Rapid sequence intubation in Scottish urban emergency departments


Objective: Airway care is the cornerstone of resuscitation. In UK emergency department practice, this care is provided by anaesthetists and emergency physicians. The aim of this study was to determine current practice for rapid sequence intubation (RSI) in a sample of emergency departments in Scotland.

Methods: Two year, multicentre, prospective observational study of endotracheal intubation in the emergency departments of seven Scottish teaching hospitals.

Results: 1631 patients underwent an intubation attempt in the emergency department and 735 patients satisfied the criteria for RSI. Emergency physicians intubated 377 patients and anaesthetists intubated 355 patients. There was no difference in median age between the groups but there was a significantly greater proportion of men (73.2% versus 65.3%, p=0.024) and trauma patients (48.5% versus 37.4%, p=0.003) in the anaesthetic group. Anaesthetists had a higher initial success rate (91.8% versus 83.8%, p=0.001) and achieved more good (Cormack-Lehane Grade I and II) views at laryngoscopy (94.0% versus 89.3%, p=0.039). There was a non-significant trend to more complications in the group of patients intubated by emergency physicians (8.7% versus 12.7%, p=0.104). Emergency physicians intubated a higher proportion of patients with physiological compromise (91.8% versus 86.1%, p=0.027) and a higher proportion of patients within 15 minutes of arrival (32.6% versus 11.3%, p<0.0001).

Conclusion: Anaesthetists achieve more good views at laryngoscopy with higher initial success rates during RSI. Emergency physicians perform RSI on a higher proportion of critically ill patients and a higher proportion of patients within 15 minutes of arrival. Complications may be fewer in the anaesthetists’ group, but this could be related to differences in patient populations. Training issues for RSI and emergency airway care are discussed. Complication rates for both groups are in keeping with previous studies.
included. When a form was not completed prospectively, investigators completed a form retrospectively with reference to the emergency department records and, if necessary, personal contact with the person who performed the procedure was made. Occasionally it was not possible to complete forms retrospectively because of lack of notes or difficulty in identifying the personnel involved in the resuscitation.

Completed forms were returned to the Central Office of the Scottish Trauma Audit Group (STAG) for data entry and analysis using the SPSS database (v.9). The χ² test was used to compare categorical variables. The Mann-Whitney U test was used for non-parametric data. Statistical significance was defined as p<0.05.

As this was an observational study, no restrictions were placed on the drugs used for RSI or any other method for facilitating endotracheal intubation. Participants were free to use whatever technique and drugs they chose for each individual patient. Therefore, no allocation of patients to one specialty or another was made on account of the study and no changes were made to normal emergency airway practice in the participating departments.

Only adult patients on whom RSI was attempted in the emergency department were included in the final analysis. Patients were excluded from the analysis if they met one or more of the following criteria: non-traumatic cardiac arrests (n=593); intubation attempt without drugs (including cardiac arrest following trauma) (n=238); intubation attempt with sedative, anaesthetic or neuromuscular blocking drug only (n=47); inhalational induction of anaesthesia (n=11); or age less than 13 (n=44).

Physiological compromise was defined as the presence of one or more of the following immediately before any attempt at intubation: systolic blood pressure less than 90 mm Hg; Glasgow Coma Score (GCS) <9; respiratory rate less than 10 per minute or greater than 29 per minute; oxygen saturation <90% (measured by pulse oximetry, regardless of inspired oxygen concentration).

RESULTS
A total of 1631 patients met the study entry criteria. Altogether 735 patients fulfilled the criteria for RSI and were therefore eligible for analysis. Table 1 gives patient details for the two groups (anaesthetists and emergency physicians).

Table 1 RSI patient details for each specialty

<table>
<thead>
<tr>
<th></th>
<th>Emergency medicine</th>
<th>Anaesthesia</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>377</td>
<td>355</td>
<td>–</td>
</tr>
<tr>
<td>Proportion of men</td>
<td>65.3% (246/377)</td>
<td>73.2% (260/355)</td>
<td>0.024</td>
</tr>
<tr>
<td>Median age</td>
<td>49</td>
<td>44</td>
<td>NS</td>
</tr>
<tr>
<td>Trauma</td>
<td>37.4% (141/377)</td>
<td>48.5% (172/355)</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Three patients did not have a specialty recorded.

Table 2 Comparisons between emergency medicine and anaesthesia

<table>
<thead>
<tr>
<th></th>
<th>Emergency medicine</th>
<th>Anaesthesia</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade I and II laryngoscopy</td>
<td>89.3% (316/354)</td>
<td>94.0% (298/317)</td>
<td>0.039</td>
</tr>
<tr>
<td>Initial success rate</td>
<td>83.8% (316/377)</td>
<td>91.8% (326/355)</td>
<td>0.001</td>
</tr>
<tr>
<td>Immediate complications</td>
<td>12.7% (48/377)</td>
<td>8.7% (31/355)</td>
<td>0.104</td>
</tr>
<tr>
<td>Physiological compromise</td>
<td>91.8% (315/343)</td>
<td>86.1% (267/310)</td>
<td>0.027</td>
</tr>
<tr>
<td>Patients intubated within 15 minutes</td>
<td>32.6% (123/377)</td>
<td>11.3% (40/355)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Immediate complications refers to the number of patients in each group who had one or more complications, not the total number of complications.

Table 3 Immediate complications

<table>
<thead>
<tr>
<th></th>
<th>Emergency medicine</th>
<th>Anaesthesia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oesophageal intubation</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>Endobronchial intubation</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Aspiration</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Vomiting/regurgitation</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Critical desaturation</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Severe hypotension (systolic BP &lt;90 mm Hg)</td>
<td>17</td>
<td>8</td>
</tr>
<tr>
<td>Surgical airway</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cardiac arrest</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

Figures are number of individual complications. All oesophageal intubations were immediately recognised and all patients had their tracheas intubated.
success rate is related to the higher proportion of good views obtained at laryngoscopy.

Both anaesthetists and emergency physicians seem to be capable of performing RSI in the emergency department with comparable immediate complication rates. Emergency physicians tended to have a higher proportion of patients who experienced immediate complications compared with anaesthetists. This did not reach statistical significance, but the study is not sufficiently powered to conclude that there is definitely no difference between the groups. The majority of these complications were either recognised oesophageal intubations or hypotensive episodes. The complications overall noted in the study are comparable to another study of intubation in the critically ill. It is apparent from table 1 that emergency physicians and anaesthetists are performing RSI on differing populations of patients and this may affect the immediate complications observed.

This study has also shown that emergency physicians are performing RSI on a higher proportion of patients with physiological compromise and a higher proportion of patients within 15 minutes of arrival in the emergency department. It is probable that these patients are so ill that the emergency physician has considered it necessary to intervene immediately to save life and reduce morbidity. It may also be related to the immediate availability of the emergency physician within the emergency department, while there may also be a variable delay between calling the anaesthetist to the emergency department and their arrival.

Notwithstanding the results of this study it is clear that trainees in anaesthesia and emergency medicine need to receive adequate training in resuscitation including advanced airway techniques; this has to include RSI and the management of the difficult or failed airway. This may entail experience in the emergency department, intensive care unit and operating theatre for both specialties along with dedicated simulator training.

The lack of internationally accepted definitions of complications of RSI means that studies of emergency airway management (in any setting) cannot be compared on an equivalent basis. Standardised definitions would permit national and international comparisons in the future.

In the UK, there is a role for both emergency physicians and anaesthetists in the management of acute airway compromise in the emergency department. Close collaboration on training and service models and delivery is essential.

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Contributors

Colin Graham: original idea, literature search, study design, proforma design, prospective and retrospective data collection, on site coordination, interpretation of results, principal investigator, writing the paper, coordination of coauthors. Diana Beard: study design, protocol, proforma design and printing, retrospective data collection, cleaning, analysis and reporting of data, co-ordination of the study, writing of results. Angela Oglesby: data collection, on site coordination, data entry, form re-design, contribution to the paper. Shobhan Thakore: original idea, study design, form design, data collection, on site coordination, subset analysis, contribution to the paper. Jacqueline Beale: form re-design, data collection, on site coordination, data entry. Jocelyn Britilliff: data collection, on site coordination, form re-design. Michael Johnston: study design, proforma design, interpretation of results, revision of paper, project supervision. Dermot McKeown: liaison with the Scottish Board of the Royal College of Anaesthetists, proforma redesign, interpretation of results, reporting on complications, revision of the paper, project supervision. Tim Parke: study design, form design, interpretation of results, revision of paper, project supervision. Colin Graham is the guarantor for the study.

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REFERENCES


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