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# STATUS OF THE CIRCADIAN SYSTEM AND SLEEP IN WOMEN WITH METASTASIZED BREAST CANCER UNDER CHEMOTHERAPY OR HORMONE/ANTIBODY TREATMENT

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## BACKGROUND

Prevalence of sleeping disorders affects up to 60% of cancer patients, who report sleeping disarrays before, during, and long after treatment. Furthermore, low sleep quality is associated with fatigue and psychological effects, such as anxiety or depression, revealing what has been called a cluster of cancer symptoms. These symptoms interact with each other and can negatively impact the patient's quality of life (QoL), treatment efficacy, and survival. Multivariable recordings under ambulatory conditions (ACM) have recently been proposed to assess alterations of the circadian system (CS) and sleep (1). ACM procedures integrate a combination of variables, such as temperature, activity and body position, which allow an integrated analysis of the internal, external, and social times of the individual and thus helps to design individualized strategies to strengthen the CS and sleep, considering life habits before addressing pharmacological approaches.

## METHODS

51 metastasized breast cancer patients (m-BCP), recruited through the Oncology Unit of Hospital Universitario Puerta de Hierro-Majadahonda, were enrolled to wear a small, watch-like device (Kronowise®) during seven consecutive days in order to monitor motor activity, wrist skin temperature and posture under free-living conditions. Participants were divided in two groups depending on treatment: m1) chemotherapy (56.8±8.8 years, 26.0±5.2 BMI, n=26) and m2) hormone/antibody (58.2±10.4 years, 25.2±4.5 BMI, n=25). Controls were recruited among free-of-cancer individuals from a general population, so that each m-BCP was coupled to a digital twin with the same gender, approximate age, height and weight.

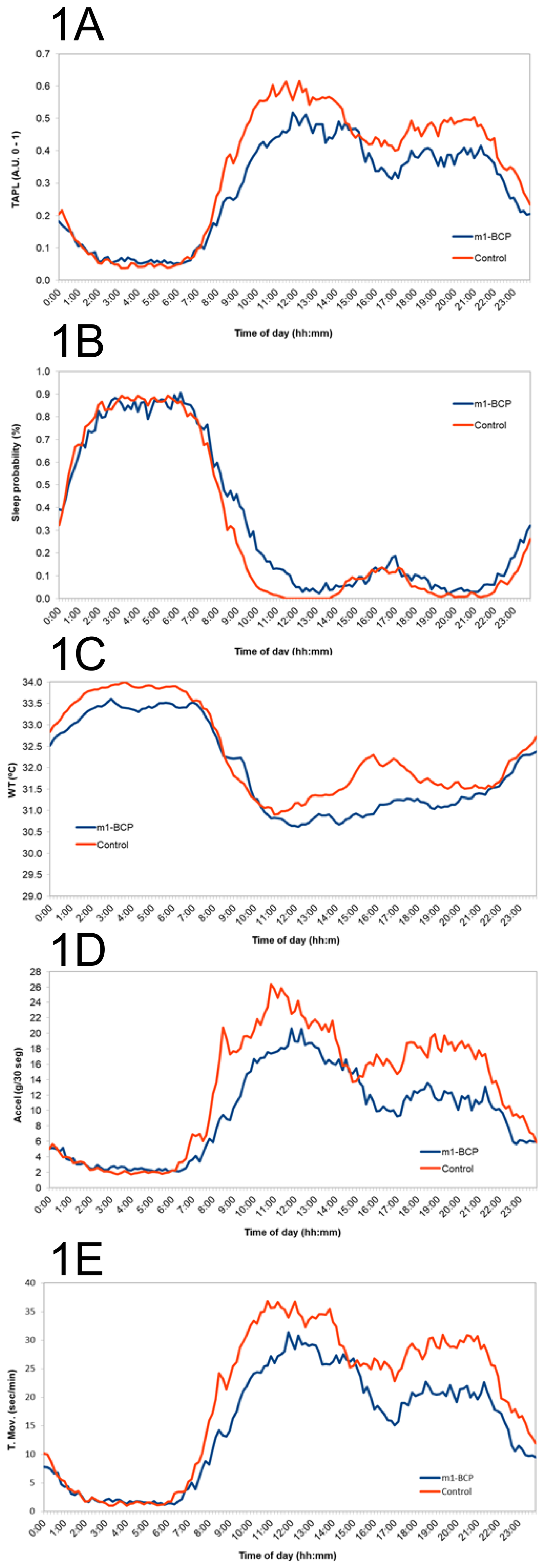


Figure 1. Mean-waveforms for metastasized breast cancer patients under chemotherapy treatment (m1-BCP) (blue line, n=26) and controls subjects (red line, n=26) for: (A) the integrated variable TAPL; (B) Sleep; (C) distal skin temperature, WT; (D) acceleration of movement; and (E) time of movement.

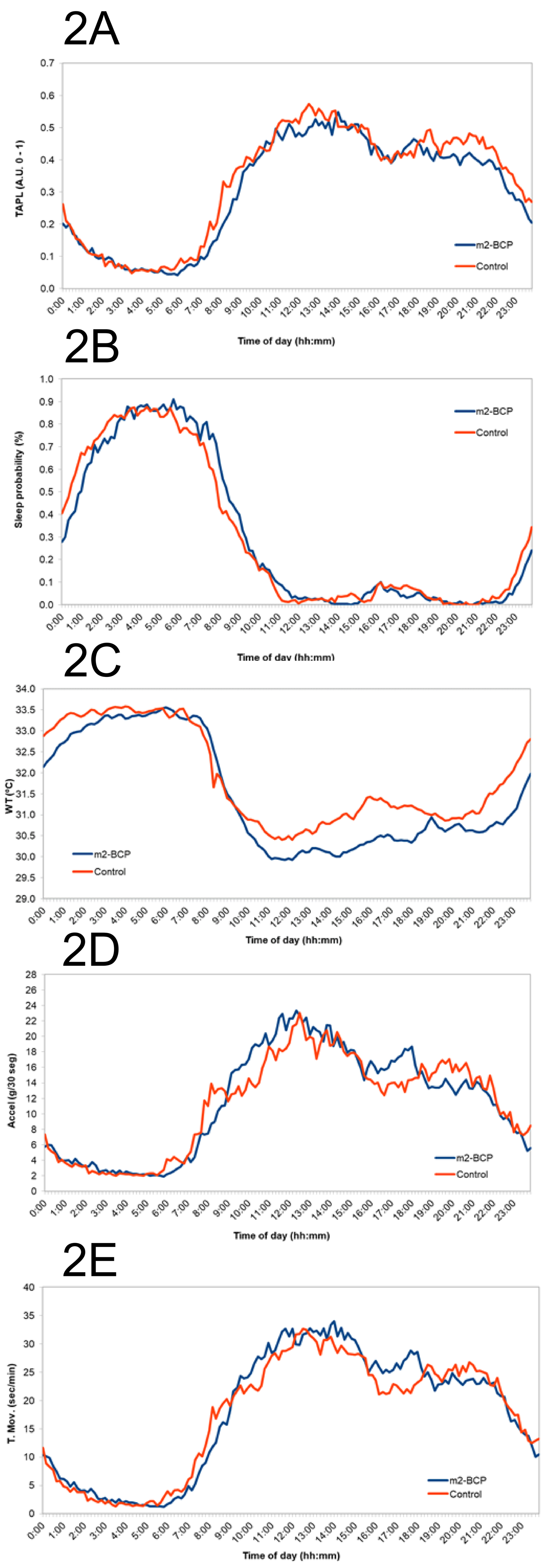


Figure 2. Mean-waveforms for metastasized breast cancer patients under hormone/antibody therapy (m2-BCP) (blue line, n=26) and controls subjects (red line, n=26) for: (A) the integrated variable TAPL; (B) Sleep; (C) distal skin temperature, WT; (D) acceleration of movement; and (E) time of movement.

Ambulatory circadian monitoring device Kronowise® (Kronohealth SL , Spain).

## RESULTS

While m1-BCP showed lower motor activity levels during the day and higher during the night, showing a significantly lower day/night contrast than their controls (1D and E), m2-BCP did not show statistical differences in motor activity rhythms compared to their controls (2D and E). Regarding the skin temperature rhythm (a variable with a high endogenous circadian component that displays high values during sleep), m1- and m2-BCP showed lower WT values and a slight delay compared to that of their controls (1C and 2C).

The integrated variable TAPL can be used to express general activation, where a value of 0 was an indicator of deep rest, characterized by immobility, vasodilation of the skin and low variability of LE (sleep), while 1 corresponded to a wake state (1A and 2A). TAPL rhythm from m1-BCP showed lower values during the day and higher values during the night, having a lower day/night contrast than contrast. On the contrary, TAPL from m2-BCP showed similar values to that of their controls.

Regarding sleep, m1-BCP slept significantly more than their respective controls (1B) and the sleep rhythm from m2-BCP was slightly delayed respecting that of their controls (2B).

In conclusion, circadian indexes were generally worse in m1- than in m2-BCP, particularly those regarding to motor activity and TAPL rhythms. Our results indicate that chemotherapy does have a more negative impact in the circadian system functioning than hormone/antibody therapy.

## REFERENCES

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