Incidence Rate of Non-Traumatic Osteonecrosis of the Femoral Head in the Japanese Population

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INTRODUCTION
The incidence rate of a disease is an important parameter for epidemiological research, which elucidate the burden, risks and trends of the disease in a general population. A number of studies have made efforts to elucidate the etiology of non-traumatic osteonecrosis of the femoral head (ONFH), such as the association with corticosteroid usage or alcohol abuse. However, regarding the incidence rate of non-traumatic ONFH in any general population, there have so far been no reports.

The present study was designed to estimate the incidence rate of non-traumatic ONFH based on the registration data of Japanese subsidy program.

METHODS
A survey was conducted on the newly identified non-traumatic ONFH patients in the Specified Disease Treatment Research Program of a Prefecture in Japan (population: 5 million) between 1999 and 2008. The age and gender distributions were provided from the Department of Intractable Disease in the Prefecture to ensure the anonymity of the patients’ identities. We defined the total population of the Prefecture as a general population which has a risk of developing non-traumatic ONFH.

The crude incidence rates were calculated as the number of non-traumatic ONFH patients divided by the total population. The age-adjusted incidence rates were calculated as previously reported (1) by applying the direct standardization method to adjust the crude incidence rates to the Japanese standard population in each year.

This epidemiological study on non-traumatic ONFH patients was approved by the institutional review board of our institution.

RESULTS
In the Prefecture, 1,244 newly identified non-traumatic ONFH patients had been recruited into the subsidy program over the span of 10 years. The gender ratio (men/women) was 1.6, of which 758 (61%) were men and 486 (39%) were women. The mean age of men was 48 years with the peak age ranged in the 40s and 50s (Figure 1), and that of women was 56 years with a bimodal peak distribution was seen in their 50s and 70s. The crude incidence rate in the 10-year period was 2.58 (1.54 - 3.66) cases per 100,000 person-year (Table 1). The age-adjusted incidence rates were 1.56 - 3.71 cases per 100,000 person-year, and the average of age-adjusted incidence rates was 2.51 cases.

DISCUSSION
The incidence rates of non-traumatic or steroid-associated ONFH have been previously reported in disease-limited populations, such as SLE, organ transplantation and Sickle cell disease (2, 3). However, few studies reported the incidence rates of non-traumatic ONFH in a general population, because of the difficulty in specifying a whole general population. In the current study, the Japanese subsidy program enabled the investigation of the incidence of non-traumatic ONFH in the Japanese population.

Fukushima et al. and Kang et al. estimated the yearly prevalence of non-traumatic ONFH to be 11,400 cases in the Japanese population and 14,103 cases in the Korean population (4, 5). However, these data included the total number of both new and old cases. We therefore presented additional epidemiological information about only the new non-traumatic ONFH cases in the current study.

The present study had several limitations. First, we surveyed non-traumatic ONFH patients in only one prefecture of Japan. Therefore, we adopted the age-adjusted incidence rates by applying the direct standardization method to the Japanese standard population in each year, which is similar to the previously reported methods. Secondly, the detailed etiologies of non-traumatic ONFH patients were not investigated in order to protect the patients’ anonymity. If a study using the detailed etiologies was allowed, the odds ratios of each etiology could be estimated as risk factors.

In conclusion, the present study showed that the incidence rate of non-traumatic ONFH was 2.51 cases per 100,000 person-year in the Japanese population.

REFERENCES

SIGNIFICANCE
The present study revealed the incidence rate of non-traumatic ONFH in a general population for the first time, which may be an important index to understand the burden, risks of ONFH in a general population.

Figure 1. Age distributions (percentage) of newly identified patients with non-traumatic osteonecrosis of the femoral head in a Prefecture between 1999 and 2008.

Table 2. Incidence rates per 100,000 person-year of non-traumatic osteonecrosis of the femoral head in a Prefecture.

<table>
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<th>Year</th>
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<th>2001</th>
<th>2002</th>
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<th>2006</th>
<th>2007</th>
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Table 2. Incidence rates per 100,000 person-year of non-traumatic osteonecrosis of the femoral head in a Prefecture.