

# Geriatric Anaesthesia

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# Geriatric Anaesthesia / Introduction

- Elderly' arbitrarily refers to patients >65yr .
- Ageing is associated with progressive deterioration of function in all systems, the effect of which may be compounded by organ-specific co-morbidity .

## Pharmacology :

- 1- TBW is reduced, the volume of distribution of water-soluble drugs is reduced, reducing dose requirements.
- 2- Fat percentage is increased, lipid-soluble drugs doses are increased which may prolong clearance .
- 3- Arm–brain circulation time is prolonged, increasing the time taken for induction agents to take effect.
- 4- Reduced plasma albumin concentration decreases the dose requirement of drugs, such as barbiturate induction agents, which are bound to albumin.

## Pharmacology :

- 4- Reduced plasma albumin concentration decreases the dose requirement of drugs, such as barbiturate induction agents, which are bound to albumin.
- 5- MAC of inhaled agents decreases steadily with age (6% reduction per decade) and is reduced by around 40% by the age of 80yr .
- 6- Risk of GI bleeding due to NSAIDs is increased .

## Preoperative assessment :

- 1- Common diseases of elderly patients may have a major impact on anesthetic management .and require special care and diagnosis
- 2- The level of physical activity that can be sustained is a useful indicator of CVS and respiratory fitness but is often limited by joint disease.
- 3- The mental state should be evaluated.

## Preoperative assessment :

- 4- With the exception of oral hypoglycaemic, regular medications should be continued until the time of surgery.
- 5- Laboratory and diagnostic studies, history, physical examination, and determination of functional capacity should attempt to evaluate the patient's physiologic reserve.
- 6- Laboratory testing should be guided by the patient's history, physical examination, and proposed surgical procedure, and should not be based on age alone.

## Perioperative Management :

- 1- Regional anaesthesia may reduce bleeding, risk of DVT, respiratory infection, and cognitive dysfunction (particularly if given with out/with minimal sedation).
- 2- Airway management : mask ventilation and laryngoscopy may be challenging especially in edentulous or debilitated patients
- 3- Monitoring
- 4- positioning

## Perioperative Management :

- 5- equipments (e.g. warming device) ....etc
- 6- preoxygenation .
- 7- Inhaled Anesthetics .
- 8- The (MAC) decreases approximately 6% per decade for most inhaled anesthetics
- 9- Intravenous Anesthetics and Benzodiazepines



## Perioperative Management :

10- Lower dose requirement for propofol, etomidate, barbiturates, opioids, and benzodiazepines.

11- Muscle Relaxants :age does not significantly affect the pharmacodynamics of muscle relaxants Duration of action may be prolonged, however, if the drug depends on liver or renal metabolism

## Physiological Changes :

### Cardiovascular

- Significant CVS disease is present in 50–65% of patients.
- Myocardial fibrosis and ventricular wall thickening occur, reducing ventricular compliance. Small changes in filling may have major effects upon cardiac output and BP.
- AF is common and reduces stroke volume through loss of the atrial component of ventricular filling.
- Capillary permeability is increased, leading to a greater risk of pulmonary oedema.

## Physiological Changes :

### Cardiovascular :

- Maximal cardiac output with exercise decreases by  $\sim 1\%$  per year from the 5th decade.
- Reduced arterial compliance causes systolic hypertension and widened pulse pressure.
- Reduced autonomic responsiveness impairs CVS responses to hypotension. The hypotensive effect of anaesthetic agents is likely to be more pronounced.

## Physiological Changes :

### Respiratory :

- Ventilatory responses to hypoxia and hypercapnia decline. Post-operative apnoea is commoner.
- O<sub>2</sub> consumption and CO<sub>2</sub> production fall by 10–15% by the 7th decade. Patients are able to tolerate a longer period of apnoea following preoxygenation, and minute volume requirement is reduced.
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- Closing volume increases to exceed the FRC in the upright posture at 66yr, normal PaO<sub>2</sub> falls steadily  $(100 - \text{age}/4)$  mmHg) .

## Physiological Changes :

### Respiratory :

- Airway protective reflexes decline, increasing the risk of post-operative pulmonary aspiration.
- In edentulous patients, maintenance of a patent airway and face mask seal may be difficult. Leaving false teeth in situ may help.

## Physiological Changes :

### Renal :

- Renal mass and number of glomeruli fall progressively (by 30% in the 8th decade), resulting in reduced GFR, creatinine clearance falls comparably, although serum creatinine may not rise because of decreased production from a reduced muscle mass.
- Reduced clearance of renally excreted drugs necessitates dose adjustment.

## Physiological Changes :

### Hepatic :

- Hepatic mass and blood flow fall by up to 40% by the 9<sup>th</sup> decade, prolongs the effect of drugs that are metabolized and excreted by the liver. These include opioids, propofol, benzodiazepines, and NDMRs..



## Physiological Changes :

### Central nervous system :

- The elderly have lower requirements for opioid analgesics and sedatives.
- Post-operative delirium (POD) and cognitive dysfunction (POCD) are common in the elderly, occurring in >10% of patients. Disturbances of cerebral perfusion and cellular oxygenation are likely to be contributory factors. Potentially reversible risk factors for POD include severe pain, infection, malnutrition, electrolyte imbalance, dehydration, environmental disturbances, and substance withdrawal (alcohol, medication).

## Physiological Changes :

### Thermoregulation :

- Increase the risk of hypothermia.
- Post-operative shivering increases skeletal muscle O<sub>2</sub> consumption, while vasoconstriction increases myocardial work and O<sub>2</sub> demand.

### Haematology and the immune system :

- Hypercoagulability and DVT become commoner .

**Thank You**

**End of lecture**