Chapter 9

CEREBRAL PROTECTION IN NEUROANESTHESIA AND ANESTHETIC AGENTS

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Damage due to the cerebral ischemia and surgical interventions during intracranial operations cause serious risks especially for the brain. Clinical characteristics of the patient, type of the surgery and the anesthetic approaches are the most effective factors on the occurrence and severity of brain damage. Therefore understanding and the utility of brain protection mechanisms during the intraoperative period reduces the postoperative morbidity and mortality while increasing the surgical success.

Intraoperative brain protection depends on two headings

1. Prevention of ischemia with the help of the neuroprotective effects of anesthetic agents.
2. The control of intracranial pressure and brain volume reduction

PREVENTION OF ISCHEMIC DAMAGE

The brain constitutes 20% of the total body oxygen consumption and in order to maintain its functions (total 50-65min) needs 3.5 - 5.5 ml / 100 g of oxygen in a minute. 60% of this oxygen consumption is necessary for neuronal activity which was used in ATP production. Cerebral reduction of total oxygen delivery low-

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Possible mechanisms that can explain its lowering ICP effects are as follows:

1. Reduces cerebrospinal fluid production and increases reabsorption, reducing intraventricular volume,
2. Reduces brain water content by pulling water into the intravascular area, reducing brain tissue volume
3. With autoregulation mechanism
4. By altering vascular pressure in the brain arteries and veins

The recommended dose of mannitol for intracranial pressure control ranges from 0.25 to 1 g / kg. Doses higher than 2 g / kg are not recommended (14).

Use of hypertonic saline (HS) for intracranial pressure control has just entered practice. The most commonly used concentration in the clinic is 3% HS. 3% HS peer 20% by volume of mannitol has almost the same osmalarity. In recent animal studies HS creates immune modulation and reduces microvascular damage and permability by reducing its effect on endothelial cells (15).

Increasing the level of anesthesia (especially with barbiturates) leads to a decrease in ICP.

Furosemide administration increases diuresis and decreases intravascular volume and CSF production especially in patients with volume burden.

The use of steroids in patients with increased ICP due to tumor can be considered as it reduces inflammation (16).

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