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Special Issue

SPECIAL ISSUE

Current practice of rapid sequence induction of anaesthesia in the UK - a national survey

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Abstract

Background: The 'classical' technique of rapid sequence induction (RSI) of anaesthesia was described in 1970. With the introduction of new drugs and equipment in recent years, a wide variation in this technique has been used. The role of cricoid pressure is controversial because of the lack of scientific evidence. Moreover, gentle mask ventilation has been recommended in situations such as obesity and critically ill patients, to prevent hypoxaemia during the apnoeic period. In identifying multiple techniques, we conducted a national postal survey to establish the current practice of RSI in the UK.

Methods: A survey consisting of 17 questions was created and posted to 255 National Health Service (NHS) hospitals in the UK. We included two copies of the questionnaire in each envelope; one to be completed by the airway lead (consultant anaesthetist with responsibility of overseeing the standard of airway training and implementing national airway guidelines and recommendations within their institution) and the other by a trainee in the same department. The difference in responses from consultants and trainees were assessed using the χ^2 test and the Fisher's exact test.

Results: In total we received 272 responses (response rate 53%) of which 266 (58% from consultants and 42% from trainees) were analysed. A majority of the respondents (68%) pre-oxygenated by monitoring end-tidal oxygen concentration and 76% of the respondents use 20–25° head up tilt for all RSIs. Propofol is the most commonly used induction agent (64% of all respondents). Opioid has been used by 80% of respondents and only 18% of respondents use suxamethonium for all patients and others choose rocuronium or suxamethonium based on clinical situation. Although 92% of anaesthetists use cricoid pressure, 83% of them never objectively measure the force used. During the apnoeic period 17% of the respondents use gentle mask ventilation.

Conclusions: Our survey demonstrated a persistent variation in the practice of RSI amongst the anaesthetists in the UK. The 'classical' technique of RSI is now seldom used. Therefore there is a clear need for developing consistent guidelines for the practice of RSI.

Key words: anaesthetics; Great Britain; intubation; neuromuscular block; oxygen; propofol; questionnaires

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Editor's key points

- The 'classical' technique of rapid-sequence induction of anaesthesia was introduced in 1970's, and there may be a wide variation of techniques now, as a result of introduction of new drugs, equipment, and concepts.
- A postal survey was made to examine the variation of this technique in the UK.
- The 'classical' technique was seldom used, and there was a wide variation in the technique, necessitating up-to-dated guidelines for the practice of rapid-sequence induction of anaesthesia.

Introduction

Rapid sequence induction (RSI) of anaesthesia is such a fundamental skill in anaesthetic practice in the UK, that the Royal College of Anaesthetists (RCoA)[1] has set it as one of the initial assessment competencies for novices. The 'classical' approach to RSI, as advocated by Stept and Safar[2], describes pre-oxygenation, administration of a pre-determined dose of thiopental and suxamethonium, application of cricoid pressure, avoidance of face mask ventilation and intubation with a cuffed tracheal tube. This ensures an optimal condition for rapid tracheal intubation.

There is controversy regarding the choice of drugs, patient position, ventilation during the apnoeic period and application of cricoid pressure during RSI.[3] In recent years, newer techniques of pre-oxygenation,[4–6] patient positioning[7 8] and delivery of oxygen during the apnoeic period[9 10] have been described. Rocuronium, at a dose of 1.2 mg kg^{-1}, has been shown to produce rapid onset of muscle paralysis similar to suxamethonium[11] and sugammadex rapidly antagonizes even profound levels of rocuronium induced neuromuscular block.[12] To prevent hypoxaemia during the apnoeic period, gentle mask ventilation has been used in situations such as the obese, paediatrics and critically ill patients.[3] Although the purpose of cricoid pressure is to prevent regurgitation of gastric contents, there are reports of its failure.[3 13 14]

The national survey[15] of anaesthetists in the UK in 2001, exploring the practice of RSI, found that all respondents used pre-oxygenation and applied cricoid pressure. The same survey found that thiopental and suxamethonium were the most widely used drugs and the majority of respondents (75%) also routinely administered an opioid. Another regional survey[16] in the UK in 2009, showed that 100% of respondents choose RSI for bowel obstruction, whereas only 83% of them chose RSI for symptomatic hiatus hernia. It also demonstrated a significant difference in the practice between trainees and consultants. A survey amongst the anaesthetists in the USA demonstrated that the majority of residents and attending physicians use mask ventilation during RSI.[17] However there are certain aspects of RSI that need to be further explored. These include the use of newer techniques of pre-oxygenation, including patient position and oxygenation during the apnoeic period, whether rocurnoium has completely replaced suxamethonium, if cricoid pressure is still routinely used and if the force applied during cricoid pressure is objectively measured. Therefore using a national survey, we aimed to evaluate the current practice of RSI in view of answering the above questions. We also wished to determine whether the practice is consistent between trainees and consultants across the UK.

Methods

The initial list of National Health Service (NHS) hospitals in the UK was sourced from the medical education department, University Hospital Coventry, UK. This was cross checked for completeness with the list of hospitals with airway leads obtained from the Health Services Research Centre, Royal College of Anaesthetists. Finally, airway leads (consultant anaesthetist with responsibility of overseeing the standard of airway training and implementing national airway guidelines and recommendations within their institution) were searched on the RCoA online database. The NHS hospitals in the UK with resources for anaesthetizing adult, non-pregnant patients were included in the survey.

A survey questionnaire consisting of a total 17 questions was designed in Microsoft Word® with 5 sections: characteristic details, such as grade of the respondent and type of hospital they work at, techniques of pre-oxygenation including patient position, drugs used, details of cricoid pressure and technique of oxygenation during the apnoeic period. The initial draft survey questionnaire was designed based on previously published audit on RSI[18] and circulated to anaesthetists in the authors' (NU and CM) own department and subsequently for all trainees in the West Midlands region. The comments and suggestions received were incorporated and the final questionnaire was designed (Appendix 1). The questionnaire requested the respondent to answer the questions with regard to their clinical practice of RSI for a haemodynamically stable adult patient.

The postal survey, addressed to airway leads was sent to 234 hospitals. In each envelope, we included a short covering letter and two questionnaires, one to be completed by the airway lead and the other one by a junior trainee in their department. The initial round of survey questionnaires were posted between 1st October and 15th October 2014. Six weeks later, the non-responders were reminded by email or telephone call. The questionnaires were re-sent to those who stated that they had not received it. During this stage, we posted 21 envelopes addressed to the college tutors in those hospitals assumed to have no nominated airway leads. In total 255 envelopes containing 510 questionnaires were sent in the post.

The responses of returned questionnaires were entered into a Microsoft Excel® spreadsheet. The incomplete responses and those received from paediatric and obstetric specialist hospitals were excluded from the analysis. Analysis of the data was carried out using statistical software SPSS (Version 18, SPSS Inc., Chicago, IL). The differences in responses between consultants and trainees were compared using the χ^2 test or, if very few anaesthetists selected specific responses, the Fisher's exact test. All comparison tests were performed at 5% significance level.

Results

We received 272 questionnaires with an overall response rate of 53%. Six returned questionnaires could not be analysed (two from specialized obstetric hospitals, one from a specialized paediatric hospital and three incomplete responses). The total 266 questionnaires; 155 (58%) from consultants and 111 (42%) from trainees were included in the analysis.

Pre-oxygenation and position

All respondents, except one trainee and three consultants, performed pre-oxygenation. A majority of the respondents (68%) pre-oxygenated by monitoring end-tidal oxygen concentration (FEO_2), with proportionately higher number of trainees monitoring the FEO_2 (Table 1). Head up position of 20 to 25° was chosen by 203/266 (76%) of respondents as a routine practice during pre-oxygenation and another 11% of the respondents use up to 45°