SydPath
ST VINCENT'S PATHOLOGY

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TOTAL SERUM PROTEIN INFORMATION SHEET

GENERAL

The measurement of total serum protein is a summation of the concentration of the hundreds of different plasma proteins in the circulation. In practice only albumin, the immunoglobulins and to a lesser extent fibrinogen, are present in high enough concentrations to individually affect the total protein concentration. Changes in total serum protein concentration measurements may be due to changes in either the amount of the proteins in the circulation, or the amount of water in the circulation. Intra-vascular water may change due to whole body effects such as dehydration, or to redistribution of water within the body, eg prolonged tourniquet or postural changes. Changes in water distribution affect the measurement of a range of analytes in addition to total protein, eg albumin, lipids, red cell count, and total calcium. These are analytes which are too large or are attached to carriers which are too large to pass though the blood vessel wall when there is a movement of water.

Serum has a total protein 3 – 5 g/L less than plasma due to the consumption of fibrinogen in the clotting process leading to the formation of serum. Moving from a lying to standing position can increase total protein by 10% due to water redistribution. Prolonged application of the tourniquet can markedly increase total protein by forcing water out of the vascular compartment prior to sample collection.

Hyperproteinaemia

Increased serum protein

- Increased immunoglobulins: monoclonal, polyclonal

Decreased intra-vascular water

- Dehydration
- Standing compared to lying
- Prolonged use of a tourniquet

Hypoproteinaemia

Decreased serum protein

- Hypoalbuminaemia: malabsorption, malnutrition, liver disease, acute phase response
- Reduced immunoglobulins
- Protein-losing states (loss of all types of protein): nephrotic syndrome, protein-losing enteropathy, burns, third space losses, post-surgery

Increased intra-vascular water

- Pregnancy
- Water intoxication
- Salt retention syndromes