



## IMPORTANCE OF CALCIUM DOSAGE IN MENOPAUSAL WOMEN ADMITTED TO THE LABORATORY OF THE ZONE HOSPITAL OF SURU-LERE AKPAKPA COTONOU (BENIN)

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### ABSTRACT

To show the importance of calcium dosage in postmenopausal women is the aim of this study. It is a cross-sectional, descriptive and analytical study which took place over one month. The study population is made up of one hundred (100) menopausal women aged 50 and over, admitted to the laboratory of the Suru-Léré Zone Hospital. Excluded from the study are postmenopausal women living with HIV and patients undergoing treatment. The spectrophotometer was used to measure blood calcium in the samples taken. The result at the end of this work was that the average age is  $58.37 \pm 8.01$  years; the average body mass index of the general population is  $27.84 \pm 6.45 \text{ Kg/m}^2$ , which represents overweight. 35% of the study population is obese with an average of  $34.3 \pm 5.3$  and 29% is overweight with an average of  $27.88 \pm 1.3$ . A total of 64% of the patients are overweight. Although 86% of the study population have normal blood calcium levels. We also observed a significant prevalence of hypocalcaemia which is 13% in the study population. In addition, our results showed that daily calcium intake is below the French recommendations. A strong awareness of the importance of calcium is therefore essential.

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### INTRODUCTION

In all countries and cultures, women play a vital role in the family. As the world's population ages, the burdens placed on older women in particular are increasing, despite the fact that they face the natural phenomenon of menopause without medical assistance. At its onset, a woman completely loses the possibility of procreation. The menopause is a sensitive phase in a woman's life, generally associated with complex changes in which biological and environmental factors are intertwined, and is a sensitive phase in her life both physiologically and psychologically [1]. For most women, the menopause begins between the ages of 45 and 55, but it can also occur between the ages of 40 and 60 [2]. Worldwide, this age is between 43 and 50 [3]; in France, the average age at which menopause occurs is shortly after the age of 50 and has changed very little

in relation to women's life expectancy (60.1 years in 1950; 80.3 in 1987 and 81.8 in 1994) [4]. According to a survey conducted in the city of Cotonou, which represents about 10% of the Beninese population, the prevalence of menopausal women is 17.4% out of 51.3% of women and the average age of menopause is estimated at  $47.57 \pm 4.08$  years [5]. However, as women become deficient in oestrogen after cessation of menstruation, the equilibrium breaks down and bone resorption becomes more important than bone formation. Thus, the decrease in oestrogen leads to increased bone resorption and rapid bone loss (about 2-3% per year) which continues for about 5-8 years after menstruation has stopped. Postmenopausal women are at high risk of developing osteoporosis and fractures [6,7]. The risk of osteoporosis increases when the diet does not provide enough calcium. Regular calcium supplementation, combined with joint

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exercises, can help prevent bone resorption and osteoporosis to reduce the risk of fractures. Calcium is therefore an essential nutrient throughout life, but is particularly important for maintaining bone health in postmenopausal women [8,9]. Calcium is therefore a very important part of the routine check-up for osteoporosis in order to eliminate any abnormalities in the calcium and phosphorus balance [10]. It is therefore necessary to assess the importance of calcium dosage in postmenopausal women in order to help them to prevent the diseases that would result from it. This is the aim of our study. It will be done through the determination of calcium levels; comparing results according to age and body mass index (BMI) and to determine the prevalence of hypocalcaemia in the study population.

## PATIENTS AND METHODS

The study took place in the laboratory of the Suru-Léré Zone Hospital in Cotonou. It is a cross-sectional, descriptive and analytical study that took place over one month. To carry out the study, the informed and accepted consent of the patients was collected by means of a questionnaire in accordance with the scientific research procedure. The study population is made up of one hundred (100) menopausal women aged 50 and over, admitted to the laboratory of the Suru-Léré Zone Hospital. Menopausal women living with HIV and patients undergoing treatment are excluded from the study. Each subject is taken on an empty stomach. The sample is taken by venipuncture at the fold of the elbow in a dry tube containing gel. The spectrophotometer is used to determine the blood calcium content of the samples taken. The principle of the assay is as follows: In an alkaline medium, the 0-cresolphthaline complexons or CPC reacts with calcium ions to form a dark red colour complex whose absorbance, measured at 570 nm, is proportional to the calcium concentration of the sample. The procedure for the assay is shown in Table 1.

**Table 1** Calcium dosing procedure (Biolabo)

	White	Stallion	Control	Dosage
Reagent 1	500µl	500µl	500µl	500µl
Reagent 2	500µl	500µl	500µl	500µl
Distilled water	25µl	---	---	---
Stallion	---	25µl	---	---
Control	---	---	25µl	---
Serum	---	---	---	25µl

Mix well and incubate for 5 minutes at room temperature.  
Read absorbances at 570 nm against the reactive white with the spectrophotometer.  
Temperature: 25°C Make the optical zero with distilled water.  
Normal values: 85 to 105 mg/l

## RESULTS

The age distribution of the population is shown in Figure 1

**Statistical analysis** (Table 2):

**Table 2** Results of the quality control previously carried out

Repeatability			Reproducibility		
Parameter	N	XS CV%	Parameter	N	XS CV%
Calcium	10	97,5±1,35 1%	Calcium	10	94,8±2,30 2%

XS: mean ± standard deviation CV: coefficient of variation

Data entry, averages and standard deviations were performed using Microsoft Excel 2007.

The CV in a repeatability test must be less than or equal to 5% to validate the method. CVs obtained by the reference technique are less than 5% for our results. The same applies to the reproducibility test.

The distribution of the population according to the routine life cycle assessment is shown in Figure 2.

The calcium level is determined in each sample. The value is classified with reference to the normal. The value is : 85 to 105 mg/l. below this value (hypocalcaemia), above (hypercalcaemia). (Figure 3)

## DISCUSSION

Through a descriptive and analytical cross-sectional study, we determined the blood calcium levels of menopausal women aged 50 and over, admitted to the laboratory of the Suru-Léré zone hospital. The average age of the 100 women was 58.37 ± 8.01 years. FARDELLONE *et al* (2010) [11] in a study on calcium intake and risk of osteoporosis and fractures in postmenopausal French women found a mean age of 67.9±10.0 years. This may be explained on the one hand by the rarity of very old menopausal women coming to hospital for routine check-ups and on the other hand by the lack of information. Beforehand, it is important to carry out a quality control of the method used to measure calcium. The coefficient of variation (CV) for the reproducibility test is less than 5%. This indicates a good stability of the control serum. In a repeatability test, the CV reflects the relative dispersion of the results of the determination of a biological sample in the same series according to Bernard (1995) [12]. The coefficient of variation for the repeatability test is less than 5%. This reflects the reliability of our results.

The average value of blood calcium is 91.2 mg/L; we notice a high rate of subjects with normal blood calcium (86%), this would be explained by the fact that the majority of the subjects in our study are still active (less than 60 years old). LIGNERES *et al* (1986) found the same results [13]. And they affirm that in menopausal women there is a slight increase in blood calcium levels, but it remains within normal values. However, a more detailed study showed a 14% prevalence of dyscalcaemia in our study population. The most common form of dyscalcaemia is hypocalcaemia (13%). This result is similar to that found by SOUBAI *et al* (2012) [14] who state that hypocalcaemia is more common than hypercalcaemia in postmenopausal women. Furthermore, there is a significant prevalence of dyscalcaemia in overweight individuals. Indeed, after the menopause, oestrogen deficiency reduces the digestive absorption of calcium and its tubular reabsorption [13]. In the presence of hypocalcaemia, bone resorption occurs in order to release calcium from the bones into the bloodstream. Over the years, this condition can lead to the development of osteoporosis, which increases the risk of hip and vertebral fractures, as well as spinal deformities and loss of height [15]. It should be noted that the blood calcium level, although normal, was found to be higher in overweight women (92.21mg/l) than in women of normal body weight (91.48 mg/l). This result contradicts that found by LATAB (2006) [16] which reported an increase in blood calcium levels in normal weight women (95mg/l) and a decrease in overweight women (86mg/l).

It should also be pointed out that the daily calcium intake obtained in the subjects of our study population (313.93 mg) is well below that recommended by the WHO, which is between 1000 and 1500mg/day. Our results are similar to those reported by the Tunisian [15] and Moroccan [17] studies carried out respectively on 1123 women over 45 years of age with a low average calcium intake of 427±160 mg/day and 130

postmenopausal women over 12 months with a low average calcium intake of 448.38 mg/day.

## CONCLUSION

Menopause is not a handicap for women. However, if it is not followed, it would have serious consequences on the woman's health. Therefore, to limit these consequences, menopausal women must have hormone treatment administered by their doctor. Our study has enabled us to find out which of the menopausal women have a sufficient or insufficient intake of calcium. In order to reduce the risk of osteoporosis and cardiovascular disease, postmenopausal women must control their dietary intake of calcium.

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