More on Reporting Medical Errors

To the Editor:

Crone et al. (1) present a case study with much of their discussion about aspects of reporting suspected medical errors, particularly when there is a possibility of misconduct or violation of rules. Marx (2), who described a useful taxonomy of medical errors, recommends that no blame be assigned a useful taxonomy of medical errors, particularly when there is a possibility of misconduct or violations.

In the clinical laboratory case discussion of Crone et al. (1), the fact that the risk management team decided later that no error had occurred would not excuse a person from reporting an event thought to be an error. As described in the case report, it was up to the (risk management) team to classify the severity of reported events, including the classification that no error occurred.

In discussing error reduction, Cone et al. focus on root cause analysis of sentinel events, omitting discussion of FMEA (Failure Mode Effects Analysis), which is designed to decrease the risk of potential errors. A successful FMEA will lead to fewer (and possibly no) sentinel events. FRACAS (Failure Review and Corrective Action System) is a tool to decrease the recurrence of observed events. In contrast to other industries, hospitals typically subject only sentinel events to root cause analysis. In a FRACAS, all errors are counted, and corrective actions are taken on those with the highest severity and frequency of occurrence. The process has a quantitative goal of reducing the combined error rate to an acceptable number, and the FRACAS process measures the combined error rate on a regular basis.

References


Evaluation of the Efficacy of Chloroform Extraction of Amniotic Fluid Bilirubin

To the Editor:

The presence of increased concentrations of bilirubin in amniotic fluid is an indicator of fetal hemolysis (1, 2). In the ΔA450 (or ΔOD450) method, the absorbance at 450 nm is used as a surrogate for concentration of amniotic bilirubin. Chloroform extraction of bilirubin from amniotic fluid samples can be used to eliminate spectral interference from hemoglobin, which absorbs at a maximum at 410 nm. However, clinical interpretation of the ΔA450 often relies on studies in which chloroform extraction was not used (3, 4)

We studied the extraction of bilirubin from 37 amniotic fluid samples submitted for bilirubin scanning. All studies were in accordance with the guidelines approved by the Institutional Review Board of the University of Utah. Frozen (−70 °C), light-protected samples were thawed and centrifuged at 900g for 5 min at 2–6 °C. Absorbanes of samples were scanned (Beckman DU-800) from 350 to 550 nm in 1-mL air-blank quartz cuvettes. The use of water or chloroform blanks increased ΔA450 < 0.01 in both native and chloroform-extracted samples (n = 4). The ΔA450 was determined as the difference between the absorbance at 450 nm and a logarithmic baseline between 365 and 550 nm, calculated as: log(A450) = m(450 nm) + b, where m = log(A550) − log(A365)/([550nm − 365nm]) and b = log(A365) − m(365 nm). This can be rearranged to yield the equation: ΔA450 = A450 - 10 [0.541 log(A365) + 0.459 log (A550)]

Chloroform was added (2 mL, HPLC grade, Fisher Scientific) to an equal volume of amniotic fluid in a closed 12-mL screw-top glass tube. Samples were shaken vigorously by hand for 1 min and centrifuged (at 2–6 °C) for 5 min at 900g. The ΔA450 was measured as the difference in absorbance between the bilirubin peak at 450 nm, and a baseline was established between the absorbance of wavelengths flanking the bilirubin peak (~370 nm and 525 nm) on a linear scale. We also calculated ΔA450 for the chloroform extract with a logarithmic baseline. Quality control specimens consisting of pooled amniotic fluid samples had ΔA450 means (SD) of 0.0360 (0.0030), and 0.1223 (0.0073). Finally, the proportion of bilirubin remaining in the clarified extracted aqueous layer was estimated in 24 consecutive samples as for native fluid.

For 36 of the 37 amniotic fluid samples examined, mean (SD) recovery of ΔA450 in the chloroform fraction was 88 (4)% as determined by regression analysis (Fig. 1). After ΔA410 nm correction in which 5% of the absorbance of the hemoglobin peak at 410 nm was subtracted from the ΔA450 mean (SD) recovery of ΔA450 increased to 93 (4)% (1). A mean (SD) of 12 (11)% of the ΔA450 in the native sample was observed in the aqueous phase after extraction in samples (n = 24) with an original ΔA450 of >0.02. The mean hemoglobin concentration in unextracted samples was 0.093 g/L (range 0–0.12 g/L).

The use of a calculated logarithmic baseline to determine ΔA450 in the chloroform extract increased the mean bilirubin recovery to ~89 (4)%.

Thus, although use of a logarithmic baseline is imperative for ΔA450 determination in native amniotic fluid samples (2), the use of a linear baseline vs a logarithmic baseline did not notably affect (1% change) measured ΔA450 in chloroform extract.

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