Myocardial infarction rates are higher on weekends than on weekdays in middle aged French men

Several studies have shown that the incidence of myocardial infarction (MI) does not follow a continuous pattern throughout the week, and that there is an increase in mortality on Mondays and possibly a decrease on Thursdays. The reasons for such a pattern are not well understood, and several hypothesis have been made, namely a change from leisurely weekend activities to stressful work among working persons or a Monday increase in the incidence of life threatening ventricular arrhythmias. To our knowledge, no assessment of the weekly distribution of MI mortality has been performed in France. Thus, we used the data from the French national mortality statistics and from the French MONICA (monitoring trends and determinants in coronary disease) registers to assess the weekly pattern of incidence and mortality from MI.

Mortality data for coronary heart disease (ICD codes 410–414) was obtained from the French National Mortality Statistics (IN- SERM SC8, Le Vésinet, France) for years 1987 to 1997. The data were provided as number of deaths according to sex, year, 10 year age group, and day of the week. The corresponding weekday distribution days of MI mortality was then compared by Wilcoxon test. Data from the MONICA registers are inherent in national mortality statistics. Although they are complete and edged regarding data from national mortality statistics, they do not provide information regarding survivors of MI. Nevertheless, those misclassifications, which are inherent in national mortality statistics, would tend to reduce differences between days of the week and thus the real differences might be even greater.

The effect of age on the weekly distribution of MI mortality has seldom been studied. The higher frequency of deaths on weekends found in this study is in agreement with some studies, but not with others. Although no clear-cut explanation can be provided, it is possible that young adults engage in strenuous activity during weekends, thus increasing the risk of MI. This hypothesis is supported by the increase in the first time MI cases on weekends than on weekdays observed using MONICA data. Further, a possible explanation for the higher mortality rates on Mondays could be caused by a reporting bias, old subjects with a coronary episode on Sundays delaying their hospital admission to Mondays, thus increasing the number of events for that day. Nevertheless, since the MONICA data includes the precise timing of the MI event, such a hypothesis is unlikely.

We conclude that, for French young men, MI incidence and mortality is higher on weekends than on weekdays, whereas for older subjects a trend towards higher MI mortality on Mondays is found. The reasons for such a discrepancy await further investigation

<table>
<thead>
<tr>
<th>Age group</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-34</td>
<td>3.1</td>
<td>2.3</td>
<td>2.9</td>
<td>2.7</td>
<td>2.6</td>
<td>2.3</td>
<td>3.5</td>
<td>*</td>
</tr>
<tr>
<td>35-44</td>
<td>23.1</td>
<td>20.6</td>
<td>22.4</td>
<td>21.0</td>
<td>22.4</td>
<td>24.5</td>
<td>25.7</td>
<td>***</td>
</tr>
<tr>
<td>45-54</td>
<td>71.8</td>
<td>63.6</td>
<td>63.1</td>
<td>66.3</td>
<td>61.2</td>
<td>71.3</td>
<td>75.3</td>
<td></td>
</tr>
<tr>
<td>55-64</td>
<td>196.9</td>
<td>188.0</td>
<td>183.5</td>
<td>186.5</td>
<td>187.5</td>
<td>190.7</td>
<td>194.2</td>
<td>NS</td>
</tr>
<tr>
<td>65-74</td>
<td>528.8</td>
<td>513.4</td>
<td>509.9</td>
<td>511.8</td>
<td>508.5</td>
<td>498.2</td>
<td>492.2</td>
<td></td>
</tr>
<tr>
<td>75-84</td>
<td>1297.9</td>
<td>1269.8</td>
<td>1252.5</td>
<td>1275.6</td>
<td>1271.9</td>
<td>1256.4</td>
<td>1247.3</td>
<td>NS</td>
</tr>
</tbody>
</table>

Results are expressed as average rates for 1000000 inhabitants. Analysis by Wilcoxon test separately for each age group: *p < 0.05; ***p < 0.001; NS, not significant.

Comparison between weekends and workdays showed incident cases to be more frequent on weekends (χ² = 7.75, p < 0.01). For women, the number of events was too low to draw any valid conclusion.

Several limitations should be acknowledged regarding data from national mortality statistics. Although they are complete and exact regarding data from national mortality statistics, they do not provide information about survivors of MI. Nevertheless, misclassifications, which are inherent in national mortality statistics, would tend to reduce differences between days of the week and thus the real differences might be even greater.

Myocardial infarction is a cause of sudden death. Average mortality rates for coronary heart disease for period 1987 to 1997, by day of the week, in men

Duchenne's progressive muscular dystrophy

Myocardial integrated ultrasound backscatter in patients with Duchenne's progressive muscular dystrophy

Duchenne's progressive muscular dystrophy (DMD) is a genetic muscular disorder that causes degeneration and atrophy of skeletal and cardiac muscle. Histologic changes in the heart of patients with DMD include fibrosis, degeneration, and fatty infiltration. Fibrosis begins in the outer half of the left ventricular posterior wall, which is a relatively specific finding for DMD.

Ultrasonography can be used to characterize changes in the myocardium at the cellular level. Unprocessed radiofrequency signals, redirected back to the transducer, provide quantitative information about intramural architecture in terms of ultrasonic integrated backscatter (IBS). Two of the IBS parameters can be measured: the magnitude of cyclic variation (CV) and IBS intensity. Changes in the CV are caused by variations in myocardial collagen, water content, myofibril orientation, and myocardial contractility. Myocardial IBS intensity is correlated with the collagen content or the degree of the fibrosis in the myocardium. In this study, we investigated whether myocardial ultrasound IBS is useful for the early detection of myocardial involvement in patients with DMD.

Twenty five patients with DMD were enrolled in this study. The mean patient age was 17.6 (2.7) years. Fourteen healthy individuals were included as an age matched control group. A previously described protocol was used for the measurement of myocardial IBS. In the parasternal long axis view of the left ventricle, an elliptical shaped region of interest was positioned in the inner and outer halves of the left ventricular posterior wall, respectively. The CV of the inner and outer halves of the left ventricular posterior wall were calculated as the difference between the end diastolic (peak) and end systolic (nadir) IBS values (CVin and CVout, respectively). The difference in the CV (dCV) was calculated by subtracting the CVout from the CVin. Mean values for the IBS intensity in the inner and outer halves of the left ventricular myocardium were automatically displayed (IBSin and IBSout, respectively).

The corrected mean myocardial IBS values for the inner and outer halves of the left ventricular posterior wall (cIBSin and cIBSout, respectively) were measured by subtracting...
the mean IBS value for the left ventricular cavity near the left ventricular posterior wall from the IBSin and IBSout. The difference in the IBS intensity (dif IBS) was also calculated by subtracting the IBSin from the IBSout.

Comparison of the IBS parameters between patients with DMD and the control group is summarised in Table 1. In the control group, CVin was significantly higher than CVout (9.6 (2.4) dB vs 8.4 (1.9) dB, p < 0.01). The intensity of IBSin was significantly lower than that of IBSout (11.4 (3.5) dB vs 14.3 (4.3) dB, p < 0.001).

Both CVin and CVout were significantly lower in patients with DMD than in the control group (6.1 (2.1) dB vs 9.6 (2.4) dB for CVin, 4.5 (2.1) dB vs 8.4 (1.9) dB for CVout, p < 0.001 for both). The intensities of IBSin and IBSout were significantly greater in patients with DMD than in the control group (15.3 (4.6) dB vs 11.4 (3.5) dB for IBSin, p < 0.001; 25.2 (6.3) dB vs 14.3 (4.3) dB for IBSout, p < 0.0001). The dif IBS was also significantly greater in patients with DMD than in the control group (9.9 (5.0) dB vs 2.9 (1.8) dB, p < 0.0001).

When the normal range for the shortening fraction of the left ventricle was defined as the mean ± 2 SD, nine patients with DMD had a normal shortening fraction (28%). Both CVin and CVout were significantly lower in patients with DMD with normal shortening fraction than in the control group (7.6 (1.0) dB vs 9.6 (2.4) dB for CVin, p < 0.05; 5.4 (1.4) dB vs 8.4 (1.9) dB for CVout, p < 0.001). There was no significant difference in IBSin intensity between the two groups. In contrast, IBSout was significantly higher in patients with DMD than in the control group (22.8 (7.3) dB vs 14.3 (4.2) dB, p < 0.005). The dif IBS was also significantly greater in patients with DMD than in the control group (8.9 (5.3) dB vs 2.9 (1.8) dB, p < 0.001). These data indicate that IBS intensity was increased and the magnitude of CV was decreased in the outer half of the left ventricular posterior wall in patients with DMD, even in the setting of normal global cardiac function (shortening fraction). When the mean (2 SD) in the control group is considered, the upper limit of normal for dif IBS, 6.5 dB > dif IBS is abnormally high. Among the nine DMD patients with a normal left ventricular shortening fraction, six patients had an increase in dif IBS.

Fibrotic changes do not always occur homogeneously throughout the ventricular wall in myocardial diseases. In the setting of idiopathic dilated cardiomyopathy, the endocardial halft of the myocardium generally has more severe fibrosis. In contrast, cardiomyopathy caused by DMD is unique in that fibrosis begins in the outer half of the myoccardium. They concluded that left ventricular myocardial IBS intensity provides useful information for predicting the degree of myocardial fibrosis and the response to β-blocker treatment in patients with dilated cardiomyopathy. We believe that measurements of IBS variables, especially the dif IBS, are useful for the early detection of the myocardial involvement in patients with DMD, even if conventional echocardiographic findings (such as shortening fraction) show normal values. Early detection of myocardial changes in patients with DMD might be important, because earlier treatment might be more effective in preventing the development of myocardial fibrosis.
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