SUMMARY

Accurate assessment of fluid loss and replacement in the perioperative period is essential for every patients. The paediatric patient having a large surface area in relation to body weight, a small circulating blood volume and an inadequately developed heat regulating center is more liable to complications if inappropriate perioperative fluid management have occurred. The most obvious clinical problems are shock from insufficient volume replacement or overhydration with subsequent pulmonary oedema. So, it is essential that the anaesthetist should assess the fluid needs of the patient throughout the entire period of surgical management; in the preoperative resuscitation phase, during intraoperative management and throughout the postoperative recovery phase until the patient has regained the normovolaemic state and is back to baseline maintenance fluid requirements.

For accurate perioperative fluid balance of the paediatric patient, the anaesthetist must have adequate knowledge of the anatomical and physiological changes that take place in the organ functions with growth and their differences in paediatrics from the adults.

There is a normal fluid balance between fluid gain and fluid loss in healthy infants and children. This fluid homeostasis is regulated by several substances acting mainly through the kidney such as renin-angiotensin-aldosterone system, ADH, prostaglandins, adenosine and nitric oxide. Energy balance has a great effect on fluid

homeostasis especially in paediatric patients because of the high metabolic rate and hence a high rate of heat production and loss especially due to the large surface area of the body in relation to the total body mass.

Assessment of preoperative fluid needs should include the patient's renal and cardiovascular status, presence of fever, sweating, diarrhea or a disease. The hydration state should be evaluated and any degree of dehydration should be detected and corrected. The duration of preoperative fasting for food or milk shouldn't be more than 6-8 hours and not more than 3 hours for clear fluids before surgery to avoid hypovolaemia and hypoglycaemia.

The goal of intraoperative fluid management is to maintain fluid homeostasis by providing the appropriate amount of parenteral fluid to maintain adequate intravascular volume and constant haemodynamics during anaesthesia and surgery. Intraoperative fluid therapy include replacement of fluid deficit due to preoperative fasting; maintenance fluid to compensate for losses in urine, sweat and insensible loss; intraoperative translocated fluid; variable blood losses and other losses as gastric secretion and peritoneal fluids.

Blood conservation have assumed a special importance in recent years. The techniques used to conserve blood including reduction of intraoperative blood loss; autologous blood transfusion and acute normovolaemic hemodilution and use of oxygen-carrying blood substitutes.

In the postoperative fluid management, re-evaluation of the fluid balance during the preoperative and intraoperative periods is

essential. The most common postoperative complications which affect fluid and electrolyte balance are vomiting and hyponatraemia. These complications should be detected and managed adequately.

Monitoring and maintenance of the blood glucose level within the average limits in the perioperative periods is very important. It is demonstrated that asymptomatic hypoglycaemia is rare but ever a present phenomenon in healthy children especially if the preoperative fasting period has been prolonged. On the other hand, the intraoperative and postoperative stress-induced hyperglycaemia in addition to the I.V. infusion of glucose containing solutions can lead to osmotic diuresis, and augmentation of ischaemic brain injury especially in neurosurgical procedures.

It is important to determine the nature and volume of fluid to be given and its rate of infusion. Replacement fluids may be crystalloid solutions, colloids, blood and cellular components or plasma and specific plasma components. The comparison between the usage of colloids and crystalloids in treatment of hypovolaemic shock concluded that the volume therapy with colloids requires less volume and achieve better filling of circulation compared to crystalloids.

Monitoring is very important to detect the hydration state of the patient and adequacy of fluid replacement. Monitoring of changes in cardiovascular dynamics can be done by measurement of arterial blood pressure, pulse rate, central venous pressure and urine output. Oxygenation of the tissues can be monitored by pulse oximetry.