



Intravenous literature: Lima-Oliveira, G., Lippi, G., Salvagno, G.L., Montagnana, M., Gelati, M., Volanski, W., Boritza, K.C., Picheth, G. and Guidi, G.C. (2012) Effects of vigorous mixing of blood vacuum tubes on laboratory test results. *Clinical Biochemistry*. Nov 10. .

Abstract:

OBJECTIVE: To evaluate the effect of tubes mixing (gentle vs. vigorous) on diagnostic blood specimens collected in vacuum tube systems by venipuncture.

DESIGN AND METHODS: Blood was collected for routine coagulation, immunochemistry and hematological testing from one hundred volunteers into six vacuum tubes: two 3.6mL vacuum tubes containing 0.4mL of buffered sodium citrate (9NC) 0.109mol/L: 3.2W/V%; two 3.5mL vacuum tubes with clot activator and gel separator; and two 3.0mL vacuum tubes containing 5.9mg K(2)EDTA (Terumo Europe, Belgium). Immediately after the venipuncture all vacuum tubes (each of one additive type) were processed through two different procedures: i) Standard: blood specimens in K(2)EDTA- or sodium citrate-vacuum tubes were gently inverted five times whereas the specimens in tubes with clot activator and gel separator were gently inverted ten times, as recommended by the manufacturer; ii) Vigorous mix: all blood specimens were shaken up vigorously during 3-5seconds independently of the additive type inside the tubes. The significance of the differences between samples was assessed by Student's t-test or Wilcoxon ranked-pairs test after checking for normality. The level of statistical significance was set at $P < 0.05$.

RESULTS: No significant difference ($P < 0.05$) was detected between the procedures for all tested parameters. Surprisingly only a visual alteration was shown by the tubes mixed vigorously.

CONCLUSION: Our results drop out a paradigm suggesting that the incorrect primary blood tubes mixing promotes laboratory variability. We suggest that similar evaluation should be done using other brands of vacuum tubes by each laboratory manager.

