type (breakdown by percentage of each residence type)</td>
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<td>Blood pressure</td>
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<td>Body Mass Index</td>
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<td>Number of Vascular Risk Factors</td>
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<td>Geriatric Depression Scale</td>
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Table 2: Comparison of Cognitive Test Scores for Women with PD Diagnosis vs. Women without PD Diagnosis at Visit 9

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<th>PD Diagnosis</th>
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<td>Trails B</td>
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<td>Lexical Verbal Fluency</td>
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<td>Category Verbal Fluency</td>
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References:
