



Geriatric physiology and how it affects dental sedation & dentistry

Dr Angelo G Preketes

BDS(Syd) Grad Dip Clin Dent (oral implants) Grad Dip
Clin Dent (conscious sedation & pain control)

Clinical associate (syd Uni)

Aging Australian population

- The Australian population is aging
- 13% of the population is over 65 yrs old .
- That's about 4mil people over 65 yrs old and 450,000 over 85 yrs old
- Predictions that over 65"s will compromise 25% of the population in the next decade .
- These individuals will account for one third of surgical procedures performed annually.

Conscious sedation in the Elderly

- The use of conscious sedation in the elderly has become very common .
- Caution must be exercised when sedating .
- No two people age in the same way
- The Aging -diminishes organ function
 - limits physiologic reserves.

We will look at the physiologic changes associated with aging and review the pharmacokinetics and pharmacodynamics of commonly used drugs that are altered with advancing age

Physiologic Changes Associated with Aging

- BODY COMPOSITION
 1. Loss of skeletal muscle (<lean body mass)
 2. Increased body fat
 3. Decreased total body water
- The injection of anaesthetic drugs can result in higher peak concentrations ,increased total volume of distribution and a longer duration of drug effect .
- Therefore clinically this means we should give smaller doses and longer intervals between doses

Physiologic Changes Associated with Aging

- **CARDIOVASCULAR SYSTEM**

1. Loss of elasticity in large arteries (left ventricular hypertrophy , hypertension and ischemic heart disease)

2. Decreased cardiac output (it declines by 1% per year after the age of 50)

- The elderly need special attention to hemodynamic monitoring in order to ensure that myocardial O₂ demand does not exceed supply

Physiologic Changes Associated with Aging

- RESPIRATORY SYSTEM
 1. Decline in elasticity of chest wall
 2. Weakening of the muscles of respiration
 3. Decrease in alveolar gas exchange surface
 4. PaO₂ declines
 5. Decreased response to hypoxia
 6. Decrease in upper airway reflexes
- Therefore more attention in assessing level of consciousness during sedation and supplemental O₂ necessary .

Physiologic Changes Associated with Aging

- HEPATIC SYSTEM
 1. Decreased liver blood flow
 2. Decreased Liver mass
 3. Decreased protein synthesis
 4. Decreased drug clearance

- RENAL SYSTEM

1. Decreased renal blood flow due to $<$ cardiac output .

2. Decreased renal mass

3. Decreased ability to conserve free water

- The overall effect of this decline in renal function is an increase in the elimination half life of drugs .Also after prolonged fasting elderly are predisposed to dehydration.

- CENTRAL NERVOUS SYSTEM

1. Decreased Brain mass and neurotransmitters
2. Decreased Memory and reasoning
3. Elderly more sensitive to sedatives
4. Elderly have a prolonged recovery
5. Higher incidence of post/op delirium

- THERMOREGULATION
- 1. Decreased temperature regulation
- 2. Decreased vasoconstriction and shivering
- 3. Keep elderly patient warm with blankets

EFFECTS OF AGING ON COMMONLY USED SEDATIVE DRUGS

- Pharmacokinetics : is the study of drug absorption, distribution , metabolism and elimination.
- Drug absorption is often unchanged .
- Drug distribution is affected by volume of distribution, which is decreased in the elderly due to decreased total body water
- Metabolism and elimination are decreased due to decrease function of renal and hepatic systems. This increases elimination half-life .

- Pharmacodynamics: is the effect that the drug
- has on the body
- End-organ sensitivity changes with age e.g. the elderly are more sensitive to drugs

PROPOFOL

- Use with caution or avoided all together
- Has a rapid onset of action leading to unconsciousness quickly , loss of airway reflexes , and apnea .
- Brain becomes more sensitive to propofol with aging

MIDAZOLAM

- a short acting benzodiazepine
- increased sensitivity of the elderly
- recovery time longer

FENTANYL

- Elderly patients require only half the dose of fentanyl that younger patients require due to pharmacodynamic changes
- The dissipation of the drug effect is usually the same in young and old as pharmacokinetics not greatly altered

PREOPERATIVE ASSESSMENT

- Complication rates more a function of concurrent disease than due to age alone
- A thorough medical history and physical examination is mandatory
- List of medications taken and possible drug interactions noted .

- For conscious sedation to be administered safely to the elderly meticulous attention must be paid to monitoring , and the administration of sedatives and analgesics must be given cautiously and titrated to clinical effect.

THE END

