The Prevalence of Osteonecrosis in Different Parts of the World

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4.1 Introduction

Osteonecrosis is a major increasing health problem all over the world. Osteonecrosis is the final stage of a number of conditions leading to bone death [1]. It has undergone several name changes. Several used synonyms are avascular necrosis, idiopathic avascular necrosis, aseptic necrosis, and ischemic necrosis of bone. Aseptic necrosis was initially used to differentiate the condition of osteonecrosis from bone infections. Avascular or ischemic necrosis presumed a homogeneous etiology and pathogenesis. The term osteonecrosis describes the main common aspect of bone death and is more neutral in its assumption of causation [2].

Many studies have consistently observed that more patients with osteonecrosis are younger and have a longer life expectancy [3]. This is mainly due to the fact that osteonecrosis is associated with alcoholism, hyperlipemia, an increasing number of transplant recipients, corticosteroid usage, and long-term survival with a better quality of life of patients with chronic diseases [2–4]. These different conditions are presumed causes of osteonecrosis, and it is difficult to assess the frequency and causative impact of each different cause. Demographic data are reported differently in many health centers worldwide. The Osaka University of Japan reported that 23 % of the osteonecrosis of the femoral head cases has been associated with alcohol and 37 % with corticosteroids [2, 5]. The Johns Hopkins University in the United States reported approximately 10,000–20,000 new cases of osteonecrosis of the femoral head each year [5–7].

Most of the studies reported rough estimates of the frequency of osteonecrosis over the world. However, specific information concerning the frequency of osteonecrosis is indeed a very important subject. In some small countries with a centralized health service, such as the Netherlands, it might in fact be possible that the diagnosis of osteonecrosis is listed among the demographic records. This study is performed to examine the magnitude of the problem of osteonecrosis in different parts of the world. What is the frequency of osteonecrosis in Europe, the United States, and Japan? Is there anything known about the increasing morbidity connected to this disorder for both men and women?

4.2 Methods

First, more precise demographic data of osteonecrosis are obtained by a detailed literature search and a summary. Different terms and authors were used in PubMed database to find scientific articles about the magnitude of the problem of osteonecrosis worldwide. In particular, the chapter on osteonecrosis in the US book, The Adult Hip (new version for 2006), is used to discuss difficulties establishing prevalence numbers of ON worldwide.

Second, a research on the Internet is done to find health organizations and to try to obtain the prevalence numbers of osteonecrosis in the Netherlands. Contacts were made by phone and/or email with different health organizations, CBS (Central Office for Statistics), WHO (World Health Organization), VWS (Ministry of Public health and Sports), RIVM (Institute for Health and Environment), and NVZ (Association for Hospitals), finally leading to Prismant (Dutch Research Databank).

Finally, a research on the Internet is done to find health organizations worldwide and to try to obtain more specific demographic information of osteonecrosis over the world. Contact by email with the WHO Europe/United States/Southeast Asia has been made. Important orthopedic surgeons and researchers from different universities in the United States, Japan, Korea, and Europe were contacted by email to obtain answers to our questions.

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Table 4.1 Demographic data of osteonecrosis in the Netherlands in 2003

	Gender		Type of age (years)			Total
	Men	Women	0–16	17–35	>35	
Aseptic bone necrosis	14	11	4	12	12	25
Chronic osteomyelitis	25	23	15	15	18	48
Total osteonecrosis	39	34	19	27	30	**73**

Table 4.2 Demographic data of osteonecrosis in the Netherlands in 2004

	Gender		Type of age (years)			Total
	Men	Women	0–16	17–35	>35	
Aseptic bone necrosis	14	14	3	10	12	28
Chronic osteomyelitis	28	20	14	14	20	48
Total osteonecrosis	42	34	17	24	32	**76**

4.3 Results

4.3.1 The Netherlands

The Dutch population living in the Netherlands counts about 15 million people. Prevalence numbers of osteonecrosis in the Netherlands have been reported by Prismant, a Dutch Research Databank. Demographic data of osteonecrosis in the Netherlands from the years 2003 and 2004 are given to Radboud Academic Hospital, Department of Orthopaedics, and used subsequently in this report. Two differentiations are made for registrations of the different stages of osteonecrosis, aseptic bone necrosis and chronic osteomyelitis (septic necrosis), both for men and women. Type of age was categorized into 0–16, 17–35, and >35 years old.

Table 4.1 shows the demographic data of osteonecrosis in the Netherlands in 2003. In this sample, osteonecrosis was more often reported in men (53.4 %). Osteonecrosis was also more frequently found in adults aged above 35 years. The total number of 73 patients with osteonecrosis was reported in 2003. Patients with chronic osteomyelitis, septic necrosis, were more often found (65.8 %) than patients with aseptic bone necrosis (34.2 %).

Table 4.2 shows the demographic data of osteonecrosis in the Netherlands in 2004. In this sample, 55.3 % of the diagnosis osteonecrosis was found in men. Again, osteonecrosis was more frequently reported in adults aged above 35 years. The total number of osteonecrosis in the year 2004 was 76 patients. Chronic osteomyelitis, septic necrosis, was more often found (63.2 %) than aseptic bone necrosis (36.8 %). The number of patients with osteonecrosis has increased in 2004 compared with 2003. The number of men with osteonecrosis has increased, while the number of women with osteonecrosis remains the same. In addition there has been a small increase in the number of patients in each age category in 2004 compared with 2003. The same data of osteonecrosis for 2005 will be available next year, probably in May 2006.

4.3.2 Europe

There are about 370 million people living in Europe. Information on demographic data of osteonecrosis is unknown for the rest of Europe. There is no centralized health service in Europe to collect and report these data on osteonecrosis. Some countries in Europe have more precise data but only data on their own country.

4.3.3 The United States

There are approximately 295 million people living in the United States. Demographics of osteonecrosis in the United States are not collected with very much precision and not kept up to date. There is published information that would indicate that there is an estimate of approximately 20,000 new cases of osteonecrosis of the hip in the United States every year [6]. The accumulated numbers of ON is between 0.3 million and 0.6 million people. However, that information is based upon several large series of total hip replacements in which 10 % of the patients had a total hip replacement because of osteonecrosis. Not taken into account are all the new cases of osteonecrosis which do not have a hip replacement. This could probably add another 5 or 10 % to the mix. The estimate is calculated at approximately 22,000 new cases of osteonecrosis of the hip in the United States every year [6]. These numbers are indeed very "soft" numbers.

In the United States the diagnosis of osteonecrosis is not listed among general demographic records and a research has to deal with rough estimates only. As mentioned before, it might only be possible in a small country with a centralized health service, such as the Netherlands and maybe Hong Kong and Japan, to get more precise demographic data.

4.3.4 Asia

Several reports state that the numbers of osteonecrosis are increasing and the disorder becomes more and more serious in Asia and other continents. The total population living in China is approximately 1.3 billion people. About 127 million people live in Japan and about 70 million people in Korea. In 1994, Japan had an appearance of 4,000 new cases of ON every year (Wang, G.). Recently, reports show a frequency of 1/10,000 patients as a low number. Recently, this estimate certainly has been doubled to 2/10,000 (Prof. Atsumi, T. and Dr. Yamano, K.). This gives a low estimate of 12,000 and a high estimate of 24,000 patients per year. Based on the report of Hong Kong, the prevalence of osteonecrosis is much higher in Asia [5]. Chang J. et al. reported several years ago that osteonecrosis was the reason for total hip replacement in 50 % of the cases (Chang, J.).

In Hong Kong and China there is a high estimated prevalence and asymptomatic presentation of osteonecrosis in adults. In China, the number of new appearance is about 75,000–150,000 per year. The accumulated numbers of ON is between 1.5 and 3 million people (Wang, G.). No data on its prevalence are known in children [8].

4.4 Discussion

This study tried to examine the magnitude of the problem of osteonecrosis in different parts of the world. The complexity of this disorder is enormous. The different stages of osteonecrosis and the different root causes make it really difficult to give a good overall estimate rate of osteonecrosis. Early stages of osteonecrosis with still intact femoral heads and functionary hip joints are not reported at all. Many doctors do not recognize the disease, and if they do, they "wait and see" till the disease progresses into the final stages. These late stages get secondary osteoarthritis and need a total hip replacement. However, the early stage can be treated successfully and the femoral heads can be preserved for at least 10 years [3, 9, 10]. In the Netherlands with a centralized health service, demographic reported data are differentiated into only two stages of osteonecrosis, chronic osteomyelitis and aseptic bone necrosis. This shows the great complexity of collecting and reporting overall data of osteonecrosis even for small countries.

No centralized health services exist to report reliable data for the different continents, Europe, the United States, Asia, and in more detail the large Asian countries, such as Japan and China. Only rough estimates on the rate of osteonecrosis are reported. Therefore no hard information on the magnitude of the problem all over the world can be obtained. Most information collected and reported worldwide is not scientific provided evidence. No scientific articles are published with exact numbers of osteonecrosis in each country or continent. Rough estimates are made through detailed literature research and by contacts with orthopedic surgeons in this specific field all over the world.

However, what is clear and hard evidence is the fact that osteonecrosis becomes more prevalent in a younger age group and it has more impact in the patient's quality of daily life. More specific information about the frequency of osteonecrosis is needed to identify the real magnitude of this disorder worldwide. It is important for patients, especially these younger patients with a longer life expectancy, that more precise data becomes available and the magnificence of the problem gets more attention to implement new treatment techniques to preserve the hip joint and to improve the quality of life [3, 10, 11].

In conclusion, this study shows a considerable lack of hard evidence and detailed knowledge of the prevalence of osteonecrosis worldwide. All continents need centralized health services to report several disorders, such as osteonecrosis. Osteonecrosis becomes more and more important in daily life every year and in younger patients. We should look for long-term prevalence rates of osteonecrosis in each continent and report it to pinpoint the magnitude of the problem of osteonecrosis worldwide.

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