Rapid sequence intubation (RSI) in hypoxic agitated patients - should it be controlled?

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The recent Royal College of Anaesthetists NAP4 audit[1] aimed to identify and study major complications of airway management in the UK. It described many of these events as likely to have been avoidable, with a disproportionately high number of adverse airway incidents occurring in the intensive care unit (ICU) and emergency department.

When compared with 'anaesthetic' airway incidents, ICU airway events were more likely to be managed by doctors with less airway experience, occur out of hours and lead to permanent harm and death. Similar findings are echoed in the report written on behalf of the UK National Patient Safety Agency[2].

The fundamental problem is that anaesthetic trainees are taught to do Rapid Sequence Induction (RSI) in the controlled theatre environment for emergency surgery. Traditional RSI is pre-oxygenation, induction with a pre-calculated dose of medications, application of cricoid pressure, followed by apnea and intubation. This method is then transferred to intensive care patients and in resuscitation rooms, where patients are often hypoxic and agitated.

A pilot survey of anaesthetic core trainees in our Trust showed that at least 90% of them will use the same drugs (Thio/Sux – thiopental and suxamethonium) and technique (RSI) in emergency anaesthesia and in hypoxic intensive care patients. Although this technique is taught in traditional training, there is very little physiological reserve in the intensive care patients to cope with a difficult or failed intubation. It is common sense that the same technique for all patients may not be sensible or safe.

Hypoxia and hypercapnia can lead to delirium, causing these patients to rip off their non-rebreather or NIV masks. This delirium, combined with the oxygen desaturation on the monitor, often leads to precipitate attempts at intubation when pre-oxygenation is inadequate. The Rapid Sequence Induction becomes Rushed Sequence Intubation with little preparation and back up plans. The obvious solution to this is the practice of CSI - Controlled Sequence Induction.

Balancing the risk of pulmonary aspiration with the much more prevalent risk of hypoxaemia, RSI-controlled in children[3] acknowledge the following principles: pre-oxygenation, rapid induction of adequate hypnosis and profound muscle paralysis using a non-depolarizing muscle relaxant, gentle mask ventilation with a maximum airway pressure of 12 cm water, laryngoscopy, and finally intubation when deep anaesthesia and full muscular blockade are present. This should suffice to provide adequate oxygenation but is unlikely to cause relevant gastric inflation.

Eich et al[4] found that the reduction of haste in RSI-controlled compared with RSI-classic reduces the incidence of unsafe actions as well as the providers' stress levels.

Scott et al[5] describe the technique of Delayed Sequence Induction - DSI. The importance of effective pre-oxygenation with sedation and use of a non-invasive ventilation technique for effective oxygenation are described as a must before intubation. DSI consists of the administration of specific sedative agents, ketamine or alpha agonists which do not blunt spontaneous ventilations or airway reflexes; followed by a period of pre-oxygenation before the administration of a paralytic agent.

By using different concept like CSI/DSI instead of RSI at least we can make the attending team less stressed and do the process in a controlled way taking adequate precautions. More importantly the approach to these patients will be different.

We hope the on-going changes in the intensive care curriculum will incorporate this fundamental aspect of the practice in their training curriculum and encourage the practitioners to use a controlled technique for intubating hypoxic intensive care patients and improve safety.

CSI should be the concept for every induction using appropriate drugs and precautions.

References

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