

ORIGINAL ARTICLE

ARE THE AGE OF MENARCHE AND THE AGE OF MENOPAUSE CORRELATED WITH BREAST CANCER MOLECULAR SUBTYPES?**V. Munteanu^{1,2}, P. Vârtej^{1,2}, Florentina Gherghiceanu¹**¹ “Carol Davila” University of Medicine and Pharmacy Bucharest, Romania² University Emergency Hospital Bucharest, Romania

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Abstract

The purpose of the study was to determine whether the age of menarche, the age of menopause or the length of the period between them are somehow related to the molecular subtype of a breast tumour. Data from 438 women collected in the past 10 years (January 2007 – December 2017) from patients that were treated for breast cancer in the Oncology Department of the University Emergency Hospital Bucharest, Romania was analyzed in a retrospective, monocentric, descriptive manner. No statistical significant correlation between the three researched parameters and the molecular subtype of the breast cancer was found.

Keywords: *menarche, menopause, breast cancer, menarche – menopause period***Introduction**

Breast cancer is the most frequently occurring form of cancer with almost 1.67 million new cases being diagnosed in the whole world in 2012, according to the World Health Organization (WHO) [1]. In the same time, it is the leading cause of cancer-related deaths among females worldwide, with an incidence that is continuously growing each year in spite of all the efforts [2].

Risk factors for breast cancer are classified as hereditary and non-hereditary, with hereditary factors being generally accepted as related to mutations in BRCA1 and BRCA2 genes [3]. Non-hereditary risk factors include but are not restricted to age, female sex, menarche, age of menopause, age at first live birth, number of births, radiation exposure, oral contraceptive use, hormone therapy and obesity [4]. Other factors such as breastfeeding,

childbirth, physical activity and low-fat, highly nutritious plant-based diets have been proven as protective [5,6]. There are also factors like smoking cigarettes that could have a dose-related dual effect depending upon the menopausal status [7].

The purpose of our study was to determine whether the age of menarche or menopause has any influence upon the characteristics of breast neoplasms later in life.

Materials and methods

The research was based on data collected from patients that had suffered of a stage I-III breast cancer enrolled in the Oncology Department of the University Emergency Hospital Bucharest, Romania for a period of 10 years (1st January 2007 – 31st December 2017).

The study was retrospective, monocentric, descriptive and included a batch of 438 patients.

Results

The ages of the patients included in the study had an average of 58.97 years with a standard deviation of 12.49 years, 37.89% coming from rural areas and 62.11% from urban areas.

Regarding the age of menarche, the mean in the studied group was 13.01 years, with a standard distribution of 1.52. Menopause showed an average age of 49.09 years, with a standard deviation of 3.94. Another parameter discussed was the menarche- menopause period, which ranged from 20-49 years. For this variable, the median was 29.68 years, with a standard deviation of 14.24 years (Table 1, Figures 1 and 2).

	Mean	SD	Median	95% CI	Minimum	Maximum
Menarche (years)	13,011	1,5282	13,000	13,000 - 13,000	9,000	18,000
Menopause (years)	49,093	3,9473	49,000	48,685 - 49,501	34,000	59,000
Menarche – menopause (years)	29,688	14,2448	35,000	34,000 - 35,522	20,000	49,000

Table 1 –Statistical data about the menarche and menopause ages

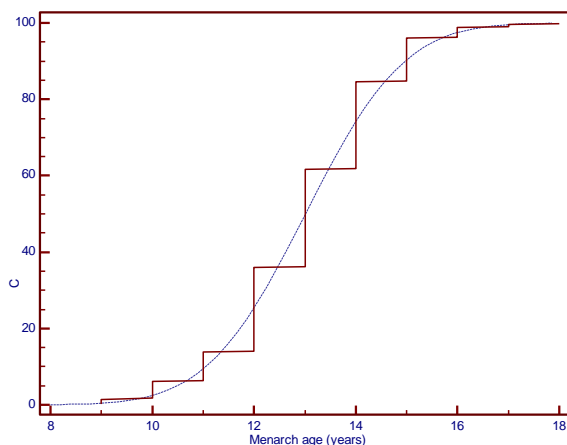


Figure 1 – The cumulative frequency of the menarche age

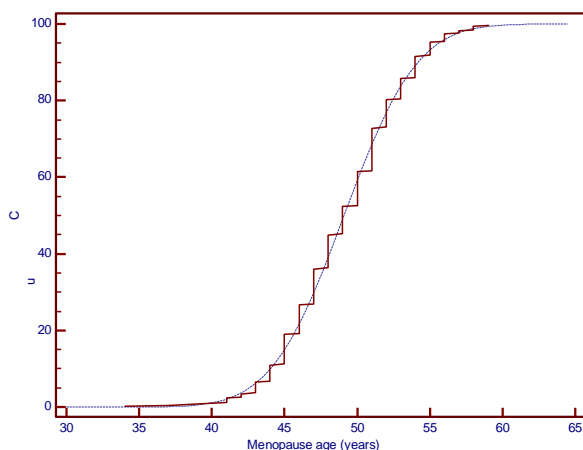


Figure 2 –The cumulative frequency of the age when menopause took place

The distribution of patients according to the molecular subtype and age of the menarche, menopause and menarche – menopause distance, respectively, showed an approximately uniform distribution, without predominance of any of the molecular subtypes (Figures 3,4,5).

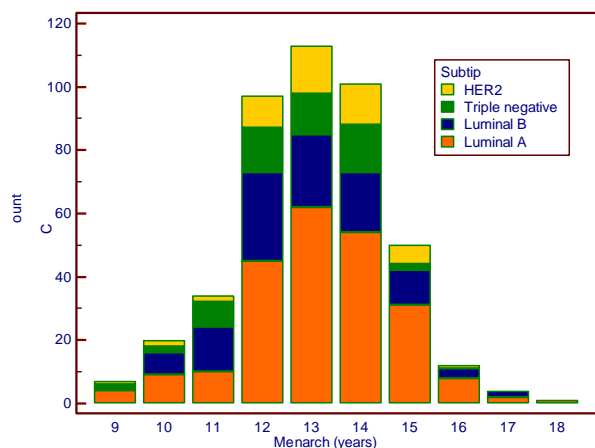


Figure 3 – Distribution of patients according to age of menarche and molecular subtype

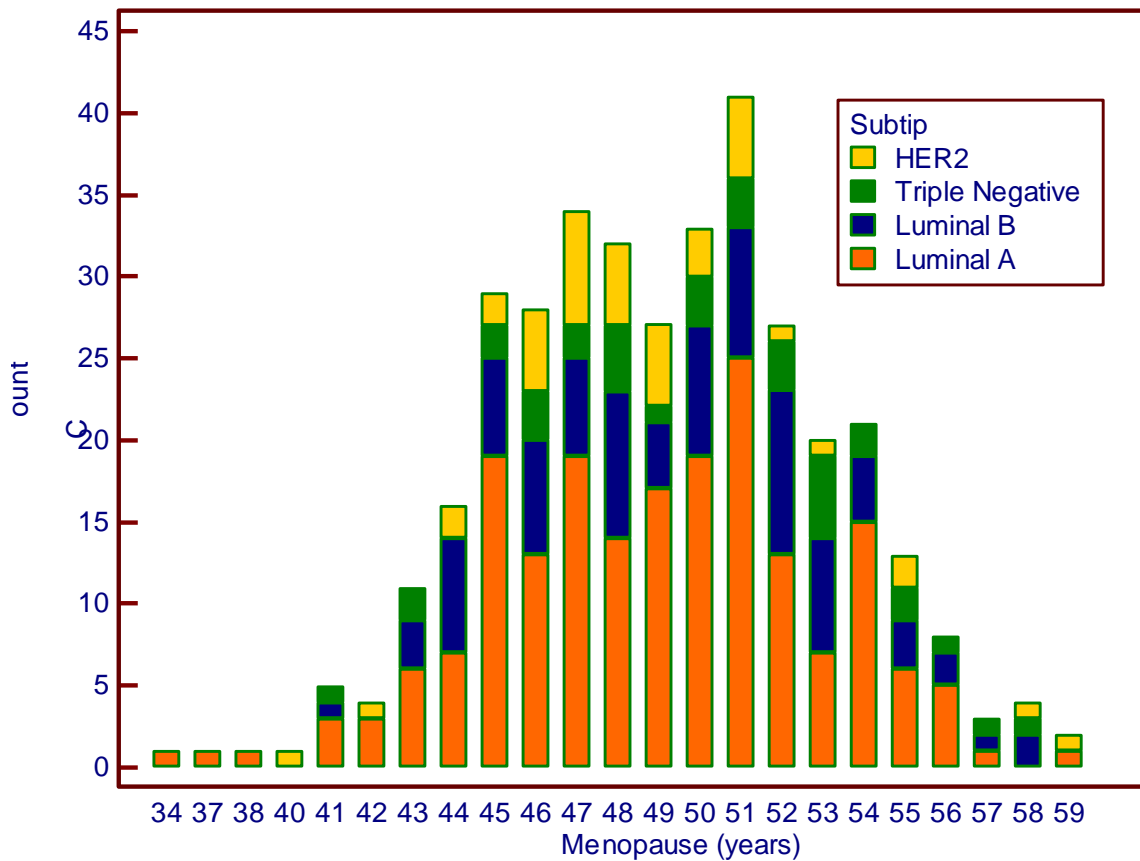


Figure 4 – Distribution of patients according to the age of menopause and molecular subtype

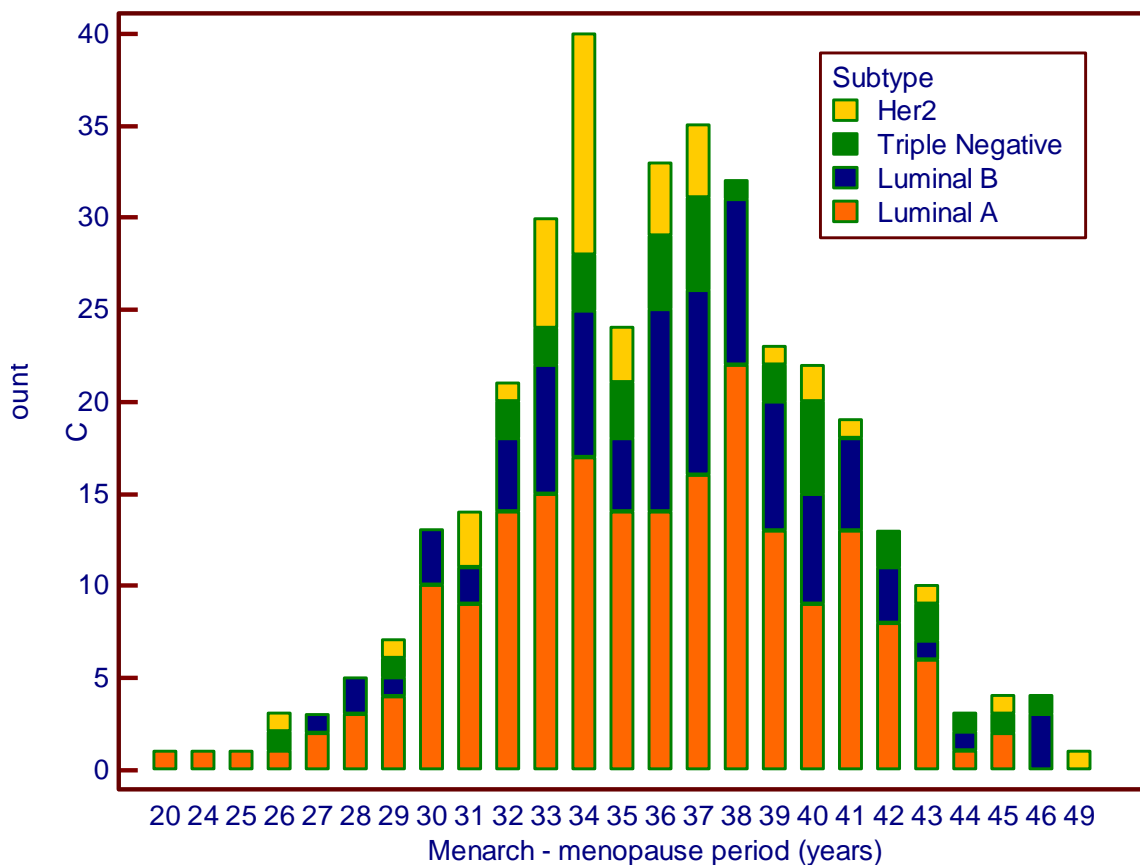


Figure 5 – Distribution of patients according to the menarche – menopause period and the molecular subtype

None of the three parameters evaluated correlated with the molecular subtypes, with the Pearson coefficient value less than or equal to 0.1 (Table 2).

	Subtype
Menarche age	-0,088
Menopause age	-0,100
Menarche – menopause period	-0,096

Table 2 – Pearson correlation coefficient

Discussions

The onset of a cancerous disease is a complicated multifactorial process which involves genetic and environmental factors. Breast cancer in particular has a mysterious onset and a complicated evolution with dramatic outcomes for women who are not lucky enough to be treated in the first stages of the disease. For many years scientists from all around the world have tried to map its onset and evolution without much success and with results that vary widely.

Fortunately, there are previous studies who found individual risk factors that are, in fact, protective towards the appearance of a breast cancer like childbirth or breastfeeding [6].

Early menarche and late menopause increase breast cancer risk [8], but does the exact age have any influence upon the molecular characteristics of the breast tumor? We have tried to answer this question using data about patients from our clinic collected in the past 10 years.

In order to answer the question, we have tried to find a correlation between the age of menarche, the age of menopause and the menarche-menopause period and the molecular subtypes of cancer. Data was analyzed using the Pearson coefficient (p) which was, in all three cases, higher than 0,05 (p<0,05 was considered a statistically significant result).

As breast cancer is a lethal, multifactorial, dangerous disease that kills women all around the world regardless of their race, age or other

characteristics, further research into risk factors and new innovative treatment is encouraged.

Conclusions

In conclusion, we have found no correlation between the age of menarche, the age of menopause or the length of the period between these two and the molecular subtype of a patient's breast cancer.

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