

## RSI & Status Asthmaticus

### RSI

Rapid sequence induction of anaesthesia is a specific technique originally used by anaesthetists, described formally in 1970 by Stept and Safar who used it in a series of 80 patients between 1967 and 1969<sup>1</sup>, showing it to reduce the risk of gastric aspiration. By definition it involves pre-oxygenation followed by the rapid delivery of a short acting induction agent and a neuromuscular blocking agent accompanied by cricoid pressure (as described by Sellick in 1961)<sup>2</sup> and the insertion of a cuffed endotracheal tube. It differs from standard anaesthetic techniques mainly in its speed of delivery of predetermined doses of anaesthetic and depolarising muscle relaxing drugs. However its was developed to induce a state of anaesthesia for surgery and not primarily for airway control. With the advent of critical care this procedure was increasingly used for the rapid control and protection of the airway and for ventilation. This technique is often referred to as 'rapid sequence intubation' (RSI). Once the decision has been made to do an RSI, it is important to ensure that all necessary personnel, equipment and drugs are ready.

**Personnel:** Intubator (Anaesthetist, or appropriately trained emergency physician), doctor to inject drugs, cricoid pressure by trained person; competent nurse to assist.

**Equipment:** Good IV cannula; suction checked and to hand; tilting trolley; bougie to hand; laryngoscopes x2 (large blade); ready access to difficult intubation equipment; endotracheal tubes of various sizes (cuffs checked); syringe; BVM with reservoir bag; CO2 detection apparatus; full ECG, BP, SpO<sub>2</sub> & CO<sub>2</sub> monitoring; Stethoscope; tube tie/tape; connector; ventilator; CXR

**Drugs:** O<sub>2</sub>; Rapidly acting paralysing agent; rapid IV induction agent (all doses less in elderly, debilitated or already reduced GCS); some add fentanyl/alfentanyl (not in asthmatics); maintenance of anaesthesia (usually propofol infusion 4-12mg/kg/hr); ongoing paralysis

Drug	Dose	Onset/duration	Cons	Pros
Suxamethonium	100mg (1-1.5mg/kg)	<1m/3-15m	hyperkalaemia, muscle aches, raised gastric/ocular pressure, bradycardia	very rapid onset and short duration
Atracurium	0.5mg/kg (induction), 50mg q15-25mins	2-2.5m/25-45m	Bronchospasm and hypotension, longer acting	longer acting for maintenance
Vecuronium	100mcg/kg (induction), 10-15mcg/kg q15mins	2.5-3m/25-40m	(rare bronchospasm)	less hypotension
Rocuronium	600mcg/kg	1-2m/30m	bronchospasm, arrhythmias	Rapid onset
Thiopental	1-4mg/kg	<30s/5-10m	hypotension, respiratory depression, laryngeal/bronchospasm, tissue necrosis if extravasated	very rapid onset, anti-fit (status epilepticus), reduces CNS activity (head injury)
Propofol	1.5-2.5mg/kg	20-40s/2-4m	apnoea, hypotension +, stinging in injection	rapid onset, good airway relaxation, smooth induction, no hang over,
Etomidate	0.2-0.3mg/kg	20-40s/2-3m	extraneous movements, adrenal suppression	good cardiovascular stability, more widespread ED use
Ketamine (usually with midazolam)	1-4mg/kg	30-60s/10-15m	Emergence (esp adults), movement, secretions, raised ICP/ocular pressure, vomiting, increased myocardial O <sub>2</sub> demand	maintains airway reflexes / breathing, analgesic properties, safe, difficult locations eg pre-hospital, good in hypotension, bronchodilator, IM dose

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### Status Asthmaticus;



- ☑ Generally accepted to be required when pCO<sub>2</sub> is high/rising, pO<sub>2</sub> is low/dropping, pH ↓, GCS altered or patient is becoming exhausted despite maximal therapy.
- ☑ Patients are likely to have very high lung compliance, high auto PEEP (air trapping) and hypoxia.
- ☑ Must be pre-oxygenated with 100% O<sub>2</sub>
- ☑ Need rapid successful tube placement to reduce time without O<sub>2</sub>
- ☑ NIV may help to prevent RSI being necessary (increased O<sub>2</sub> delivery, reduced work of breathing by improved compliance and PEEP can overcome the auto-PEEP-generated need for increased work)
- ☑ Risk of barotrauma with NIPPV, high pressures may be required-beware tension pneumothoraces.

- ☑ Avoid Atracurium (causes histamine release), use vecuronium instead

Medline Search, 1955 to Nov 07

[exp Intubation, Intratracheal/ or rapid sequence induction.mp. or rsi.mp. or intubation.mp. or crash induction.mp. or airway management.mp] AND [exp Asthma/ or asthma.mp.] AND [exp Anesthetics/ or exp Anesthesia, General/]

88 papers found, 10 papers relevant.

1. No help with the use of pre-treatment iv lignocaine (BestBET)<sup>3</sup>
2. Initial NIV then if intubation required; prolonged expiration phase in ventilator settings, and permissive hypercapnia generally results in a good outcome (Review)<sup>4</sup>
3. Ketamine and benzodiazepines may be used for induction (and maintenance) of anaesthesia, reviews and case series. <sup>5,6,7</sup> (Ketamine has some innate bronchodilatory effects)
4. Some case series describe success with Isoflurane in otherwise refractory cases<sup>8</sup>
5. Halothane has also been described in case reports as being useful for refractory cases<sup>5,9</sup>

#### References

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