

1.1.3 Calcium

Calcium is one of the major cations in human body, it plays a major role in many bodily functions including bone metabolism, neuro-muscular conduction, action potentials in excitable tissues, coagulation, endocrine and exocrine glandular functions. Ninety nine percent of body calcium resides in bone while only 1% exists in the extracellular fluid. (Bushinsky & Monk, 1998; Kaplan & Kellum, 2010; Moon *et al.*, 2011; Johnson, 2012).

Because of this relation between albumin levels and total extracellular calcium, calcium level will decrease by 0.8mg/dL for every 1g/dL decrease in serum albumin concentrations below 4g/dL ,therefore corrected calcium concentrated should be calculated in order to assess calcium levels in patients with hypoalbuminemia using the following equation :

$$\text{Corrected Calcium} = (0.8 * (4 - \text{albumin})) + \text{serum calcium}$$

Because the free ionized serum calcium represents the biologically active form of calcium, it is a more reliable indicator of calcium functional state .Normal serum concentrations of free active calcium lies between 1.12 and 1.3mmol/L. Furthermore, free active calcium levels poorly correlates with total serum calcium concentrations , therefore, free active calcium must be measured in critically ill patients in order to prevent serious complications of calcium irregularities including cardiac and blood pressure instabilities as these patients often present with acid-base imbalance and