With the induction of anesthesia, compensatory mechanisms are lost and hypotension will develop if volume deficits arte not appropriately corrected prior to the time of surgery. Hemodynamic instability can be avoided by correcting known fluid losses, replacing ongoing losses, and providing adequate maintenance fluid therapy preoperatively. In addition to measured blood loss during surgery, open abdominal surgeries are associated with continued third-space losses due not only to the preexisting conditions but also to exposed bowel during the time of surgery.

Sodium and potassium are important for maintaining osmolality and cell volume, generating the resting membrane potential and generating action potentials of excitable tissue. Calcium is largely an extracellular ion, but has an important role in the regulation of cell metabolism, and in cardiac and skeletal muscle as the link between electrical activity and contraction. It also influences neuromuscular excitability and is required for blood clotting.

In all organs of the body with continuous capillaries, except in the brain and the kidney, the interstitial colloid osmotic pressure is high and approximately one-fourth to one-third of that in plasma. Thus, fluid filtration will gradually be reduced, when the new Starling equilibrium is achieved. Similarly, fluid absorption will successively increase the interstitial colloid osmotic pressure and the absorption will cease at a somewhat reduced tissue volume when the new Starling equilibrium is achieved. Filtration-induced increase in

interstitial hydrostatic pressure may also counteract filtration, but this effect is weak except in organs enclosed in a rigid shell, such as the brain and the kidney.

Common replacement strategies of the required volume of crystalloid to blood loss ratio have traditionally been 3:1 and even higher up to 5:1.To preserve normovolemia with crystalloids, large volumes need to be given to fulfill this requirement during trauma and hemorrhage up to an extreme relation 20:1, or even above that to keep the Starling equilibrium intact with crystalloids. This clearly indicates that the interstitial compliance is no longer a linear function as in dehydration or initial over hydration but has instead reached appoint where it is very high or virtually infinite because very large volumes are required to maintain the interstitial hydrostatic pressure.

Colloid is, namely a high molecular weight (MW) substance that largely remains in the intravascular compartment, there by generating an oncotic pressure. Colloids are considered to have a greater intravascular persistence when compared to crystalloids.

Human albumin, hydroxyl ethyl starch (HES), gelatins, and dextran solutions are the main colloids.

Some anesthesiologsists emphasize that infusing glucose is their only way to provide ‘‘free’’ water to compensate the body for evaporation losses from the airways and from open wounds. The main or only source of osmolality in the solution is the glucose itself, but all osmotic strength disappears after metabolism to water and carbon dioxide (the latter beinge liminated by breathing).

When administering hypertonic solutions, endogenous fluid is mobilized first from the microvascular endothelium and the red blood cells, with the most pronounced effect taking place in those capillaries that have a swollen endothelium. Increasing concentrations of sodium have a positive inotropic effect at an osmolality range of 240 to 320 mOsm, where as concentrations higher than 320 mOsm have a negative effect. This could possibly explain why too rapid infusion of HS could lead to a decrease in blood pressure.

The milky white perfluorocarbon emulsions are considered candidates for increasing oxygen delivery during the hemodilution of cardiopulmonary bypass and other major operations with expected blood loss and /or hemodilution. Another potential value of perfluorocarbon emulsions in bypass surgery is a high gas solubility of perfluorocarbon that allows rapid absorption and elimination of gaseous emboli generated during extracorpeal circulation.

Hyponatremia is most commonly observed in the postoperative period and in pediatrics in emergency departments when hypotonic solutions have been administered or when salt loss is greater than water loss. Hyponatremia is an emergency and should be treated rapidly by administering normal saline or hypertonic sodium chloride when neurological disorders are present.

Decompensated hypovolemia is what many people refer to as shock. The degree of hypovolemia is such that reflex redistribution of blood flow is in sufficient to compensate, and vital organs are no longer adequately perfused. If untreated, this clinical state rapidly

progresses to total circulatory arrest. Delay in the treatment of hypovolemic shock greatly reduces the chances of successful resuscitation.

In comparing crystalloids and colloids, similar doses were used in the beginning before spinal anesthesia. However, it seems more reasonable to compare similar levels of plasma expansion instead. Similar doses (7mL/kg) of preload with 3% gelatin or isotonic saline in 32 elderly patients undergoing transurethral surgery resulted in the prevention of hypotension by the use of the colloid in most cases (not all) where isotonic saline failed.

Investigations in to the use of fluid prehydration in parturients have focused most recently on spinal anesthesia for cesarean delivery, when both the potential for uterine aorto-caval compression and the rapid onset of hemodynamic effects are observed. Such trials are difficult to compare due to differences in study design and quality; heterogeneity exists in the types and volumes of fluids in the experimental and control groups, the coexisting use of vasopressors, the occasional noted absence of uterine displacement, and the presence of labor.

The goal during the major vascular surgery, e.g., abdominal aortic aneurysm repair, is to maintain adequate hydration intraoperatively, to maximize perfusion and urine out put, and to maintain an adequate intravascular volume prior to aortic clamp removal. Rapid severe hemorrhage is common, and blood loss must be replaced quickly in these circumstances.

Infusion of cold fluid may sometimes cause shivering in response to the temperature change, where as fluid at body temperature may cause an unpleasant feeling of ‘‘heaviness’’ in the chest.

The patient with latent or manifest cardiac failure may, at too vigorous IV volume load, suffer circulatory deterioration and hypotension.

Pulmonary edema has been considered a risk factor associated with crystalloid fluid resuscitation.

All IV colloids, including HSA, can induce anaphylactoid reactions, but the available incidence numbers vary to a considerable extent between different countries, depending on efficacy of official reporting systems, true local variations in predisposition or endemic antibody titers.