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### Rhythm & Blues

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## Chapter 6

# Coping with a life event in bipolar disorder – ambulatory measurement, signalling and early treatment

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## Summary

Disruption of the biological rhythm in patients with bipolar disorder is a known risk factor for a switch in mood. This case study describes how modern techniques using ambulatory assessment of sleep parameters can help in signalling a mood switch and start early treatment. We studied a 40-year old female with bipolar disorder experiencing a life event while wearing an actigraph to measure sleep-wake parameters.

The night after the life event the subject had later sleep time and shorter sleep duration. Adequate response of both the subject and the treating psychiatrist resulted in two normal nights with the use of 1 mg lorazepam, possibly preventing further mood disturbances. Ambulatory assessment of the biological rhythm can function as an add-on to regular signalling plans for prevention of episodes in patients with bipolar disorder. More research should be conducted to validate clinical applicability, proper protocols and to understand underlying mechanisms.

## Background

Modern techniques such as ambulatory assessment of physiological parameters may be helpful to monitor and signal potential elicitors of new episodes in patients with a mental disorder. In bipolar disorder disruptions of the biorhythm such as a change in sleep are known risk factors for a switch in mood(1). We describe a case where ambulatory measurement could have functioned as a signal for early treatment.

## Case presentation

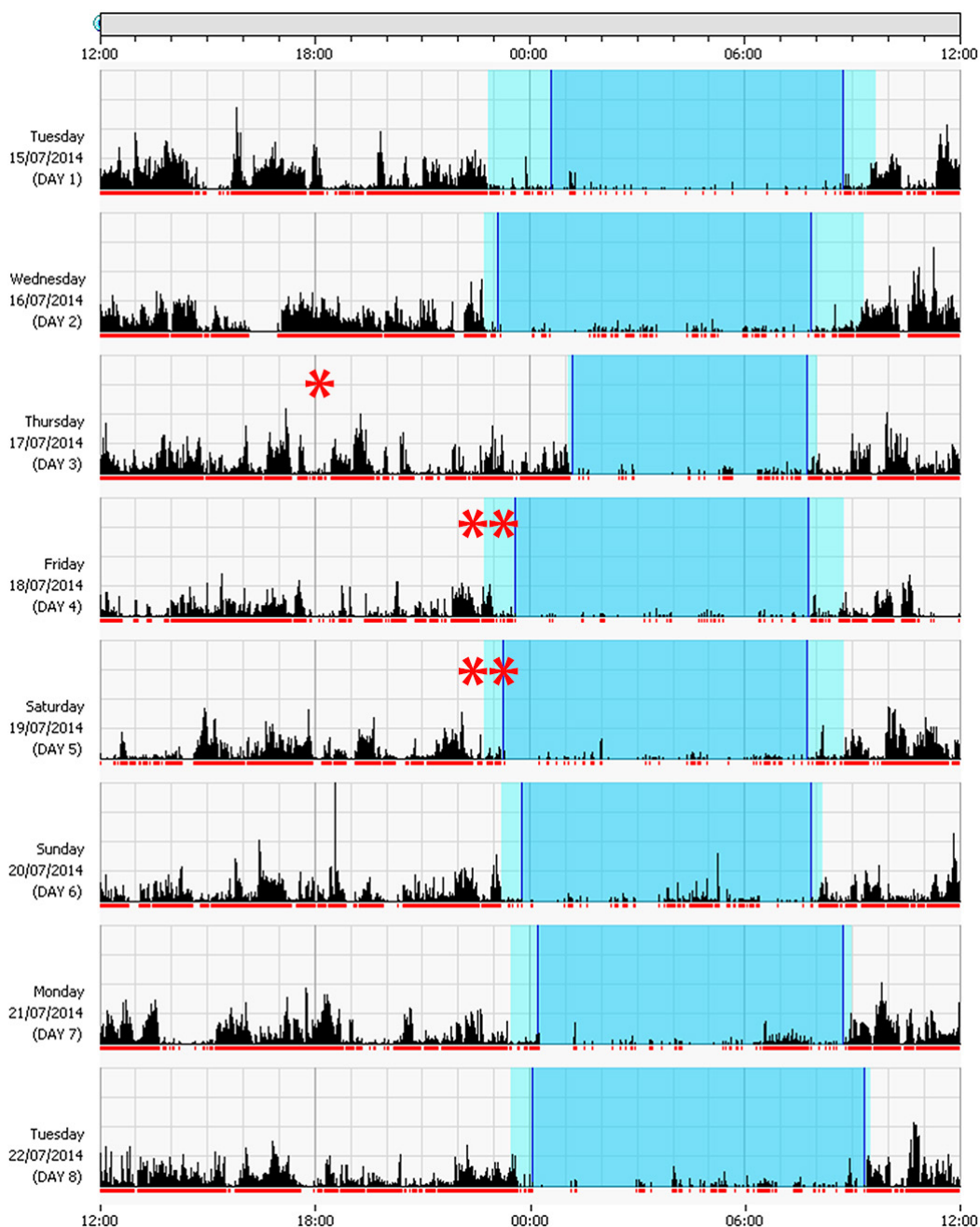
A 40-year-old woman is in treatment for bipolar disorder type I since 8 years. The bipolar disorder was diagnosed by a psychiatrist from the department of psychiatry of the University Medical Center Groningen (UMCG) according to the *Diagnostic and Statistical Manual of Mental Disorders IV* criteria. Since diagnosis and treatment she was admitted once to the psychiatric department for a depressive episode. She visited her treating psychiatrist around every six weeks. Furthermore she experienced subclinical mood swings once or twice a year, particularly after stressful life events. These subclinical mood swings persisted after different psychological treatments (cognitive behavioural therapy, interpersonal psychotherapy and individual conversations). She was treated with lithium, 600mg a day, with a blood level of 0.56 mmol/l, after recent dosage lowering because of a developing renal insufficiency, a known side effect of lithium treatment. As the renal insufficiency continued after dosage decrease of lithium the patient switched to lamotrigine as mood stabilizer. This medication change happened after the presented events.

The patient participated in the study "Circadian timing systems in bipolar disorder" in the Netherlands from July 15<sup>th</sup> 2014 till July 22<sup>nd</sup> 2014 (2). The aim of the study was to identify variations in circadian rest-activity rhythms in-vivo. As part of the study she wore an actigraph (the Actiwatch 2, Philips Respironics, validated for sleep analysis), a small wristband that can measure activity and light and calculates sleep timing, duration and quality of sleep (3,4). During the study the patient had no insight in her own actigraphy data. During this period she experienced a serious life event, the loss of a friend by an accident.

The news of the loss came to her in the afternoon. The following night she immediately had a change in her sleep pattern, went to bed approximately 2 hours later than usual and slept around 1,5 hours less than usual.

## Treatment

The day after the life event, she contacted her psychiatrist to discuss the event and its emotional impact, because she knew from earlier experience that this might destabilize her. The psychiatrist prescribed 1mg lorazepam for two consecutive nights, knowing that sleep loss can provoke a mood episode. Using lorazepam restored a stable rhythm, with regular in bed and out of bed times and having a night of about 7,5 hours.



**Figure 1** Actogram of 8 days. Black bars represent activity per minute. The dark blue overlay indicates sleep time, while light blue overlay shows time in bed, without being asleep. The red blocks under the activity represent time awake. Red blocks during a sleep period indicate moments of being awake. Single asterisk marks means a life event, and double asterisks mark the intake of 1 mg lorazepam. On the third day there was a life event, coped with two nights of lorazepam use.

## Outcome and follow-up

After two nights of lorazepam use, she slept at her regular time, going to bed at 23:14 and waking up at 8:10, without the use of lorazepam. Although she was sad, her mood remained euthymic afterwards.

See figure 1 for a visualization of the rest-activity rhythm in an actogram.

## Discussion

A major goal of bipolar disorder treatment is the prevention of manic or depressive episodes by early signalling and treatment (5). In this patient, an episode was probably prevented by adequate signalling of an increased risk and the use of a benzodiazepine. Two factors were important to achieve this, the insight of the patient into her disease and the adequate use of medication to maintain a regular sleeping pattern. Although there were no formal psychotherapeutic interventions from the psychiatrist, getting a brief supportive reaction from her psychiatrist could have been helpful as well. A strong, direct effect on sleep with the same strength as one might expect from lorazepam is unlikely.

As part of the study, sleep and activity were also measured by an actiwatch during this period. Apart from recognizing the potential risk of this emotional event herself, the objective measure of sleep could also have been helpful to alert the patient. A monitoring system could inform both patient and treating health personnel. For many years, the use of early alarm-systems, such as a signalling plan, has been advocated and tested, but modern technology ('wearable technology') now makes objective measurements very accessible to patients and practitioners(6,7).

It is clear that there is an interplay between sleep and the onset of mood episodes in bipolar disorder. The onset of mania is often preceded by changes in sleep patterns, and the antidepressant effect of sleep deprivation on relieving depression suggests a similar mechanism (8). With this in mind, continuous sleep measurement in patients with bipolar disorder could help to prevent full-blown episodes by early signalling of changes in these patterns. Future studies are needed to see if this would outperform patients' own early recognition of an upcoming mood episode and be helpful to prevent new episodes. Current commercially available actigraphs may show the result of sleep-wake measurement on a person's smartphone, but lack the clinical validity needed to apply them to patients (9). Further research is therefore needed, both in the form of longitudinal studies to determine what early changes in physiological patterns precede new episodes, and in the form of randomized controlled trials examining the benefit of feedback of such changes to patient and clinician in order to intervene early.

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