Advanced airway control in trauma resuscitation

M. E. McBRIEN*, A. J. POLLOK† & D. J. STEEDMAN*
*Department of Accident and Emergency Medicine and †Department of Anaesthetics, Royal Infirmary, Lauriston Place, Edinburgh

SUMMARY

Definitive airway control which may require endotracheal intubation with or without an induction agent and muscle relaxant is an essential component of trauma resuscitation. We reviewed the delivery of advanced airway care in the resuscitation room of a regional trauma centre. This prospective survey suggests that in the absence of an experienced anaesthetist, A&E staff with a background of suitable training and experience may undertake the anaesthetic responsibility associated with securing a definitive airway when the situation demands.

INTRODUCTION

Acute hypoxia remains a major cause of preventable death in patients with major trauma (Royal College of Surgeons of England, 1988). The ability to recognize a compromised airway, rapidly protect it and assist ventilation where appropriate can be life saving (Watson, 1990). We report on the advanced airway control provided within the resuscitation room of a regional trauma centre.

PATIENTS AND METHODS

The Royal Infirmary of Edinburgh is the major trauma centre for the Lothian and Border Regions, serving a population of 1.5 million. An accident flying squad operates from the A&E Department. A prospective survey was undertaken over 15

Correspondence: Mr D. J. Steedman, Consultant, Department of Accident and Emergency Medicine, Royal Infirmary, Lauriston Place Edinburgh.
weeks (March–June 1990) during which the A&E resuscitation team leader completed a proforma on all trauma patients requiring advanced airway control. Details recorded were the patient’s age; sex; estimated weight; Glasgow Coma Scale prior to intubation; endotracheal tube size and drugs administered; serially recorded vital signs (Dinamap); and arterial blood gas measurements.

Critical review of the patient’s management was undertaken by a consultant anaesthetist (AJP) who had access to the A&E notes and resuscitation charts but was blinded to the specialty and grade of the doctor performing tracheal intubation.

RESULTS

Fifty-three injured patients required advanced airway control which comprised 30% of trauma patients (53/175) treated in the resuscitation room during the survey. The mean age was 29 years (range 2–80 years), 43 patients (81%) were male. All patients were initially received by a medical and nursing team from A&E led by a doctor of registrar grade or above. Endotracheal intubation was performed in 29 patients (55%) in the resuscitation room (median ISS = 25), in six patients (11%) at the scene (median ISS = 34) and in 18 cases (34%) prior to transfer from another hospital (median ISS = 26). The median Glasgow Coma Score values on intubation were 8, 3 and 6 respectively. All patients were orally intubated to secure the airway following head or facial injury.

Of the 35 intubations performed by staff from this hospital, (29 in the resuscitation room, six at the scene of the accident) 21 (60%) were by A&E doctors and 14 (40%) by anaesthetists. Twenty-three patients (66%) were managed between 1700 and 0900 hrs. The seniority of the doctor performing intubation, consultant; senior registrar; and registrar, was seven; seven; and nine (A&E staff) and one; four; and nine (anaesthetists). No doctor below registrar grade was involved.

Of the 29 patients intubated in the resuscitation room, 25 (86%) required an induction agent (sodium thiopentone) and a rapidly acting muscle relaxant (suxamethonium chloride). In 13 patients who were anaesthetized by A&E staff, a consultant either performed or superintended the procedure.

Fourteen of the 18 patients transferred from another hospital required supplemental muscle relaxant (pancuronium bromide) and sedation (phenoperidine) administered by A&E staff on admission to the resuscitation room.

Independent critical review of the 53 cases revealed complications in six instances (11%). Although the dosage of induction agent was correctly reduced in four hypovolaemic patients, four transient hypotensive episodes (>15% decrease in preintubation systolic bp) were documented (three A&E; one anaesthetist). Prolonged intubation (greater than ones own breathhold) was documented in two cases (one A&E, one anaesthetist). However there were no instances of inadvertent oesophageal intubation. There were no recorded episodes of vomiting and aspiration during induction of anaesthesia in the A&E resuscitation room. Nasogastric suction had been instituted prior to anaesthesia in 84% of cases (21/25) and cricoid pressure was performed during the procedure in all cases. In addition to clinical observation, ECG and intermittent arterial pressure monitoring,
pulse oximetry was available in seven (13%), central venous pressure monitoring in 15 (28%) and direct arterial pressure monitoring in 11 (21%) patients.

DISCUSSION

Definitive airway control which may require endotracheal intubation with or without an induction agent and muscle relaxant is an essential component of trauma resuscitation practice (Bullock & Teasdale, 1990; Watson, 1990). Such control is often required immediately following admission to the A&E Department resuscitation room. Although an experienced anaesthetist is an essential member of the trauma team, occasions may arise when he is not immediately available and even a brief delay in response can seriously compromise the patient. The reception facility for trauma victims in the U.K. is the A&E Department staffed increasingly by appropriately trained specialists. This survey suggests that in the absence of an experienced anaesthetist, A&E staff with a background of suitable anaesthetic experience may undertake the anaesthetic responsibility in securing an airway when the situation demands. Anaesthetic and intensive care experience is obligatory during the higher medical training in A&E Medicine (Joint Committee on Higher Medical Training, 1989) and the successful completion of an Advanced Trauma Life Support (ATLS) course run by the Royal College of Surgeons of England should be considered mandatory for trainees in all specialties involved in acute trauma care. Clearly the risks of regurgitation of stomach contents and aspiration of vomit, exacerbating injury to the cervical spine during intubation and haemodynamic compromise, from injudicious use of drugs are high. Transient hypotensive episodes following anaesthetic induction were recorded more frequently when performed by A&E staff compared to anaesthetists. However, a larger study would be necessary to determine whether a difference in significant complication rate exists. Whether the responsibility is accepted by an anaesthetist or non-anaesthetic staff, all should be aware of the potential risks and have extensive experience in managing multiple trauma victims.

We acknowledge that the low incidence of adverse respiratory and cardiovascular responses documented may reflect inadequate monitoring. Recommendations for minimal levels of monitoring during anaesthesia have been recognized and, in cases of hypovolaemic shock, includes direct measurement of arterial and central venous pressure, pulse oximetry and capnography (Association of Anaesthetists of Great Britain and Ireland, 1989). The specialities involved in the immediate care of the multiply injured patient now need to agree upon appropriate levels of monitoring which will accurately reflect acute changes in the cardiovascular and respiratory states in response to resuscitative intervention.

The lack of involvement of senior staff in the initial reception and management of trauma patients has been recently criticised (Royal College of Surgeons of England, 1988). The survey suggests that in the absence of a trained anaesthetist, medical staff with appropriate training, seniority and experience can competently undertake the initial management of a trauma patient with an unprotected airway and inadequate ventilation.
ACKNOWLEDGEMENTS

We would like to thank Mrs E. MacDonald and Mrs E. Laing for typing the manuscript.

REFERENCES