Induction agents for intubation

IV INDUCTION AGENTS

- **GENERAL PRINCIPLES:**
  - in hypotensive patients, consider ketamine (even if head injury) or etomidate, or use reduced dose thiopentone with care
  - in those with asthma, consider ketamine as it has bronchodilator properties, or propofol, or etomidate
  - in those with head injury or acute stroke:
    - if hypotensive or normotensive, consider ketamine
    - if hypertensive, consider etomidate with pre-treatment with fentanyl, although ketamine may still be used.
  - if status epilepticus, consider thiopentone or midazolam as both have anticonvulsant properties
  - for "awake" intubations, consider ketamine as it preserves respiratory drive
  - thiopentone is C/I in those with acute intermittent and variegate porphyrias
  - otherwise, most will use either thiopentone, propofol, or in the USA, etomidate.

THIOPENTONE

- iv induction dose: 3-5mg/kg
- reduce dose in elderly or those at risk of hypotension
- consider ketamine (a bronchodilator) or etomidate instead for patients with acute asthma as it may release histamine

PROPOFOL

- iv induction dose: 1.5-2mg/kg
- onset of action: 15 to 45 seconds
- duration of action: 5 to 10 minutes
- similar induction rate to thiopentone but more rapid recovery
- does not provide analgesia
- pts are more rapidly able to ambulate afterwards & "feel better" with less N/V
- Does not appear to cause cumulative effects or delayed arousal with infusions.
- Resistance to its effects occurs after a few days ⇒ limits duration of Rx in ICU
- Distribution half life = 2-8mins; Elimination half-life (via liver) = 1-3hrs;
- Total body clearance > hepatic blood flow ⇒ other clearance mechanisms too
  - ⇒ useful in pts with impaired ability to clear other drugs
- may cause **MARKED HYPOTENSION** during induction via decreased total peripheral resistance
- Apnoea & pain at injection site occur.

Source: *http://www.ozemedicine.com/wiki/doku.php?id=induction_agents*

ETOMIDATE

- induction dose iv: 0.3mg/kg
- onset of action: 15 to 45 seconds
- duration of action: 3 to 12 minutes
- a carboxylated imidazole that has minimal CVS & resp depressant effects.
- produces excellent sedation with relatively little hypotension
- it is the agent of choice for emergency RSI in most circumstances - unfortunately not available in Australia
- is known to suppress adrenal cortisol production even after one dose. The clinical relevance of this degree of suppression is not yet known, but has led some to suggest etomidate not be used in patients with shock - consider giving iv dose of corticosteroids to such patients.
- acts directly on the gamma amino butyric acid (GABA) receptor complex, blocking neuroexcitation and producing anesthesia
- provides no analgesic effect, so it does not blunt the noxious stimulation of the upper airway during laryngoscopy and intubation and thus pre-treatment with fentanyl 3mcg/kg iv given 3 minutes prior is often used in cardiac patients or those with head injury as long as they are not hypotensive.

KETAMINE

- induction dose iv: 1.5mg/kg (1-2mg/kg)
- onset of action: 45-60 seconds
- duration of action: 10-20 minutes
- may be an excellent induction agent for patients with elevated ICP and hemodynamic compromise despite it potentially causing raised ICP, the benefit it maintaining BP is probably more important.
- should be avoided in patients with elevated ICP and elevated or high-normal blood pressure because of its propensity to raise blood pressure and heart rate through catecholamine release - use thiopentone or etomidate instead.
- “dissociative anaesthesia”
- produces catatonia, amnesia & analgesia via block of glutamic acid @ NMDA receptor subtype
- lipophilic, rapidly distributed to highly vascular organs & subsequently redistributed to less perfused tissues with concurrent hepatic & renal elimination.
- may produce emergence phenomena of disorientation, vivid dreams esp. adults > children; may be reduced with premed of midazolam
- produces increased salivary secretions ⇒ risk of laryngopasm
- sometimes premed with atropine is given
- the ONLY IV anaesthetic that routinely produces CVS stimulation via central sympathetic NS stimulation ⇒ raised plasma noradrenaline and adrenaline ⇒ increased HR, cardiac output & BP (peak @ 2-4min, decline over 10-20min);
- decreases RR slightly for 2-3min, but usually maintains upper airway reflexes.
- markedly increases cerebral blood flow ⇒ raises intracranial pressure.
- bronchodilator
- main uses:
  - poor-risk geriatric pts & pts in shock needing GA
  - outpatient anaesthesia
  - children undergoing painful procedures eg. changing burns dressings
    - oral dose: 6-10mg/kg
    - IM dose: 3-5mg/kg

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BENZODIAZEPINES

MIDAZOLAM

- midazolam is water-soluble but becomes lipid-soluble at physiologic pH.
- iv induction dose: 0.2 to 0.3 mg/kg
- dose-related myocardial depression can result in hypotension
- More rapid onset, shorter elimination half life (2-4hrs) & steeper dose-response curve than other benzodiazepines.
- Slower onset of CNS effects cw thiopentone
- Maximal CNS effects tend to be below true anaesthetic levels.
- Prolong recovery time when added to other GA's
- Cause high incidence of anterograde amnesia