Social Impact of Osteoporotic Fractures: Early Diagnosis and Possible Therapies

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ABSTRACT

Osteoporosis affects about 200 million subjects in the world and is responsible for 8.9 million fractures each year. The frequency of osteoporotic fractures is rising in many countries, due to the increased longevity of the population. In Europe, the annual cost of all osteoporotic fractures has been estimated to be 30 billion of Euros. In this paper, after an overview of the socioeconomic impact of osteoporosis in the world and in Italy, with particular focus on Apulia region, the most important techniques used to assess the fracture risk are briefly described. Moreover, the most commonly used pharmacological agents for the treatment of osteoporosis are reported. The aim of this review is to analyze the main factors causing the huge impact of osteoporosis on healthcare system, in terms of diagnosis and therapies, and to illustrate recent advances for treatment and prevention of this “silent disease”.

Keywords: Diagnostic Techniques, Fracture Risk Factors, Fragility Fractures, Osteoporosis, Pharmacological Therapies, Social Costs

INTRODUCTION

World Health Organization (WHO) defines osteoporosis as “a systemic skeletal disease characterized by low bone mass and micro-architectural deterioration of bone tissue with a consequent increase in bone fragility and susceptibility to fracture” (Cooper et al., 1992). Osteoporotic people have a higher risk of developing fractures, even spontaneous, especially in spine, ribs, femur, wrist, forearm and foot. The significant impact of osteoporosis on public health derives from morbidity, mortality and economic costs associated with fractures. For
a long time osteoporosis has been considered a disease of women; however, in the earliest reports on the epidemiology of osteoporosis, it was apparent that the classic age-related increase in fractures seen in women is also evident in men (Guglielmi et al., 2008). Approximately one in two women and one in four men over 50 years of age will have an osteoporosis-related fracture in his or her lifetime (National Osteoporosis Foundation, 2013). Then, osteoporosis affects millions of people around the world and the frequency of osteoporotic fractures is rising in many countries, in particular because of the increased longevity of the population. The relationship between population aging and increase in the incidence of osteoporosis is confirmed by the fact that osteoporosis occurs more frequently in areas in which the population is generally older. In 1990, there were an estimated 1.7 million hip fractures worldwide (Cooper et al., 1992; Cummings and Melton, 2002). In 2050, hip fractures could exceed 21 million (Cummings and Melton, 2002; Gullberg et al., 1997). In this context, attention must be focused on the identification of patients at high risk of fracture rather than on the identification of men and women with osteoporosis (Kanis et al., 2002). In fact, despite the new findings, only a minority of patients at high fracture risk are identified and successively addressed to treatment.

The aim of this paper is to provide the impact of osteoporotic fractures from both epidemiological and economic points of view, with particular focus on Italy and Salento area. Moreover, in order to identify the best practice in osteoporosis management, an overview of the most widely used diagnostic techniques and pharmacological treatments is presented.

**COSTS OF OSTEOPOROTIC FRACTURES**

WHO considers osteoporosis to be second only to cardiovascular diseases as a critical health problem (Kanis et al., 1997). The disability due to osteoporosis is comparable or greater than that caused by cancers and by a variety of chronic non-communicable diseases, such as rheumatoid arthritis, asthma and high blood pressure-related heart disease (Johnell and Kanis, 2006).

Osteoporotic fractures are a major contributor to medical care costs in many countries of the world (Table 1). The total annual costs of osteoporosis exceed, for instance, those for various brain disorders (Ettinger et al., 1992). In the United States, the medical cost of osteoporosis and related fractures is estimated at 20 billion of dollars per year (Cummings and Melton, 2002) and the prediction in dependence of annual rise in age-adjusted incidence of osteoporotic fractures is estimated at 50 billion of dollars in 2050. China spent around 1.5 billion of dollars treating hip fracture in 2006. It is estimated that this will rise to 12.5 billion of dollars in 2020 and to more than 26 billion of dollars by 2050 (Luo and Xu, 2005).

In Europe, the total economic burden of osteoporosis was estimated at 30.7 billion of dollars in 2010. Table 2 lists the expenditure for hip fractures of European Countries confirming the clinical and economic relevance of osteoporosis. The direct costs are expected to increase to 76.7 billion of dollars in 2050 in dependence of changes in demography (Johnell and Kanis, 2006).

Currently, in Europe, the annual expenditure for osteoporosis corresponds to approximately 3.5% of the total spent on healthcare (Strom et al., 2011). However, the total costs of osteoporosis in a country is difficult to estimate because it depends on a variety of factors, including the age-specific fracture risks, the population’s size, age and sex distribution, acute hospital care, the cost per fracture, long-term care in the home and the proportion of hip fracture patients requiring nursing home care after fracture, medications, rehabilitation, treatment and loss of working days. Estimated costs are sometimes based on many assumptions that are difficult to test. It should be noted, however, that not all fracture-related costs come from the countries’ healthcare budgets (e.g., long-term care, informal care, community care).

Generally, a majority of costs is attributed to incident fractures, while pharmacological treat-
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