



THE INFLUENCE OF CORTICOSTEROIDS ON GLUCOCORTICOID-INDUCED OSTEOPOROSIS AMONG PATIENTS OF MOULAY YOUSSEF HOSPITAL IN RABAT, MOROCCO

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|Received | 01 Mai 2016|

|Accepted | 21 Mai 2016|

|Published 26 July 2016 |

ABSTRACT

Background: The major problem today for osteoporosis is to correctly identify patients at high risk for fracture requiring effective preventive treatment. The need also is to develop well-defined therapeutic strategy. **Objective:** This study aims to improve our understanding of osteoporosis, a disease that can now be prevented and treated. By studying the risk factors and the influence of osteoporosis induced by glucocorticoids in patients and assessing the perception of glucocorticoid-induced osteoporosis in Moulay Youssef hospital in Rabat, Morocco. **Methods:** This study took place in a hospital structure in 2015 in Moulay Youssef hospital in Rabat, Morocco. The information about hospital patients were collected using a questionnaire and individual interviews with general practitioners, cardiologists, pulmonologists, and surgeons, the results are given in tables and figures. A descriptive statistical analysis was carried. The data collection method is represented by: a). a survey conducted using an anonymous questionnaire distributed to individual patients, and b). a semi-directive interview with general practitioners, cardiologists, pulmonologists, and surgeons. Data analysis was performed by a statistical descriptive analysis and a quantitative analysis which was based primarily on a semi-structured interview. **Results:** The study sample consists of all hospitalized patients and those who came in consultation; it consists of 100 patients, 46 men (46%) and 54 women (54%), the average age is between 30 and 60 years and older. 93% consider menopause one of the risk factors for osteoporosis, 85% blame the low calcium diet and low sun exposure. 78% emphasized the fracture risk of osteoporosis. 91% ignores the recommended intake of calcium daily. 54% of participants surveyed were menopausal, 62% did not practice physical activity. 46% receiving corticosteroids, the size of 64% of study participants decreased by 3cm, 94% of participants did not have densitometry check up and 97% have never received anti-osteoporosis treatment. Accurate and early identification of patients at high risk of fracture, avoids the adverse effects of osteoporotic fractures. Simple tools need to be developed according to a well-defined therapeutic strategy. **Conclusion:** It appears that in osteoporosis fracture event is one of the most dreaded complications of corticosteroid therapy at a dose beyond 5 mg / d of prednisone equivalent for a period exceeding 3 months. Some authors have reported the existence of a fracture risk of lower dose for three months or more.

Keywords: *Glucocorticoid-induced osteoporosis, fracture risk, densitometry, bone mass density, therapeutic strategy, corticosteroids.*

I. INTRODUCTION

Osteoporosis is a systemic skeletal disease characterized by reduced bone strength leading to an increased risk of fracture [1]. The glucocorticoid-induced osteoporosis is characterized by a predominant trabecular bone loss on the sector (vertebrae and ribs). Its amplitude depends on the dose and duration of corticosteroid treatment and therefore the cumulative dose [2-3].

Morocco is a country where the population is largely young majority. However, the number of elderly is increasing and this category of population health problem will vividly in the future. Today the issue of osteoporosis in Morocco arises with more and more acute, it causes health risks of the population on which its impact is becoming increasingly important.

Osteoporosis is a benign condition of the bone, which is a public health concern because of its prevalence, the incidence of osteoporotic fractures, and consequences. The danger of osteoporosis lies in the fact that it is a disease that can remain silent and unnoticed for years [4]. Corticosteroids (CC) are widely used in the treatment of several autoimmune disorders, rheumatological, pneumological, gastroenterology, oncology or organ transplant suites. However, with prolonged use of these molecules, the therapeutic effect was balanced against by many side effects, including osteoporosis and increased risk of fracture is one of the most serious problems [5].

mechanisms: firstly they reduce bone formation by osteoblasts inhibition, induction of apoptosis and inhibition of growth factors and secondly they accelerate bone resorption. The cumulative dose of corticosteroids and duration of treatment have been implicated in different studies [6].

Corticosteroids may be responsible for a number of side effects including glucocorticoid-induced osteoporosis and increased fracture risk is one of the most serious problems. Epidemiological studies have shown, however, that there are not many doctors who prescribe a preventive treatment for osteoporosis by starting a corticosteroid therapy, many admit to not always think about preventing osteoporosis by starting a long-term corticosteroid [7]. However, exposure

to CC in the general population is very broad and the prevalence of their use is in the range of 0.5% to 2.5% in subjects over 70 years. The glucocorticoid-induced osteoporosis is the most common secondary osteoporosis and represents one of the major complications of long-term corticosteroid therapy. [5].

In the international observational study Global Longitudinal Study of Osteoporosis in Women (GLOW), conducted in general practice in ten countries, 4.6% of 60 393 postmenopausal women currently receiving CC [8]. Despite this considerable prevalence, therapeutic management is insufficient: 4 to 14% of patients only, receive a preventive or curative treatment of OC [9]. At Morocco, epidemiological studies on glucocorticoid-induced osteoporosis are almost nonexistent [5].

The importance of vitamin D in bone metabolism has long been established and its role in the pathophysiology of osteoporosis is crucial. It is also known that vitamin D deficiency is responsible for rickets in children and osteomalacia in adults. In recent years, there is a renewed interest in this vitamin because many recent studies have shown that it is involved in the pathogenesis of many diseases (cancers, infections, chronic pain syndromes ... etc.) [10].

This study aims to increase our understanding of osteoporosis, a disease that can now be prevented and treated. by studying the influence of osteoporosis induced by glucocorticoids in patients Moulay Youssef hospital in Rabat, Morocco

2. PATIENTS AND METHODS

2.1 Setting and studied population: This study was conducted in 2015, on a regional Hospital, named Moulay Youssef in Rabat Morocco; that serves the population of the Rabat-Salé-Zemmour-Zear region estimated 625.000 habitants. The study sample consists of all hospitalized patients and those who come in consultation at the hospital; it consists of 100 patients, 46 men (46%) and 54 women (54%), age is between 30 and 55,2 years . The patients were informed about the purpose of the study.

2.2 Methods: The information about hospital patients were collected using a questionnaire and individual interviews with general practitioners, cardiologists, pulmonologists, and surgeons, the results are given in tables and figures. A descriptive statistical analysis was carried.

2.3 Data collection methods: The data collection method is represented by:

- The survey is conducted using an anonymous questionnaire distributed to individual patients.
- The semi directive interview: This is an interview with general practitioners, cardiologists, pulmonologists, and surgeons.
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2.4.Description of data collection tools: To conduct this study, I used the following measuring instruments: A questionnaire as the main tool. It is addressed to patients on corticosteroid therapy vulnerable to develop glucocorticoid-induced osteoporosis
An interview guide as a tool for physicians. To support, supplement or as to invalidate the questionnaire data.

2.5 Methods of analysis of the data collected: We have performed (a) a statistical descriptive analysis regarding quiz data by use of Excel; (b) and a content analysis which was based primarily on the "verbatim" for the semi-structured interview. Content analysis is passed by the faithful transcription (word for word) what was said by all stakeholders and an analysis of their statements.

3. RESULTS

Educational and demographic characteristics of the population

The population presents a level of education with 9% illiterate; 34% primary, 39% secondary, 17% university. The age group > 41 years represents 87% of the participants. The Women is slightly dominant, as it represents 54% of cases. The following table shows the distribution of patients by gender and age group.

Table 1: Table shows the distribution of patients by gender and age.

Age	Women		Men		Total patients		
	N	%	N	%	N	%	C%*
30 to 40 years	7	13%	4	8.7%	11	11%	100%
41 to 50 years	13	24%	10	21.7%	23	23%	89%
51 to 60 years	10	18,5%	9	19.6%	19	19%	66%
> 61 years	24	44,5%	23	50%	47	47%	47%
Total	54	100%	46	100%	100	100%	

*Cumulative %:C% in Descending Order

factors for osteoporosis

Most participant respondents report that menopause is a risk factor with a percentage of 93%, followed by low calcium

diet and low sun exposure with 85% and low physical activity with a percentage of 62%. The following table shows the risk factors for osteoporosis.

Table 2: Table shows the risk factors perceived by the surveyed.

Risk Factors	Number	Percentage
Menopause	93	93%
low calcium diet	85	85%
Low sun exposure	85	85%
Low physical activity	62	62%
chronic smoking	43	43%
Low weight	14	14%
Total participants	100	100%

Mode of drug administration:

According to this graph, we see that 63% of respondents receive oral corticosteroids, inhaled 18% and 9% by infiltration.

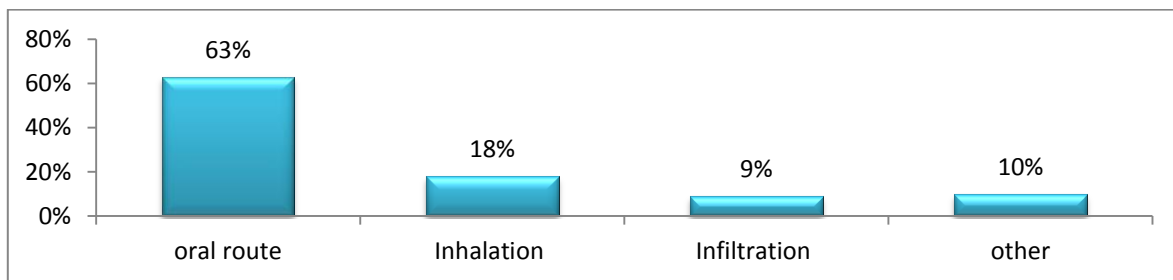


Figure 1: the figure shows the distribution by mode of drug administration.

Duration and dose of treatment

Figure 2 shows that 58% received treatment corticosteroids for 15 days, 43% of participant’s respondents receive corticosteroid 5 to 10 mg/d.

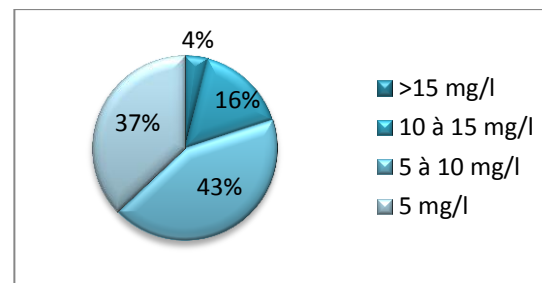
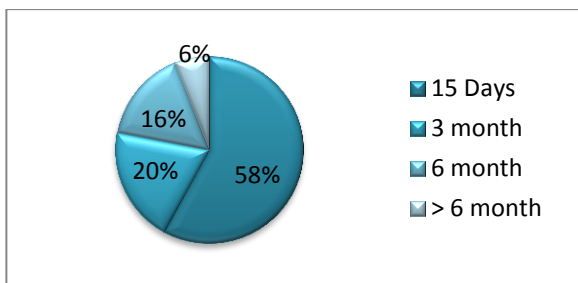


Figure 2: The figure shows the time length of corticotherapy.

Figure 3:The figure shows the Dose of corticotherapy.

Preventive treatment of osteoporosis

Figure 4 shows that 68.5% of surveyed patients do not receive preventive treatment of osteoporosis 31.5% say the opposite.

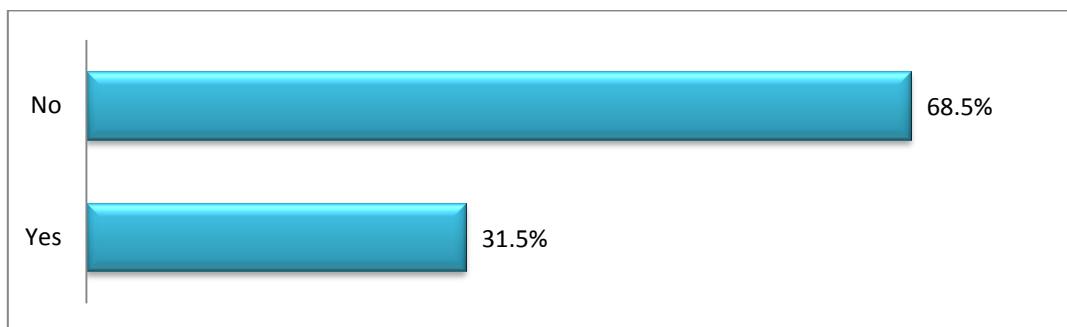


Figure 4: The figure shows the patients who receive preventive treatment of osteoporosis.

4. DISCUSSION

The survey targeted a sample of 100 participants hospital and those who came in consultation at the hospital, with a 100% participation rate, the sample consists of 46 men (46%) and 54 women (54%), the age is 30 years and 55.2 years. The age group > 41 years represents 89% of the participants; these results are more pronounced 17% of those of an epidemiological study of osteoporosis made in Hong Kong between 1995 and 1998 [11].

In another study in 146 patients. They were 84 women (57.5%) and 62 men (42.5%), meanage 33.18 ± 12.5 years. [12]. he was shown a slight predominance of the female because it represents 54% of cases. Similarly in a study by the International Foundation of Osteoporosis 54% of postmenopausal white women in the US are osteopenic and osteoporotic 30% (only 26% are "normal"). In Canada it is estimated that one in four women have osteoporosis after 50 years, one in eight men over 50 years.

At your population studied, we found 46% of participants interviewed who received corticosteroids. 63% of respondents receiving treatment corticosteroid orally inhaled 18% and 9% infiltration. 58% received treatment corticosteroids for 15 days, 20% for 3 months, 16% for 6 months 6% over 6 months. 43% of participants (are) surveyed (s) receive a corticosteroid 5 to 10 mg / day, 16% of 10 to 15 mg / day, and 4% more than 15 mg / day. But in a study in 38 patients with inflammatory disease, administration of methylprednisolone infusions at a dose of 6.6 to 10 mg / kg every month for six months is associated with bone loss significant between 0 and six months at the lumbar spine (2.6%), femoral neck (1.7%) and total hip (1.9%) [13,14].

Bone loss induced by the GC is observed from 6 first month of treatment. a meta-analysis of 56 cross-sectional studies and 10 longitudinal studies published in 2002 showed bone loss in the year following the initiation of treatment is 2 to 3% as at the lumbar spine than the femur [15].

This phenomenon is confirmed by the analyzes of placebo groups in therapeutic trials published at the same time [16,17]. The magnitude of this disease depends on the dose and duration of treatment [18-2] corticosteroid is variable with in a population and no criterion densitometry, biological clinic predict for a given individual the occurrence and magnitude of osteoporosis.

In this meta-analysis the most frequent indications for GC were rheumatologic diseases (67%) and COPD (16%) [15]. Note that this data has more than 10 years, there are few studies on the inflammatory rheumatism evolution treated more effectively treated by more effectively through biological treatment. These studies show no lack of bone loss in RA patients treated with low doses of GC and receiving DMARDs disease [19,20] in a context of optimal control of inflammation.

In another study in volving 62 patients with RA treated with methotrexate and sulfazalazine, randomized to methylprednisolone infusion of 1000 mg every other day, three times every 2.5 months on average for a year or methylprednisolone through oral dose of 16 mg daily, the méthyprednisolone infusions are not associated with a significant decrease in bone density between day 0 and one year; there is bone loss significantly higher in the group treated with methylprednisolone orally compared with infusions [21].

Semeao et al showed in a study conducted in 119 young adults with chronic illness that higher cumulative dose to 5 g, greater than 7.5 mg daily dose or exposure time more than 12 months increased so significant risk of bone demineralization [22].

A meta-analysis of 56 cross-sectional studies and ten longitudinal studies has shown that bone loss occurs the third month of treatment with a peak at 6 months (-5 to -12% per year), then slow down (- 2 to -3 per year) probably favored by the decrease in the dose of corticosteroids. The decrease in bone mineral density (BMD) maybe reversible upon discontinuation of corticosteroids. [23].

The use of short-term (<90 days) or former GC (> 12 months) was not associated with increased risk of fracture [24]. The systematic realization of radiographs of the thoracic and lumbar spine in postmenopausal women receiving long-term corticosteroid and not suffering from back pain shows that the prevalence of vertebral fractures (VF) is more elevated than the expected prevalence and it is not just explained by the daily dose and duration of corticosteroid [23]. All this confirms the results of the study [10], which noted that the severity of Glucocorticoid-induced osteoporosis depends on: the dose of corticosteroids, route of administration, and the patient (menopause calcium deficiency associated ...).

From the results collected 68.5% of surveyed patients do not receive preventive treatment of osteoporosis. Similarly in an international observational study Global Longitudinal Study of Osteoporosis in Women (GLOW), conducted in general practice in ten countries, 4.6% of 60 postmenopausal 393 femmes commonly received CC [8]. Not with standing this considerable prevalence, therapeutic management is insufficient: 4 to 14% of patients only, receive a preventive or curative treatment of OC [9].

The management of osteoporosis is based on a healthy life style consisting of the practice of regular physical activity, the ouster of tobacco and alcohol, preventing falls, and a vitamin and calcium intake appropriate. A measurement of bone density is required as soon as the diagnosis of osteoporosis made in a patient at risk or when corticosteroid therapy is contemplated.

5. CONCLUSION

The results of this study, showed that awareness on glucocorticoid-induced osteoporosis demand as much interest and prioritization in the first place, by those responsible for public health and improving the Assumption high lighting a strategy and uniform basis.

The relationship between the cumulative dose of GC and fracture risk is not clearly shown in the literature, probably because of difficulties in calculating the cumulative dose of GC, which can be false due to self-medication of patients and recall bias.

The use of the smallest dose of glucocorticoids for the shortest period remains the primary preventive measure. In addition to counteract other risk factors for osteoporosis and in addition with calcium-vitamin D supplementation, bisphosphonates or teriparatide may be used depending on the initial bone status and the severity of osteoporosis.

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Cite this article. Bouziam Rachida, Youssef Aboussaleh, Rachid Sbaibi, Rachid Bengueddour, and Mohamed El Hioui. The influence of corticosteroids on glucocorticoid-induced osteoporosis among patients of Moulay Youssef hospital in Rabat, Morocco. *Am. J. innov. res. appl. sci.* 2016; 2(8): 347-352.

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