Field of Research: Epidemiology and environmental risk factors of amyotrophic lateral sclerosis (ALS) in Reggio Emilia, Italy.

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Objective

Amyotrophic lateral sclerosis (ALS) is a rare neurological disease due to selective degeneration of motor neuron and characterized by extreme clinical severity and lack of effective therapy. Its etiology is still unknown but both genetic and environmental factors were found to be associated with the disease. Mortality and incidence of ALS showed variable rates between countries and in some studies appeared to increase over time.

We performed a project to assess ALS incidence in the northern Italy area of Reggio Emilia in a ten-year period and to study the etiologic role of environmental risk factors, such as exposure to selenium and other trace elements through drinking water and to extremely low frequency electromagnetic field (EMF).

Methods

We identified the new cases of probable or definite ALS diagnosed among residents in Reggio Emilia province between 1996 and 2005 using several sources of data, such as death certificates, clinical records, hospital discharge registers and drug prescriptions. Only patients fulfilling the El Escorial revised diagnostic criteria for probable or definite ALS and with residence in Reggio Emilia province at time of diagnosis of the disease were included.

We calculated sex and age-adjusted incidence rates, directly standardized to the Italian population at census of 2001 and to the world population, and analyzed incidence change over time.

Each patient was associated, through random selection among age- and sex-matched residents in the Reggio Emilia municipality, with two and four controls to investigate the possible association with drinking water chemical composition and residential exposure to EMF.
We investigated of the sources of water consumed in the 35 years before the diagnosis of ALS and its chemical composition; we also investigated history of residence in the 35 years before diagnosis of ALS and we mapped these residences as well as the areas with high EMF exposure within a GIS database.

**Results**

A total of 94 newly-diagnosed patients were identified. The average standardized incidence in the period was 2.0 and 1.0 cases/100,000/year, using respectively the Italian and the world population as reference, and it did not show relevant variations during time. Incidence was 1.3 in males and 0.8 in females. No cases were observed before 35 years, then incidence increased especially since 55 years, reaching a peak in the group 70-74 and declining thereafter. Analysis of association between ALS risk and selected environmental factors is still ongoing.

**Conclusions**

ALS incidence in this population was similar to that observed in other Italian regions and European countries. It did not show relevant variations during the study period, while it appeared to be influenced by sex and age. Further research on the environmental risk factors for ALS is in progress.