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Comparison of assays for measuring plasma paracetamol. Possibility of calibration error needs evaluation

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Abstract
Egleston et al report a significant difference in plasma paracetamol concentrations assayed with the AcetaSite bench assay and a standard laboratory assay. Rapid and accurate determinations of plasma paracetamol concentrations are crucial in the expeditious and appropriate administration of antidotal treatment, which prevents severe liver damage if given sufficiently early in the course of poisoning.

Keywords
assays, measuring, plasma, paracetamol, comparison, possibility, evaluation, calibration, error, needs

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Egleston et al compare the accuracy of a standard laboratory paracetamol assay with that of a rapid bedside test (AcetaSite). Egleston et al used a statistical method developed by Bland and Altman to assess agreement between the two methods of clinical measurements. The limits of agreement were calculated to be 0.16 and 5.04. This translates into poor agreement between the two assays, with 95% of values obtained with AcetaSite being between 0.16 and 5.04 times the values obtained with the laboratory assay. The authors concluded that the AcetaSite test should not replace the established laboratory method.

We have also evaluated the AcetaSite test, recruiting 58 patients to our study. Four sets of results were excluded from the analysis because the Stat-Site meter recorded a maximum of >250 mg/l, (by contrast, the laboratory gave a specific reading). At the lower end of the range (<20 mg/l), 15 sets were excluded for similar reasons. On the remaining 39 samples, using Bland and Altman's test, we found our limits of agreement to be 0.79 and 1.1. Our results therefore suggest good agreement between the two assays. The performance (r = 0.97) matches closely that shown for the dataset for AcetaSite compared with standard reagents (r = 0.97 and r = 0.983).

When evaluating a new technology, such a contrast between studies merits careful analysis. Egleston et al make some suggestions for the reason for the poor agreement between the two assays in their study. Although there may be other reasons, the most likely is training and education. Our study was carried out by the six middle grade doctors in the accident and emergency department and a small number of senior house officers after a one to one training programme. An algorithm card was used from the outset (modified after piloting). Particular attention should be paid to this much overlooked aspect of study design if accurate results are to be attained and valid conclusions drawn.

We believe that the AcetaSite test does provide a rapid and accurate bedside assay of paracetamol concentrations. Further analysis in our study, however, indicates that