CAN’T INTUBATE CAN’T OXYGENATE (CICO)
Management of the Critically Obstructed Airway

Jet Oxygenation Technique

Jet oxygenation is the means by which oxygen is delivered to the patient via the cannula, traditionally using a device which delivers oxygen under high-pressure (although we recommend the use of lower pressures, see later). The main danger with jet oxygenation down a cannula is the potential to cause barotrauma (e.g., pneumothorax, pneumomediastinum, tension pneumothorax). It is therefore important to use the safest effective jet oxygenation technique possible to avoid this situation.

Available devices include the Manujet™, ENK™ and the RAPID-O2 OXYGEN Cricothyroidotomy Insufflation Device™ [Medicare CODE 2290-001] (formerly known as the Leroy). All have Luer-Lok connections. General principles of use apply to all three devices. The Manujet™ differs from the other two in that it connects to a high pressure source of oxygen while the other two connect to a flow meter. In addition it does not contain a vent and will need to be disconnected if venting is considered necessary due to accumulated gas.

General principles of safe jet oxygenation

- After connecting the cannula to the jet oxygenation device, never let go of the cannula.
- Only jet oxygenate whilst watching for chest wall rise and fall.

First inspiratory breath

You are trying to achieve 2 things with jet oxygenation in the CICO scenario:

1. Provide oxygen
2. Prevent/improve airway and alveolar collapse

We recommend the initial jet oxygenation to rescue the patient from hypoxia to use one longer breath in order to re-expand the collapsed hypoxic lungs. This should be followed by subsequent breaths when the patient begins to desaturate (i.e. not at a pre-determined rate, but in reaction to the SpO2). We believe that it minimises the risk of barotrauma to the patient.

The Manujet™ should be set at 1.0 bar (i.e. Infant setting, in the Yellow Zone). The ENK™ and Rapid-O2™ devices should be connected to an O₂ flow meter set to 15 litres per minute. These settings deliver an inspiratory flow of approximately 250 mls/second. We recommend jetting for 4 seconds, which delivers 1000mls of oxygen, sufficient to re-expand the lungs.

Whilst applying the first jet, check the chest for movement and listen for flow. If there is no response or improvement in SpO₂ after 30 seconds, a second jet of 2.0 seconds should be administered.

Subsequent inspiratory breaths

We recommend not jetting again until the SpO₂ has dropped by 5% from the maximum achieved with the initial jet. The subsequent jet should be of 2 secs duration. This has been shown in the Wet Lab to be a safe and effective method. If there is no saturation reading insufflate 500 mls every 30 seconds.
Expiration

The rate-limiting step for the frequency of safe jet oxygenation is the patency of the expiratory pathway. Always keep in mind that ventilation is not important in the emergency scenario. You are not trying to control the CO2 initially.

If the patient has complete upper airway expiratory obstruction, then some form of expiration through the cannula is necessary in case the lungs are hyper-inflated and causing haemodynamic compromise.

An obstructed upper airway may also be improved with the usual manoeuvres to open it such as jaw thrust, chin lift or LMA insertion.

If jetting with the Manujet, and there is no signs of expiratory flow, then you should disconnect the Manujet to allow some expiration through the cannula (Taking care to not inadvertently remove the cannula). This is to ensure hyperinflation causing reduced venous return does not occur. The Rapid-O2™ and ENK™ allow expiration through the cannula and do not require disconnection.