

Occasional Survey

Acute airway management in the critically ill child requiring transport

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Airway compromise was found to be a common problem in children requiring critical care transport to our hospital. This retrospective review of 39 infants and children was undertaken to assess the frequency and degree of airway compromise in these children, to document the management required and to determine who performed it. Ninety-seven per cent of children had airway difficulties associated with their disease, and one-third of these required further airway management on the arrival of the transport team. Airway specialists had not been involved in the care of these children before the arrival of the transport team. This indicates that greater attention should be paid to airway management as soon as children are identified as being sufficiently ill to require transport to a tertiary care facility.

Les voies aériennes compromises représentent un problème fréquent chez les enfants nécessitant le transport aux soins intensifs de notre hôpital. Cette revue rétrospective de 39 nouveau-nés et enfants a été conçue afin d'évaluer la fréquence et le degré du danger sur les voies aériennes chez ces enfants, de documenter la conduite requise et de déterminer qui en est responsable. Quarante-vingt-dix-sept pour cent des enfants présentaient des difficultés concernant les voies aériennes associées à leur maladie et le tiers de ceux-ci ont nécessité une conduite additionnelle à l'arrivée de l'équipe de transport. Les spécialistes des voies aériennes n'étaient pas impliqués dans le

soin de ces enfants avant leur arrivée à l'hôpital. Ceci indique qu'une plus grande attention doit être portée aux voies aériennes aussitôt que les enfants sont identifiés comme étant assez malades pour nécessiter un transport vers un centre de soin tertiaire.

Critically ill children with a variety of illnesses may be referred for transport to a tertiary care facility. In our experience, airway compromise is often the primary problem or a major complication of the serious illness leading to the request for transport. This paper reviews the airway difficulties encountered by the Paediatric Transport Team of the Children's Hospital of Western Ontario. Our main interest was to document the frequency of and the causes for airway intervention by the transport team and the community hospital anaesthetist's role in the process.

Methods

The records of all children transported to the Children's Hospital of Western Ontario from January 1982 to December 1985 were retrospectively reviewed. Sources of data included the chart from the sending hospital (photocopied), the transport record, and the hospital chart. Data such as the specialty of physicians named in the sending hospital's chart were obtained by telephoning the referring hospital's medical records department. The diagnosis at the time of the transport request was recorded as was the existence of airway compromise, the airway intervention performed and the specialty of the physician(s) providing airway therapy at the time of transport request. Also noted was the need for any further airway management by the transport team and the outcome of the child on hospital discharge.

Airway compromise existed when:

- 1 hypoxia or hypercarbia was demonstrated by blood gas analysis,
- 2 the patient had suffered decreased level of consciousness and was unable to protect his airway,
- 3 indicated by clinical observation of cyanosis, chest

Key words

AIRWAY: management;
ANAESTHESIA: paediatric;
INTENSIVE CARE: paediatric.

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TABLE

<i>Diagnosis</i>	<i>Disease</i>	<i>Airway compromise</i>	<i>Anaesthetist involved</i>	<i>Further airway intervention by team</i>
Coma	16	16	4	8 (50%)
Airway obstruction	18	18	6	4 (22%)
Shock	5	4	0	0 (0%)
Total	39 (100%)	38 (97%)	10 (26%)	12 (31%)

wall indrawing, struggling for breath, or inadequate respiratory effort.

Results

During the study interval 39 children aged three weeks to 12 yr were transported by the team. Thirty-two survived while seven died within six months of hospital admission, as a result of severe neurological damage (Table).

Chart review suggested that the children had three main reasons for airway intervention; coma with impaired respiratory drive (15/39), upper airway obstruction (18/39) and haemodynamic instability with hypoxaemia and present or impending shock (5/39). According to our criteria 38 of 39 children had airway compromise. Anaesthetists were involved before transport with only ten of these 38 children.

The transport team found it necessary to perform further airway management for 12 of 38 (31%) of the children. No extra airway management was required if an anaesthetist was involved. If an airway specialist was not involved, the transport team performed additional airway support in 12 of 28 (43%) of patients. Further airway management included provision of additional O₂, tracheal intubation (five cases), application of positive end expiratory pressure (PEEP) (one case), and institution of mechanical ventilation (six cases), including hyperventilation of head-injured children. There were no cases of oesophageal intubation in the group. In the two patients with epiglottitis the trachea had already been intubated, and they were among the group who had been attended by an anaesthetist.

The only instances where an anaesthetist was involved occurred:

- 1 when the child required airway intervention in the operating room during anaesthesia, with the possibility of a need for a surgical approach to the airway,
- 2 when a "cardiac arrest" was called in the community hospital.

Although several of the patients were transported by air, none of the airway management performed by the transport team was done specifically to prevent problems associated with air transport.

Discussion

This study revealed a high incidence of airway compromise in children requiring critical care transport. The patients who were initially attended by an anaesthetist required no further airway management, while 43% of those without involvement of an airway specialist required further airway stabilization by the transport team. However, anaesthetists were involved in only a small percentage of cases. The overall mortality of 18% indicated the severity of illness in this group of children. Earlier complete airway management might have improved their outcome.

The importance of airway management is common knowledge among practicing anaesthetists.¹⁻⁵ It has been shown that the outcome of head-injured patients can be improved with airway management⁶⁻⁹ and control of hypotension and seizures.¹⁰ The anaesthetists' role in the head-injured patient was reviewed by Gelb *et al.*¹¹ Aggressive supportive management of the patient with other critical illnesses can also improve outcome.^{12,13} Avoidance of hypothermia during resuscitation is especially important in paediatric patients.^{14,15} Anaesthetists are ideal resource physicians in dealing with these concerns.

Our "transport team" consists of a critical care fellow or senior paediatric resident with airway management skills, paediatric critical care nurse, respiratory therapist and two ambulance attendants. The team is continuously available to retrieve critically ill children from hospitals where facilities do not exist for their optimal care. The average response time from the request for transport to the team being on the way to the referring hospital is 40 min. Travelling time to the referring hospital varies with distance, weather conditions, and mode of transport.

The immediate provision of optimal airway management is important to critically ill children and cannot await arrival of the transport team. As emergency physicians with specialized airway training take up practice in smaller hospitals, they may be able to provide such care. All physicians who work in emergency departments should seek advanced airway management training and maintain these skills. In cases where the primary physi-

cian is not an airway specialist, a multi-disciplinary approach including an anaesthetist should be considered early in the care of these patients. In most situations, an anaesthetist based at the primary hospital could attend to such patients before the arrival of the transport team.

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