Letters

Scintimetric assessment of synovitis activity

Sir, The recent article on scintimetric assessment of synovitis activity by Dr Olsen and his associates\(^1\) presents a unique and extremely valuable data set, from which the relative sensitivity of a number of standard outcome measures, including scintigraphy, can be assessed, because overall treatment changes of adequate magnitude occurred. Analysis of the data was difficult because there were three separate treatment groups, and at least 12 separate outcome measures. Furthermore, each of these outcome measures had different units, with clinical improvement reflected in an increase with some outcome measures (such as grip strength) or a decrease with other measures.

It is clearly desirable to extract from this complex mass of data all the information of interest. Fortunately, the needed statistical strategies are readily available and derive from standard analysis of variance techniques. We are interested only in the treatment change between zero and eight months. Using the statisticians' device of assuming the null hypothesis, we proceed as if there is no difference in the treatment effect produced by levamisole, penicillamine, and azathioprine, and, similarly, no difference in the sensitivity of the various outcome measures. If we express all these changes on a common scale this assumption allows us to pool the overall measured changes for each outcome measure, determining the mean overall change and its standard deviation.

Standardisation of the data by dividing a measured treatment effect by its standard deviation permits expression of the results in a common scale of standard deviation units. This division causes the units unique to each measure to vanish. For the isotopic assessment the mean change in activity index unit is the numerator, the standard deviation of this change in the denominator is the same units, and after division the units of change cancel out. This calculation can be repeated for each separate outcome measure, adjusting the sign of the change so that improvement will always be reflected in a constant direction.\(^2\)

Now all the treatment changes are expressed in the same (standard deviation) units, and all the power of analysis of variance and related statistical analytical techniques may be applied to all the data. No information is lost, and much statistical power is gained.

In the study under discussion it would be extremely useful to know how the isotope index performed in comparison with the older standard outcome measures, and the analysis of variance techniques will give this information quite easily. Factor analysis or other complex techniques can be used to see whether there was more than one factor contributing to measured clinical improvement—for example, whether some patients had improvement in pain not closely correlated with improvement in sedimentation rate or isotope activity.

The authors provided the standard deviation of the treatment change for the isotope activity index in Table 3, but did not provide the comparable standard deviations for the other outcome measures in Table 4. The most useful standard deviations would be those that arise from pooling the levamisole, penicillamine, and azathioprine data, assuming the null hypothesis. These can be estimated at the risk of minor calculation errors from the individual standard deviations. The overall improvement in isotope activity index was 0-61 units, with a standard deviation of about 0-73. The t value for the treatment effect produced by levamisole is 0-98, by penicillamine 3-46, by azathioprine 2-88, and the overall pooled t value, representing the sensitivity of the isotope technique in measuring the overall treatment improvement, showed a t value of 4-22. Note the gain in statistical efficiency provided by pooling the data.

One would like to repeat this calculation using all the other outcome measures, and thereby compare the sensitivity of the isotope technique with the other methods. We can do this if the treatment standard deviations are provided, and obtain more interesting analyses of the differences among drugs and outcome measures if the total data set is provided.

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References


Sir, We thank Dr Smythe for his most relevant comments on our recent article on scintimetric assessment of synovitis activity.\(^1\) We agree with him that a gain in the statistical efficiency can be provided by pooling the data of the three treatment groups, assuming that there is no difference in the treatment effect of a given variable produced by levamisole, penicillamine, and azathioprine. When this was done, the isotope 'activity' index of Table 3 and some relevant variables of Table 4 were further analysed for the total group of 36 patients. For the variables selected Table 1 in this letter shows the average change (d) from month 0 to month 8 and its standard deviation (SD). The signs of the d values are chosen such that a negative value reflects an improvement.

It can be seen from the table that the numerical t value of the isotope activity index is higher than the t values found for grip strength and for tender and swollen proximal interphalangeal joints, but lower than the t values found for erythrocyte sedimentation rate, pain, and...
Table 1  Average change of variables between month 0 and month 8

<table>
<thead>
<tr>
<th>Variable</th>
<th>d</th>
<th>SD</th>
<th>t Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isotope activity index of eight PIP* joints</td>
<td>-0.61</td>
<td>0.90</td>
<td>-4.07</td>
</tr>
<tr>
<td>Tender and swollen PIP joints (No)</td>
<td>-1.83</td>
<td>3.06</td>
<td>-3.53</td>
</tr>
<tr>
<td>Grip strength (right + left hand) (mmHg)</td>
<td>-10.0</td>
<td>30.2</td>
<td>-1.98</td>
</tr>
<tr>
<td>Swollen joints of the body (No)</td>
<td>-4.98</td>
<td>4.98</td>
<td>-5.95</td>
</tr>
<tr>
<td>Pain (visual analogue scale)</td>
<td>-2.61</td>
<td>3.18</td>
<td>-4.92</td>
</tr>
<tr>
<td>ESR* (mm/h)</td>
<td>-21.8</td>
<td>28.1</td>
<td>-4.66</td>
</tr>
</tbody>
</table>

*PIP=proximal interphalangeal; ESR=erythrocyte sedimentation rate.

Injections and physiotherapy for the painful stiff shoulder

Sir, Dacre et al are to be congratulated on their paper. They have confirmed that neither injections nor physiotherapy have any effect on the natural history of the painful stiff shoulder, but that injections are a great deal cheaper. I suspect that if medical audit were to be applied to many of the other conditions commonly treated by rheumatologists or physiotherapists it would produce similar findings. But why, when ‘treatment’ has clearly been shown to have no effect, continue to use it? I have found that most patients with adhesive capsulitis are content to await spontaneous improvement once it is explained to them that they have a benign self limiting condition from which they will eventually make a good recovery, even if this may take up to 18 months. I do, of course, inject patients with acute subacromial bursitis due to a ruptured calcific deposit, in which the results can be quite dramatic. I also use injections, but with less conviction, for the various localised lesions such as bicipital tendinitis, which were excluded from the study.

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References