

Delayed Sequence Intubation and Apnoeic Oxygenation

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Introduction

Preoxygenation is a critical step in advanced airway management and serves to enhance the time available for intubation prior to desaturation when patients are at additional risk. The average patient breathing room air will experience significant desaturation below the critical 90% level within 45-60s post administration of a paralytic.^{1,2} The ideal goal is three minutes of adequate breathing of 100% oxygen.²

This is a challenge for combative or delirious patients. In these cases, an innovative technique of delayed sequence intubation (DSI) coupled with apnoeic oxygenation is a viable alternative to maximise patient safety.

DSI involves administering a drug such as ketamine to safely sedate the patient and facilitate preoxygenation. If still required, this is followed by a standard RSI procedure wherein oxygen is continuously administered via nasal prongs during the apnoeic period.²

Indications for DSI

“Good lungs, bad brain” – i.e. hypoxic, agitated, alcohol intoxication
“Bad lungs” – i.e. COPD, severe asthma, ARDS, pneumonia
“Bad vital signs” – i.e. poor oxygen saturations, hypotension

Rationale for DSI

- Patients with increased metabolic demands desaturate faster.
- Patients who are shunting desaturate faster, are harder to pre-oxygenate and are more difficult to re-oxygenate

What is Apnoeic Oxygenation?

Apnoeic oxygenation is a process whereby high flow oxygen is continually administered to an apnoeic patient during airway management attempts.

Rationale & procedure for apnoeic oxygenation

- Apnoeic oxygenation can prolong safe apnoea period, particularly useful for obese patients who desaturate faster than normal weight patients.^{2,4} (Figure 1)
- Insert bilateral nasal airways. (Figure 2), apply nasal cannula at 10-15 l/min after induction agent and leave in place during intubation attempt(s).³

Procedure for DSI

1. Identify agitated patient requiring intubation
2. Administer induction agent, ideally ketamine 1-2 mg/kg.
3. Place non-rebreather mask (NRM) and nasal cannula at 15 L/min each (Figures 2 & 3)
4. If SpO₂ is <95% then use CPAP/BMV/anaesthetic circuit with PEEP at 5-15 cmH₂O (this usually takes 2-3 minutes, but may take up to 10 minutes – if oxygenation does not improve during this time then it may be necessary to proceed with intubation with SpO₂ <95%).
5. Administer neuromuscular blocking agent and wait 45-60 seconds.
6. Perform apnoeic oxygenation using 15 L/min O₂ via nasal prongs +/- continue CPAP.
7. Intubate patient.

Benefits of DSI over RSI

- Occasionally DSI can avert the need for intubation completely as the patient is no longer agitated and oxygenation improves.⁵
- DSI can significantly improve oxygen saturations prior to intubation.⁶

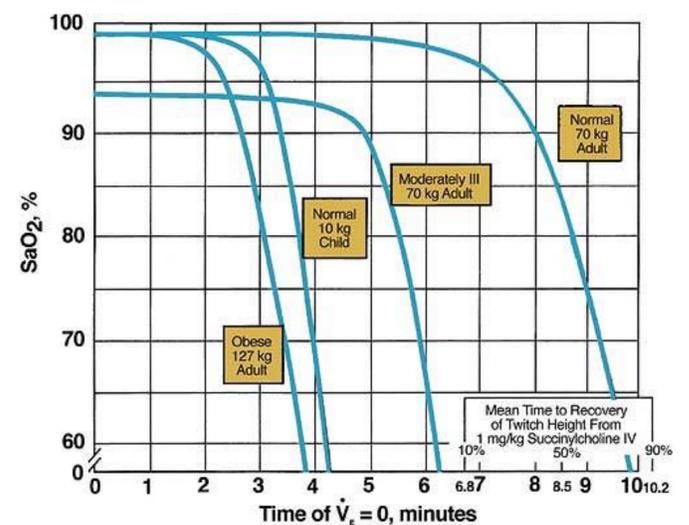


Figure 1. Time to desaturation in patients (1)



Figure 2. Oxygenation via nasal cannula (2)



Figure 3. Pre-oxygenation via NRM & nasal cannula (2)

Conclusion

- DSI can avert the need for intubation.
- In those patients who require intubation, DSI can make intubation conditions easier and safer.
- DSI combined with apnoeic oxygenation can prolong the period of safe apnoea.

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