

PP 54

The effect of bilirubin on estimation of creatinine in buffered saline solution: A comparison between Jaffe reaction and creatinase enzymatic method

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Background: Jaffe reaction is used world-wide in serum creatinine determination, but, Jaffe reaction is affected negatively by bilirubin. Therefore, it is important to compare Jaffe reaction and creatinase method as it has been reported that creatinase method is more accurate though it is of relatively high cost.

Objective: To estimate and compare the creatinine in buffered saline solution with different bilirubin concentrations using Jaffe reaction and creatinase enzymatic method.

Methods: Ten different creatinine concentrations and eleven different bilirubin concentrations were prepared by using standard solutions of creatinine in buffered saline solution and bilirubin with the concentrations of 20 mg/dL and 60 mg/dL, respectively. Each creatinine concentration of the gradient was spiked with eleven different bilirubin concentrations to obtain 110 different combinations of creatinine and bilirubin concentrations. After spiking, the creatinine and bilirubin concentrations in the final matrix were 0,1,2,3,4,5,6,7,8,9 mg/dL and 0,3,6,9,12,15,18,21,24,27,30 mg/dL, respectively. The total bilirubin, creatinine concentration by Jaffe reaction and creatinase kit method were determined by Indiko™ Clinical and specialty Chemistry System. Prior to specimen analysis the analyzer was calibrated for bilirubin, Jaffe reaction and creatinase method. Statistical analysis was done by linear regression analysis.

Results: Jaffe reaction showed a significant underestimation in creatinine concentrations of 0,1 and 2 mg/dL with all the bilirubin concentrations. From 3 mg/dL onwards, a significant overestimation could be observed with high bilirubin concentrations. The minimum bilirubin concentration required for overestimation varied with the creatinine concentration. According to the creatinase method, as the bilirubin concentration increases a significant underestimation was given by creatinine concentrations above 1 mg/dL. The lowest bilirubin concentration needed for creatinine underestimation varied with

112

Proceedings of the International Conference on Health Sciences 2018 - FMS, USJ

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the creatinine concentration. The underestimation observed with increased bilirubin concentration was increased when creatinine concentration of the standard solution increases.

Conclusions: Creatinase method is better compared to Jaffe reaction in the determination of creatinine in buffered saline solution with the concentration of ≤ 1 mg/dL.