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LETTER TO THE EDITOR

A SOURCE OF ERROR IN BLOOD ALCOHOL ANALYSIS

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The contamination of blood samples obtained for alcohol analysis in a number of drink-driving cases with extraneous alcohol (not specified) derived from the swab used to clean the skin prior to venepuncture, has recently attracted the attention of the British National Press (*The Times*, 18 March, 1989). The spuriously high readings for the blood alcohol concentration (BAC) resulting from this possible contamination have necessitated the re-examination of a number of cases where drivers were convicted of driving with excess alcohol in their blood.

When the precise concentration of ethanol in the blood has to be measured, it is clearly essential to avoid the possibility of contamination with ethanol or any other alcohol which may interfere in the assay procedure. This problem has been recognized for some time in the U.S.A., and has resulted in a number of cases of litigation (Dubowsky and Essary, 1983). The increasing use of factory–sterilized vacuum tube and needle assemblies (such as Vacutainer®) should avoid the problem, but wet skin cleansers (for example, Sterets®) are still widely used in clinical practice, and these contain 70% v/v isopropyl alcohol.

The generally accepted method for assaying ethanol in body fluids for evidential or other purposes is gas liquid chromatography (GLC) using flame ionization detection (FID) and head space or direct liquid analysis (Cooper, 1971; Solon *et al.*, 1972; Hammond, 1975), but the assay cannot distinguish intrinsic from extrinsic ethanol and, depending upon the assay conditions, other alcohols can affect the measurement of ethanol. In this laboratory we have found that the isopropyl alcohol present in Sterets can interfere with the assay of ethanol in blood obtained by venepuncture. Using a Pye Unicam P4500 GLC in the FID mode and the conditions described by Hammond (1975), the relevant retention times were: isopropanol, 1.32 min; ethanol, 1.52 min; and *n*-propanol (the internal standard), 2.23 min. When the isopropanol was present at concentrations greater than three times that of ethanol, the ethanol and isopropanol peaks on the chromatograph could not be resolved, even using a computing integrator. Consequently, a spuriously high ethanol reading was obtained in a number of samples which were being assayed as part of a bioavailability study of acute ethanol in healthy volunteers. The frequency of sampling from individual subjects, and the simultaneous confirmatory breath analyses using a Lion Intoximeter, revealed the discrepant results.

Only a minute contamination from a 70% solution of isopropanol is necessary to interfere with the assay of ethanol at the much lower concentrations present in the blood; the critical range from an evidential point of view being 0.07–0.09% (70–90 mg/100 ml). It is therefore important, in any study involving the collection of blood for subsequent alcohol analysis, to be aware that it is not sufficient merely to avoid ethanol as a skin cleanser, but that other alcohols may also interfere with the measurement of the BAC.

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