STUDY OF THE INFLUENCE OF MONTHLY CIRCADIAN BIOLOGICAL RHYTHMS ON THE TOTAL MORTALITY

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The hypothesis according to which human life since birth passes in conformity with three separate cycles (emotional, physical, and intellectual) was created by H. Swoboda (1904) and Flies (1906) (cited after 1). However, only recently an extensive research was performed to substantiate it and to find its practical use. It was established that the number of car and plane crashes increased considerably in critical days of circadian cycles (6, 7). The analysis of 151 myocardial infarction cases showed that its incidence in the negative phase of one of patient’s cycles was higher than that in the positive one (2). That is why this hypothesis was used in some countries to caution the risk contingents in critical days and in the negative phase of circadian biological rhythms (CBR). However, other authors are distrustful of these data and consider them unconvincing to support this hypothesis (4, 5).

Having in mind the contradictory literature data about the importance of CBR we decided to study the relationship between the single phases of CBR (physical, emotional, and intellectual) and the total mortality with a view to improve the preventive work with chronically ill individuals.

Material and methods

CBR were calculated according to 396 deceased persons’ birth dates. Their distribution was analyzed in relation to the cycle phase, critical days, coupling of single days of the cycle and of the three cycles put together. The influence of CBR on the total mortality was evaluated by means of the alternative analysis and the coefficient of comparability was estimated (3).

Results and discussion

The distribution of the lethal cases according to single days and phase of CBR was rather irregular. On the day coinciding with the transition from positive to negative phase called “critical” day, a mortality increase was expected. However, the number of lethal cases in a “critical” day of physical cycle was even under the mean cycle level (fig. 1). The relative part of cases in positive phase of this cycle when human functional state should be optimal according to this hypothesis was greater as compared with that in the negative one. Most lethal cases were established on the 8th day of physical cycle, i.e. in the positive phase but not on the “critical” day or another day of the negative phase.

The lethal cases during the 28-days emotional cycle were distributed irregularly, too. However, as distinct from the other two cycles, there were more lethal cases on the “critical” day of the deceased persons than in the rest period (fig. 2).
The relative part of these cases in the positive phase was smaller than the theoretically calculated incidence but these differences were statistically insignificant \((p>0.05)\). The distribution of the lethal cases in single days of intellectual cycle was irregular, too. The number of deceased patients on the “critical” day of this cycle was under the mean level, similarly to that of the physical one (fig. 3). It was evident that the increase of the number of the lethal cases over the mean value was observed in both positive and negative phases of the cycle.

The differences between the theoretically calculated incidence and the factual distribution of deceased persons in different phases of CBR were statistically unreliable which was probably due to the absence of a defined dependence of the functional state of the patients on the days and rhythm phase.

Deceased patients' distribution depending on characteristic combinations of days and phases of the three cycles is shown on table 1. It can be seen that in coincidence of three “critical” days of CBR no lethal cases have been registered.

In coincidence of three positive and three negative phases the relative part of the cases close to theoretically calculated values. In combination of days of positive and negative phases of the three cycles there is the greatest relative part of the cases which is confirmed to be statistically significant according to the data of the alternative analysis \((p <0.05)\).

The coefficient of comparability after G. Lazarov (3) shows that most lethal cases are established in different combinations of positive and negative phases of the cycle but not on “critical” days.

Our data demonstrate that there is no definite relationship between the relative part of the lethal cases and the different phases of CBR as well as between the lethal cases and the various combinations of characteristic days of the three cycles. The number of the lethal cases is over the mean level in “critical” days of
the emotional cycle only. It is a significant fact that there is no case in days when “critical” days of the three cycles coincide. When two “critical” days coincide the relative part of the lethal cases is smaller than the theoretically calculated value. It allows us to challenge the principle of the hypothesis of CBR concerning

their independent course from birth date to death of the individual and their definite influence on his functional state. All the more that in this hypothesis the biological origination in man is absolutelized and the endogenic biological rhythms are overestimated. However, it is well known that higher forms of matter movement involve the lower ones thus forming a complex community with its own regularities of functioning. Man possesses a complicated biosocial nature that changes adequately to external conditions.

Therefore, according to these considerations the hypothesis discussed should not be absolutelized and further investigations on this problem are required.

The following conclusions can be drawn on the basis of our study:

![Fig. 3. Distribution of lethal cases during intellectual cycle](image)

Table 1

<table>
<thead>
<tr>
<th>Day groups</th>
<th>% of total number in the year</th>
<th>Relative part of lethal cases</th>
<th>Comparison coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Coincidence of the critical days of three cycles</td>
<td>0,27</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2. Coincidence of the critical days of two cycles and the rest days of the third cycle</td>
<td>1,64</td>
<td>0,757</td>
<td>0,461</td>
</tr>
<tr>
<td>3. Combination of one critical day and the rest days in the cycles</td>
<td>17,54</td>
<td>19,192</td>
<td>1,094</td>
</tr>
<tr>
<td>4. Coincidence of the days of the negative phase of three cycles</td>
<td>8,77</td>
<td>10,858</td>
<td>1,238</td>
</tr>
<tr>
<td>5. Coincidence of the days of the positive phase of three cycles</td>
<td>8,77</td>
<td>9,596</td>
<td>1,094</td>
</tr>
<tr>
<td>6. Combination of days of the positive and negative phase of three cycles</td>
<td>32,60</td>
<td>59,596</td>
<td>7,76</td>
</tr>
</tbody>
</table>
1. There is no relationship between death setting in and CBR phases.
2. The distribution of the lethal cases does not depend on the "critical" days of monthly CBR.

REFERENCES


ИЗУЧЕНИЕ ВЛИЯНИЯ МЕСЯЧНЫХ БИОЛОГИЧЕСКИХ РИТМОВ НА ОБЩУЮ СМЕРТНОСТЬ

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РЕЗЮМЕ

Изучено распределение 396 смертельных случаев в зависимости от фазы физического и интеллектуального циклов умерших. Полученные результаты не подтверждают гипотезу о влиянии эндогенных биоритмов, начинающихся с момента рождения и неизменно протекающих в течение всей жизни человека. Между наступлением смерти и фазами отдельных биологических ритмов зависимости не было установлено. Распределение смертельных случаев не зависит от критических дней месячных биоколебаний.