Blood sample transportation and the erythrocyte sedimentation rate

Sir,

Determination of the erythrocyte sedimentation rate (ESR) is a frequently used blood test,[1] which must be accurately performed, in accordance with international standards.[2] For this reason the reliability of the blood test is an important aspect of its diagnostic value in general practice. Following the example of Norwegian investigators,[3] we recently studied this aspect in the Netherlands.[4] In both studies, centrally prepared blood samples were distributed, and the ESR was determined for each sample in the participating general practice centres. In our study we found a clinically relevant inter- and intra-practice variability. Despite the more standardized conditions in the Norwegian study, it also showed an important interpractice variability. The blood samples were transported by car and this might have influenced the results of the studies. One group of Scandinavian investigators studied the stability of some serum and blood constituents during postal transport[5] and found no significant influence. However, ESR was not included in the study. We found no further studies on this subject, and therefore decided to investigate it ourselves. The study fits in well with attempts at developing a good collaboration between general practitioners and clinical chemists.[6]

Five general practice centres and the local hospital laboratory participated in the study. Blood samples of 10–30 ml were obtained from patients admitted to the local hospital, as well as from blood donors and laboratory personnel, after verbal informed consent. The patients underwent venepuncture for this purpose. The samples were collected by laboratory personnel in the usual way, and the blood was collected in ethylenedia minetetraacetic acid (EDTA) tubes, to prevent clotting. After storage for less than two hours in the laboratory refrigerator, the samples were divided into pairs and placed in small, disposable plastic tubes. One of each pair stayed in the laboratory and the remaining tubes were placed in the boot of a car, in the dark, in a fixed position. The car and its driver did not change during the study. All the general practice centres were visited within a time span of about 30 to 60 minutes. The car then returned to the laboratory.

For each pair of samples the ESR was determined simultaneously in the laboratory. The test was carried out by the normal laboratory staff, following the Westergren method, taking the results in mm after one hour. From the beginning of April to the beginning of May 1988 17 blood sample pairs were collected and analysed in this way. In analysing the data, graphs were constructed in accordance with the recommendations for showing variables without an independent 'gold standard'.[7]

Figure 1 shows to what extent, and in which direction the ESR values changed during the transport for the 17 blood sample pairs. A higher ESR value after transportation is regarded as a positive change, a lower ESR as a negative one. The product moment correlation coefficient R was calculated as 0.98 ($P<0.001$) and the regression coefficient as 1.07 (95% confidence interval 0.96–1.19, intercept −3.0).

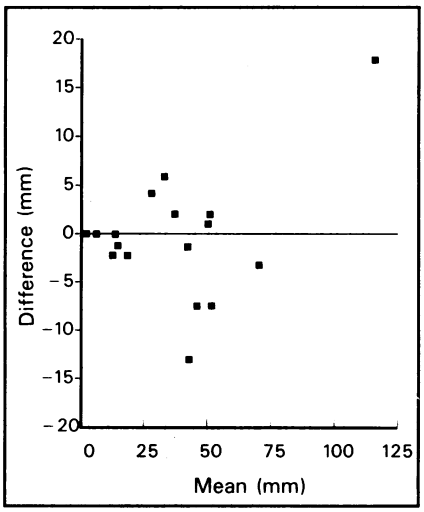

Figure 1. *Differences between ESR determinations for each blood sample pair, before and after transportation (vertical axis), in relation to the mean of the determinations (horizontal axis).*

While in three cases no differences could be established between the ESR values before and after the transport by car, there were two cases in which the differences amounted to 13 and 18 mm. As would be expected, the blood sample pairs which showed no differences were those with a low mean ESR value (one to 15), whereas the highest differences were found for two pairs with a high mean ESR value (44 and 121 respectively). To some extent, then, the differences increased with increasing mean ESR values, but there was no blood sample pair where this became clinically relevant. Moreover, the differences did not point systematically in one direction; in eight cases the ESR value was lower after the transport, in six it was higher. This result is reflected in the extremely high correlation and regression coefficients. Therefore it can be concluded that blood sample transport does not influence the ESR values, and that other factors must be responsible for the variability. There may have been inter-observer variability within the laboratory but the laboratory personnel, knowing that they were involved in a scientific experiment would probably have performed the ESR determinations more accurately than usual.[8]

Comparing these results with the clinically important inter- and intra-practice variability found previously, it can be concluded that blood sample transport by car has no substantial effect on this variability, which therefore needs further investigation in order to discover its origin.

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Surveillance of iron deficiency, anaemia and hypercholesterolaemia in rural pre-school children

Sir,

With reference to James and colleagues' study of iron deficiency in inner city pre-school children[1] our practice reviewed its data on the prevalence of iron deficiency, anaemia and cholesterol level in a selec-