Should parents accompany critically ill children during inter-hospital transport?

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Background: Parental accompaniment during inter-hospital transportation (retrieval) of critically ill children is not commonplace in the United Kingdom.

Methods: A three month pilot of parental accompaniment was undertaken in 2002 (143 retrievals), after which time the policy was adopted as standard practice. A follow up audit was performed in 2004 (136 retrievals).

Results: Findings were remarkably consistent between the two periods. Staff perceived little or no added stress during the majority of transfers (96% in 2002, 98% in 2004), and felt able to perform medical interventions without hindrance (98% in 2002, 100% in 2004). There was good agreement between medical and nursing staff regarding perception of stress and ability to perform interventions (phi statistic 0.57 to 1.00). Adverse events occurred during 11 (3.9%) retrievals; six of these involved a parent exclusively. Stress tended to be associated with adverse events or parental behaviour rather than disease acuity. Staff vetoed the offer of accompaniment on 11 occasions, for a variety of reasons. The majority of parents found the experience safe, beneficial, and perceived a reduction in stress as a result. These data may inform other retrieval services who are considering adopting a similar policy.

METHODS

A preliminary, anonymised survey of 100 PICU staff was undertaken in April 2002, to gauge attitudes regarding parental accompaniment. Although 72% of respondents supported this concept, one third of this group specified that accompaniment should not be offered unconditionally. Several themes were identified, including: severity of the child’s illness, mental state of the parents, a clear explanation of the benefits and risks being given to parents before embarkation, and the ability of the ambulance crew to look after parents if cardiopulmonary resuscitation was needed. Many staff expressed concerns that they would be placed under undue stress, and may be inhibited from carrying out medical procedures.

On the basis of the survey, a three month pilot was undertaken between October and December 2002 (period 1), whereby one parent or guardian was offered the opportunity to travel in the ambulance. Any of the retrieval team members (doctor, nurse, ambulance driver) had right of veto. Parents were given an information sheet about what to expect when travelling in the retrieval ambulance, and retrieval staff discussed aspects of safety with parents prior to departure. Before commencing the pilot, clarification was sought about cover provided by the ambulance service’s insurance policy with respect to parental accompaniment.

Data were collected prospectively concerning patient demographics, retrieval team composition, medical and nursing interventions required during the journey (interventions were defined as those over and above routine physiological monitoring), and the occurrence of adverse events. The definition of an adverse event has been published previously. Briefly, an adverse event was defined as any unforeseen occurrence which could actually or potentially affect patient care or the safety of anyone in the ambulance. These included: (a) physiological deteriorations (for example, hypotension, hypoxia); (b) equipment/therapy failures (for example, loss of oxygen supply, mechanical ventilator malfunction); or (c) other (motor vehicle accident, aggressive/abusive behaviour). Nursing and medical staff were
agreement.18 Like kappa, values for
producing a chance independent measure of inter-observer
low kappa values. Phi corrects for this phenomenon,
agreement over and above chance is small, producing very
perceived as stressful). When this occurs, kappa derived
extreme (for example, if the majority of retrievals were
situations where the majority of outcomes cluster at one
retrievals during period 1 and 136/150 (91%) during period
Staff questionnaires were returned for 143/155 (92%)
RESULTS
Parents were given a questionnaire after arriving in the
PICU, asking if they had been given the opportunity to travel
in the ambulance, and asking about perceived levels of safety
and information given during the transfer.
Following the pilot, parental accompaniment was adopted as
standard practice, and a follow up audit was undertaken
18 months later, between April and June 2004 (period 2).
Ethical approval was not sought for this audit; however,
the audit was registered with our hospital Trust via the
standard procedure.

Statistics
Data are presented as raw counts and percentages, while
summary statistics are reported as median (interquartile
range). Demographic data are compared using the Mann-
Whitney test (continuous) and χ² test (categorical). For the
staff questionnaire, inter-observer agreement was assessed
using the phi statistic (Φ).17 Phi is more robust than kappa in
situations where the majority of outcomes cluster at one
extreme (for example, if the majority of retrievals were
perceived as stressful). When this occurs, kappa derived
agreement over and above chance is small, producing very
low kappa values. Phi corrects for this phenomenon,
producing a chance independent measure of inter-observer
agreement.18 Like kappa, values for Φ range from −1.0 to
+1.0, with level of agreement interpreted as follows: less than
0, poor agreement; 0 to 0.2, slight; 0.2 to 0.4 fair; 0.4 to 0.6
moderate; 0.6 to 0.8 substantial; and 0.8 to 1.0, excellent
agreement.

RESULTS
Staff questionnaires were returned for 143/155 (92%)
retrievals during period 1 and 136/150 (91%) during period
2, and form the basis of this report. The median (inter-
quartile) journey time from referring hospital to PICU was 40
minutes (25–65). Case mix differed slightly between the
epochs; patients in period 2 were slightly older with a lower
incidence of mechanical ventilation, and hence disease
severity (table 1).
In both periods, the retrieval team typically comprised a
doctor, a nurse, and a dedicated ambulance crew. On 32% of
occasions, the team included more than one member of the
medical staff (typically a fellow and resident), and in 15%
there was more than one nurse in attendance (usually for
training purposes). The most senior medical staff member
present was a consultant (2%), fellow (87%), and resident
(11%). The grade of the most senior nurse in attendance was
H (1%), G (14%), F (45%), and E (40%). Medical or nursing
intervention was required in 39% (109/279) of retrievals
(many of these required more than one type of intervention),
with the commonest interventions being: administration of
sedation and/or neuromuscular blockade (26%), fluid bolus
(10%), commencement or adjustment of an inotrope infusion
(7%), and endotracheal suction (5%). Adverse events
occurred during 11 retrievals (3.9%), and are shown in
table 2. Interestingly, the majority of these were not patient
related, but rather involved staff or parents, or pertained to a
logistic aspect of the retrieval.
Parental accompaniment was offered for the majority (250/
279) of transfers, and was accepted in 71% (178/250) of
these. The commonest reason for declining accompaniment
was the desire for both parents to travel together. The team
was unable to offer accompaniment due to a parent not being
present at the referring hospital on 18/279 episodes (6.5%),
and staff veto occurred on 11/279 occasions (3.9%). Reasons
for retrieval team veto were varied, and are shown in table 3.
There was no obvious relation between the occurrence of
team veto and the seniority of the team members.
The majority of staff found parental accompaniment to be
non or minimally stressful (96% period 1, 98% period 2), and
found little or no difficulty in performing medical/nursing
interventions (98% period 1, 100% period 2). There was
generally high agreement between nursing and medical staff

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Patient demographics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Period 1</td>
</tr>
<tr>
<td>Total number</td>
<td>143</td>
</tr>
<tr>
<td>Median patient age (months)</td>
<td>7.6 (1.4–43)</td>
</tr>
<tr>
<td>Median mortality risk (%)</td>
<td>10 (5–14)</td>
</tr>
<tr>
<td>Number (%) mechanically ventilated</td>
<td>109 (76%)</td>
</tr>
<tr>
<td>Number (%) requiring inotropic support</td>
<td>19 (13%)</td>
</tr>
</tbody>
</table>

*Calculated using the Paediatric Index of Mortality score. Numbers in parentheses represent the interquartile range.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Adverse events occurring during retrieval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td>Age (mth)</td>
</tr>
<tr>
<td>1</td>
<td>180</td>
</tr>
<tr>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>1</td>
<td>156</td>
</tr>
<tr>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>2</td>
<td>172</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>166</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>1.2</td>
</tr>
</tbody>
</table>

HLH, hypoplastic left heart syndrome; TGA, transposition of the great arteries.
DISCUSSION

The results of this audit show that parental accompaniment during paediatric retrieval is feasible, appears beneficial for parents, and generally provides little in the way of stress or hindrance to staff.

It is interesting to note that many of the potential difficulties predicted in our initial staff survey were not realised. One third of PICU staff respondents in the pre-pilot survey who were in favour of parental accompaniment stipulated that a series of conditions should be fulfilled before it is offered. However in practice, staff veto was only taken on 3.9% of occasions, and adverse incidents involving parents reported in 6/178 (3.4%) of accompanied transfers. A similar discrepancy between perceived and actual difficulty has been shown in a large United States survey of 110 retrieval teams.13 Thirty six per cent of teams who do not allow parental accommodation predict potential problems with this practice; however, difficulties are reported by only 8% of teams who allow accommodation.15 It has also been shown that parental presence in the accident and emergency setting does not adversely affect clinical performance or increase anxiety among the attending staff.16

<table>
<thead>
<tr>
<th>Period</th>
<th>Age (mth)</th>
<th>Risk</th>
<th>Diagnosis</th>
<th>Veto</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>68</td>
<td>4%</td>
<td>Status epilepticis</td>
<td>Whole team</td>
<td>Lack of space</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>12%</td>
<td>Bronchiolitis</td>
<td>Whole team</td>
<td>Parent required medical attention</td>
</tr>
<tr>
<td>1</td>
<td>144</td>
<td>4.9%</td>
<td>Multi-trauma</td>
<td>Doctor</td>
<td>Parent’s behaviour perceived as inappropriate</td>
</tr>
<tr>
<td>1</td>
<td>120</td>
<td>30%</td>
<td>ARDS</td>
<td>Doctor</td>
<td>Patient too unstable</td>
</tr>
<tr>
<td>1</td>
<td>31</td>
<td>9.9%</td>
<td>Thoracic aortic tear</td>
<td>Ambulance crew</td>
<td>Unknown</td>
</tr>
<tr>
<td>2</td>
<td>19</td>
<td>3.5%</td>
<td>Asthma</td>
<td>Doctor and nurse</td>
<td>No English spoken, no translator, taxi ordered by DGH</td>
</tr>
<tr>
<td>2</td>
<td>187</td>
<td>26.5%</td>
<td>Severe arrhythmia</td>
<td>Doctor and nurse</td>
<td>Patient too unstable</td>
</tr>
<tr>
<td>2</td>
<td>39</td>
<td>18.7%</td>
<td>Sepsis</td>
<td>Whole team</td>
<td>Patient required medical attention</td>
</tr>
<tr>
<td>2</td>
<td>114</td>
<td>8%</td>
<td>Meningitis</td>
<td>Doctor and nurse</td>
<td>Lack of space</td>
</tr>
<tr>
<td>2</td>
<td>0.1</td>
<td>2.7%</td>
<td>Tricuspid atresia</td>
<td>Doctor and nurse</td>
<td>Mother given birth &lt; 6 h, and required medical attention</td>
</tr>
<tr>
<td>2</td>
<td>0.1</td>
<td>2.9%</td>
<td>Obstructive uropathy</td>
<td>Doctor</td>
<td>Mother given birth &lt; 6 h, and required medical attention</td>
</tr>
</tbody>
</table>

ARDS, acute respiratory distress syndrome; DGH, district general hospital.

Figure 1 Agreement between medical and nursing staff according to the perception of stress and the ability to intervene while in the ambulance. Phi (Φ) was calculated by converting the above 5 × 5 tables to 2 × 2 tables, with scores of 1–2 indicating the absence of stress/difficulty, and scores of 3–5 indicating presence of stress/difficulty. Φ = (odds ratio agreement)²⁻¹/([(odds ratio agreement)²−1] + 1).

<table>
<thead>
<tr>
<th>Period 1</th>
<th>Not stressful</th>
<th>Stressful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>Doctor</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Period 2</th>
<th>Not stressful</th>
<th>Stressful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>Doctor</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
</tbody>
</table>

Was having a parent present stressful?

Were you able to perform interventions?

Table 3 Reasons for staff vetoing offer of parental accompaniment
Although rare, parent related adverse events during the retrieval did have an impact on our staff, producing a degree of stress that was higher among nurses. Adverse events causing greatest stress were those that involved a parent becoming unwell, or exhibiting aggressive behaviour. Although staff did not perceive difficulty in performing interventions on these occasions, we are unable to assess whether stress compromised performance in other ways (such as decision making and technical competence); thus this factor must be born in mind by other retrieval services that are considering parental accompaniment. Conversely, many staff members reported that having a parent present produced a calming effect on non-ventilated patients, similar to the United States experience. Other benefits reported by staff included opportunities to develop a rapport with the parent, explain aspects of the child’s illness, clarify what to expect while in the intensive care unit, and to take a full medical history.

These themes were mirrored by the parents’ survey, where the perception of benefit was an unambiguous and recurrent qualitative finding. It was remarkable how similar many of the comments were to those reported from an audit in the United States. The latter report highlighted that parental presence during medical procedures. Am J Dis Child 1990;144:270–1. Other benefits reported by staff included opportunities to develop a rapport with the parent, explain aspects of the child’s illness, clarify what to expect while in the intensive care unit, and to take a full medical history.

A service development may initially be followed by a honeymoon phase, after which time enthusiasm for the development wanes, or deficiencies become apparent. Thus diseased acuity did not appear to influence the desire to travel in the ambulance. We also found that parents who did not accompany often reported additional stress associated with negotiating transport to the referral centre. "The worst journey of our lives": parents’ experiences of a specialised paediatric retrieval service. Paediatric Intensive Care Society, UK, 2001.

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Although adverse events were rare, a significant proportion involved a parent directly.

**What is already known on this topic**
- Parental accompaniment during inter-hospital road transportation of critically ill children is uncommon in the UK
- Experience from the United States suggests that this may place extra stress on staff

**What this study adds**
- Parental accompaniment per se does not appear to increase staff stress nor compromise the performance of medical interventions in the majority of occasions. When present, staff stress tends to be associated with parental behaviour and the occurrence of adverse events rather than the child’s disease acuity
- Although adverse events were rare, a significant proportion involved a parent directly

**REFERENCES**