Dementia and the Great East Japan Earthquake 2011
A report from the secondary support area - 1. An importance of neuropsychological screening for the weakness due to the disaster

Department of Geriatric Behavioral Neurology, Tohoku University Graduate School of Medicine, Sendai, Japan

ABSTRACT: According to Osaki City’s request of help confirming the safety of residents after the Great East Japan Earthquake 2011, we visited 790 houses and discovered 54 “weakness due to the disaster.” Most of them were older people previously assessed as Clinical Dementia Rating (CDR) 0.5 (mild cognitive impairment) in the Osaki-Tajiri Project. It is important to screen CDR 0.5 residents in a community for the measure to disaster as well as early detection of dementia. We are now planning to survey the weakness due to the disaster using an original neuropsychological screening test for risk management and social judgment.

The aim of our laboratory is to study the neuroscience of dementia and contribute to the welfare of elderly. Our work in northern Miyagi prefecture has always been our priority. However, we never expected to experience such an extreme challenge as that of the 3/11 earthquake.

1 Our laboratory’s effort at the secondary support area
1.1. Primary emergency stage at Tajiri
The author was seeing outpatients at our research clinic in Kurihara City when the earthquake struck. We immediately ensured the safety of the patients by evacuating the building. All the staff knew how to act, perhaps partly because of their experience of the 2008 Iwate-Miyagi Inland Earthquake, which hit this city only 3 years ago. After ensuring that everything was in order at the clinic in Kurihara City, I went to the Tajiri Clinic, which is one of our most important research centers (Meguro et al. 2002, Meguro 2011). At the clinic, I found that a large number of refugees had gathered. However, the doctor in charge was off-duty that day. I took on the duties of the clinic, confronting a series of challenges caused by the disaster.

I was pleased to find that most of the 80 refugees had carried their own medications with them, which enabled us to make up a list of their doctors and medications. There were no patients without their antipsychotic or antiparkinsonian drugs, the absence of which might have been troublesome (Rabinak et al. 2010, Baldessarini et al. 2010). An important lesson in disaster preparedness is to teach repeatedly everybody about the critical importance of medications.

After getting permission for use of 3 cars as emergency vehicles, made available by two staff members and a graduate student, we discussed possible support for refugee shelters that might ask for our help. As a preparation for a disaster, we should know how to make our cars as emergency vehicles.

1. Secondary support stage at Tajiri
1.2.1. Our policy
Ten days after the earthquake, the “primary emergency stage,” in which the activities of rescue and emergency teams play the most critical role, was followed by the “secondary support stage.” At this time, refugees from the most damaged areas began to arrive in less damaged areas, including our own research areas, Osaki City.

Our policies were as follows:
(1) Ensure the safety of the destination area. Some refugee shelters were situated near the coast, with a risk of secondary incidents.
(2) Identify the probable demands on the destination area so that preparations could be made before people arrive. (As it happened, 40 volunteer medical doctors were waiting at a shelter with nothing to do, having rushed to the site to help refugees, without any plan.)
(3) Understand the goals of volunteers and try to match their goals with needs, taking into account potential dangers, including psychological trauma. Some volunteers or students may be so eager to help that they may not be mindful of danger.

Following establishment of these policies, Osaki City requested help confirming the safety of people in the community.

1.2.2. Activities of the support team for Osaki City
Our team visited 790 houses and discovered 54 people helping need. Our visits accounted for 10.4% of the 7,604 houses that were visited in Osaki City. We discovered various cases of “weakness due to the disaster.” Most of the people who needed help were elderly, including some who had become sick. A shortage of fuel had prevented
some people from consulting their doctor. Others were confused because they did not have the information that they needed to obtain medicines from a doctor other than their usual consulting doctor. Unfortunately, some elderly people who lived alone were found deceased in their house. Most of the “weakness due to the disaster” was previously assessed as Clinical Dementia Rating (CDR) 0.5 in the Tajiri Project (Meguro et al. 2004), which is the borderline condition between healthy aged and dementia. As shown by Figure 1, the ratio of CDR 0.5 was 30.2%, which was higher than previously considered.

I think that it is important to routinely screen CDR 0.5 residents in a community. Our contributions may help in planning future health policies.

2 Application of neuroepidemiologic survey
To screen the weakness due to the disaster, we consider a test assessing social judgment to be useful. We applied the previous data and now making a new tool.

2.1 Neuroimaging findings on social judgment
From a community-based cohort of the Osaki-Tajiri Project, 22 participants of CDR 0.5 were previously studied by neuropsychological tests including the Cognitive Abilities Screening Instrument (CASI) (Inoue et al. 2012).

The CASI contains nine domains, i.e., Remote memory, Recent memory, Attention, Mental manipulation & concentration, Orientation, Figure copying, Abstraction & judgment, List-generating fluency, and Language. Regarding CASI domain Abstraction & judgment, subjects are asked for abstracting similarities between pairs of items, together with the following questions: What actions would you take if you saw your neighbor’s house catching fire? What actions would you take if you lost a borrowed umbrella? What would you do if you found an envelope that was sealed, addressed, and had a new stamp?

Regional cerebral blood flow (rCBF) was assessed using \([^{123}\text{I}]-\text{N-isopropyl-p-iodoamphetamine}\) and single photon emission CT (IMP-SPECT). The SPECT scan was acquired at 30 min of mid-scan-time after the injection of 111 MBq IMP. We used the statistical parametrical mapping (SPM5) software with Matlab 6.5.1 (Mathworks, USA) for voxel-based whole brain analysis. Multiple regression analyses were performed for each CASI domain: age, years of education, gender, and whole brain counts of the SPECT image were used as confounding covariates. The threshold of statistical significance for the peak height was set at p<0.005 and cluster extent>300 voxels at p<0.05.

As illustrated by Figure 2, we found decreased CASI domain Abstraction & Judgment score to be correlated with lower rCBF in the left parietal cortex.

2.2 Screening test for the weakness due to the disaster
According to Mussweiler (2003), human judgment is comparative in nature. When people evaluate targets of all levels of complexity, ranging from simple psychophysical objects to complex social stimuli, are evaluated in a comparative manner. Thus episodic memory, semantic knowledge, and emotion as well as risk detection test would be unified. A preliminary data will be presented.

3 References