Key points

- Pediatric and geriatric patients have important physiological specificities
- Hypotension, hypoventilation and hypothermia should be monitored and corrected
- One anesthetic recipe cannot reasonably be used for all patients: every patient is different

As the human-animal bond grows, more and more pediatric and geriatric patients benefit from surgery. Both groups have very important and surprisingly similar physiological specificities that require special attention before, during and after anesthesia.

For the sake of our discussion, we will consider that:

- A neonate is 0 to 6 weeks old
- Pediatrics are 6 to 12 weeks old
- Geriatrics have reached 75% of their life expectancy.

**Physiology of pediatrics**

Pediatrics have a number of specific physiological changes. Among those:

- A permeable blood-brain barrier, which means that drugs can reach the brain more easily.
- A reduced volemia, which increases the risk of hypovolemia.
- A low body fat content means that drugs stay around longer.
- An immature sympathetic nervous system, which impairs the ability to increase cardiac output.
- Immature kidneys, liver, heart, respiratory system also have a number of consequences.

Pediatrics are more susceptible to hypothermia for a number of reasons, including: an immature thermoregulatory system, a high body surface:weight ratio, limited vasoconstriction capabilities, limited body fat and muscle mass.

The higher metabolic rate of pediatrics may however be used to our advantage: mask induction is quicker than in an adult.

**Physiology of geriatrics**

Aging leads to progressive alterations in organ function. This can influence various aspects of anesthesia in geriatrics, including:

- Changes in the brain means that less anesthesia drugs are necessary.
- Overall decreased muscle mass and increased body fat, so drugs stay around longer.
- Hypo-albuminemia, which leads to more free protein-bound drugs: ketamine, NSAIDs → exaggerated effects.
- A decreased metabolic rate makes them more susceptible to hypothermia.
- Geriatric kidneys less efficient at eliminating fluids and correcting fluid/acid-base/electrolyte imbalances.
- A decreased liver mass and function leads to decreased metabolism of anesthesia drugs.
• Decreased ventilation, gas exchanges, lung capacity, respiratory muscle mass, lung elasticity and rib elasticity lead to decreased oxygenation.

The good news however is that there is no correlation between chronological age & physiological age.

Precautions before anesthesia

Generally speaking, the side-effects of any drug should be anticipated and monitored. Consider using local blocks and CRIs but avoid NSAIDs unless they have been approved in young patients. Be aware of potential side-effects of NSAIDs in geriatrics.

Precautions during anesthesia

We will discuss the pros and cons of various induction options: propofol, ketamine/vallium and mask induction

Patients are maintained on gas, and all of the consequences of gas inhalation are closely monitored: hypotension, hypoventilation, hypothermia, cardiac depression, especially when the patient has renal or hepatic issues. The percentage of gas can be reduced because of premed, local block, CRI, sickness etc

Pediatrics shouldn’t be fluid-overloaded since they cannot compensate as well as adults. Geriatrics cannot eliminate excess water & salt as well.

Both pediatrics & geriatrics are at increased risk for hypothermia for a number of reasons. Careful heat support is very important.

Precautions after anesthesia

Heat support and pain management are continued after surgery. All abnormalities are corrected: hypoglycemia, hypothermia etc. Patients, especially pediatrics, are fed as soon as possible once they are fully awake and conscious.

Pediatric and geriatric patients can be safely anesthetized, as long as their physiology is understood and some common-sense precautions are taken. We should avoid using one recipe for all patients and embrace the concept that “Every patient is different.”