# HOT TOPIC 23

## DO YOU PERFORM A RAPID SEQUENCE INDUCTION (RSI) IN EMERGENCIES?

### SUMMARY OF KEY POINTS:

- The evidence to support the use of cricoid pressure is conflicting and may not be practical in children
- Our survey found the decision to perform an RSI in children following trauma is largely dependent on patient factors such as starvation and injury timing
- We found the majority of anaesthetists would perform an RSI for a patient presenting with acute appendicitis, and the decision to do so was not age dependent

### REVIEW OF EVIDENCE

Pulmonary aspiration seems to have a slightly lower incidence in children, with fewer deleterious effects when it does happen (1). A review in *Pediatric Anesthesia* stated that the 'classic' RSI technique (preoxygenation, cricoid pressure and intubation following a pre-determined dose of thiopental and succinylcholine) has been adopted without any supporting evidence from randomized controlled trials, and can be stressful and potentially harmful in paediatrics. Recommendations in the use of a 'controlled RSI' include having sufficiently deep anaesthesia, avoiding cricoid pressure, $20^{o}$ head up position and confirmation of muscle paralysis prior to intubation. Gentle ventilation is advised to avoid hypoxaemia and hypercapnia (1,2). A recent review from SFAR (French Society of Anaesthesia and Intensive Care Medicine) looking at the broad practice of RSI in children advised the use of a rapid onset muscle relaxant (3). A 2017 Cochrane review comparing Rocuronium vs Succinylcholine for RSI in the paediatric subgroup demonstrated no statistically significant difference in intubation conditions. However, the review as a whole demonstrated a superiority of Succinylcholine to Rocuronium in RSI (4).

Children are more prone to hypoxaemia following RSI due to physiological differences such as a reduced functional residual capacity, increased oxygen demand and greater closing capacity compared to adults (2). Preoxygenation can be difficult and may not prevent hypoxaemia (1). Children aged 3-12 years have been found to have a higher incidence of severe hypoxaemia, bradycardia and difficulty with intubation when using the classic RSI (2). Gentle mask ventilation not exceeding 10-12cm H2O can significantly reduce hypoxaemia and bradycardia with no pulmonary aspiration (2). The head up position during preoxygenation has been shown to improve efficacy in adults and may be useful in children (1).

Cricoid pressure is an integral part of the classic RSI without any robust evidence to support improved clinical outcome (2). The technique is of variable efficacy and can hinder the chances of effective tracheal intubation by distorting the airway. The cricoid cartilage is smaller and harder to locate in children, and when pressed can decrease the lower oesophageal sphincter tone increasing the risk of passive aspiration (1). Children find cricoid pressure unpleasant and it may not be tolerated in a combative or agitated child. However, cricoid pressure has been shown to prevent passive regurgitation in one study using paediatric cadavers (2). It may also prevent gastric insufflation during manual ventilation in children between 2 weeks and 8 years old (1). Opinion suggests that the use of 'careful' cricoid pressure with gentle ventilation may be advisable (5).

We sent a survey to all consultants who routinely or occasionally deliver paediatric anaesthesia in a District General Hospital (DGH), and to all consultants in a Tertiary Children's Hospital (TCH). We asked

five questions about the decision to perform an RSI in three emergency scenarios: testicular torsion, acute appendicitis, and a forearm fracture. For each question we asked for comments and anything that might influence their decision. We had 21/35 responses from the DGH and 14/21 from the TCH.

**Would you perform an RSI in a child presenting with a testicular torsion?**

**DGH** –Yes 43% No 33% Other 24% **TCH** – Yes 36% No 28% Other 36%

Comments included factors such as whether patient was starved, use of opioids, pain onset time. 3 responders mentioned the use of a modified RSI with or without cricoid.

**Would you perform an RSI in a child presenting with acute appendicitis?**

**DGH** – Yes 71% No 24% Other 5% **TCH** – Yes 64% No 21% Other 15%

Comments included needing to assess each case individually e.g. fasting times, presence of cannula, compliance and age of child.

**Would you perform an RSI in a child presenting with a forearm fracture?**

**DGH** – Yes 5% No 71% Other 24% **TCH** – Yes 0% No 64% Other 36%

Comments included need for clarification on timing of injury, eg RSI if within 6 hours of injury; RSI if open fracture or high use of opioids; RSI if accident on day of anaesthesia and food eaten.

**Is the decision for an RSI age dependent, and if so what age?**

**DGH** – Yes 14% No 86% **TCH** – Yes 50% No 50%

For those who expressed age dependence, the age below which a consultant would NOT perform an RSI varied from 2 years to 12 years.

Both the TCH and DGH anaesthetists frequently mentioned starvation times, the individual case and patient history such as acuity of injury, severity of illness and use of opioids. Also, some form of 'modified' RSI was a common alternative (no sux, and delayed or no cricoid).

**Conclusion:**

A Cochrane Review (4) advises the use of succinylcholine or rocuronium as a rapid onset muscle relaxant. A review article in *Paediatric Anesthesia* (2) suggests the use of a modified RSI including gentle ventilation, head up position, avoidance of cricoid pressure and muscle relaxation prior to intubation. The results from our survey suggest that there is a slightly higher use of RSI in the DGH compared to the TCH, and a higher concern in the DGH about compliance and presence of an IV cannula than the TCH. Many comment about the decision being case dependent. The default seems to be generally 'yes' to a modified RSI in testicular torsion and acute appendicitis and 'no' in an isolated forearm fracture. However the numbers are small and there are many other factors which affect decision making.

References:


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