A Response to “Serum-Ethanol Determination: Comparison of Lactate and Lactate Dehydrogenase Interference in Three Enzymatic Assays”

To the Editor:

We agree with the authors of a recent article (1) in their belief that the best method for ethanol analysis is gas chromatography. However, we have some comments on the impact of this article on legal proceedings in cases that involve driving under the influence of alcohol. The authors’ conclusion was based on postmortem samples and in vitro studies. The only clinical cases described in the article were those related to two patients with chronic liver failure and endstage liver disease; lactate dehydrogenase (LDH) and lactate concentrations were 2379 and 8015 IU/L and 15.4 and 12.3 mM, respectively (normal, less than 170 IU/L and 0.7–1.8 mM).

The authors’ conclusion is misleading to law enforcement agencies, attorneys, and even some pathologists because the average individual found driving under the influence or even an intoxicated person with traumatic injury does not match the pathology or the LDH and lactate concentrations described in this article.

We would like to caution the forensic toxicology community that such a conclusion does not apply to situations in which an injured driver has received lactated Ringer’s solution intravenously prior to having his blood taken for a blood alcohol test. Their in vitro study with nonphysiologic concentrations of lactate and LDH did not apply to a living person. Their approach was not scientifically sound. Table I in the article did not show any case where LDH and lactate concentrations matched the 682 IU/L and 14 mM listed in the article.

We caution forensic toxicologists that the concentrations in this article did not apply to living subjects who are able to drive a motor vehicle and might apply only to extremely rare clinical situations and postmortem cases.

As an aside, we disagree with the authors’ comments on gas chromatography. We have never considered gas chromatography to be costly or time consuming.

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References


The Authors Reply:

As reported in the introduction of our paper (1), we encountered two pediatric patients where apparent false-positive ethanol concentrations were obtained by the Syva EMIT alcohol assay. This was in addition to two adult hospital patients (as shown in Table I) where apparent false-positive ethanol concentrations were noticed by this method. As stated in our discussion, our study was in agreement with what was previously reported in the literature (2,3).

Our study showed the effect that abnormally high concentrations of lactate dehydrogenase (LDH) and lactate could have on one specific analytical method, which was then in use for the determination of serum/plasma ethanol concentrations. We wish to draw attention to the paper by Sloop et al. (4). This paper showed that high lactate and LDH concentrations can also give false-positive drugs of abuse results in urine specimens.
The conclusions drawn in our paper applied to the cases in the report. The mechanism of interference in the assay was investigated in the laboratory to obtain an understanding of the biochemical basis for the falsely elevated ethanol concentration. Our studies effectively demonstrated the nature of the interfering biochemical mechanism and defined the concentrations at which the effect was observed; we suggested possible approaches to minimize or eliminate the interference. It was shown that not all enzymatic methods in use at that time were affected by the presence of these biochemicals. The effect of Ringer's lactate was not investigated.

It is paradoxical that Dr. Winek and Dr. Wahba, while questioning the scientific soundness of our study, do not support the statements made in their letter with any scientific data.

Cost accounting information in our laboratory (not included in the original communication) shows the gas chromatographic method to be more expensive; also, it does require more time to perform than the automated enzymatic assay for ethanol determination.

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References