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Transport of critically ill children in a resource-limited setting: alternatives to a specialized retrieval team

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Dear Editor

We agree with Duke's [1] conclusion that although introduction of a paediatric ICU (PICU) transport service in developing countries will minimize technical errors during transport, this might not lead to an overall fall in childhood mortality if scarce resources are diverted from improving overall paediatric care. In Malaysia, where ICU is a developing service, we face similar issues in the transport of critically ill children. In 118 non-specialized transfers to our intensive care unit in Kuala Lumpur, one or more technical adverse events occurred in 48.3% of patients and clinical adverse events in 65.2% (Table 1). More than two adverse events per transport were suffered by 53.6% of patients. Alarmingly 52.5% and 30.5% respectively of the children were in shock or required urgent intubation/reintubation upon arrival at the PICU. Junior staff performed the majority of transports with a mean transport time of 2 h. Adverse events were compared with those occurring in the first 2 h of care in a matched control group (admitted to the PICU from other hospital care areas). There were 0.56 insults per patient in the control patients compared with 4.1 in the transported patients ($p<0.05$).

Table 1 Types of adverse events occurring in non-specialized transport of patients to a paediatric intensive care unit ($n=118$) (*IV* intravenous, *ETT* endotracheal tube)

Adverse events	No.	%
Technical adverse events		
Loss of IV access	32	27.1
Medication error/omission	35	29.6
Inappropriate ETT size	16	13.5
Malpositioned ETT	14	11.8
Oesophageal ETT	16	13.5
Blocked ETT	8	6.7
Clinical adverse events		
Cyanosis/hypoxia	58	49.1
Shock	62	52.5
Hypothermia	32	27.1
Hyperglycemia	15	12.7
Hypoglycemia	15	12.7
Critical adverse events		
Cardiac and/or respiratory arrest	4	3.4
Immediate intubation	16	13.5
Reintubation	30	25.4

In a larger multi-centre study involving three PICUs in Kuala Lumpur comparing 827 non-specialized transports with 877 in-hospital transfers, the differences in standardized mortality ratio (SMR) (1.86 vs 1.57, rate ratio 1.18, 95% CI 0.96–1.46) and adjusted odds ratio of mortality (adjusted for PRISM, length of stay and age) of 1.26 times compared with in-hospital transfers (95% CI 0.96–1.66) were not significant. Thus although adverse events were far more common in transported patients, those receiving care primarily in the tertiary centres (with fewer adverse events) did not have a superior outcome. Therefore introduction of a paediatric retrieval service (PRT) alone might not lead to improved outcomes if tertiary PICU care is not improved first. We believe improvement would come about only after improving *both* pre-PICU and PICU care [2].

Since the introduction in our unit of a pre-transport checklist of important physiological parameters, we have found: (1) more fluid boluses being administered, (2) earlier use of inotropes, and (3) a higher proportion of patients being intubated with appropriately sized/placed tubes prior to transport, leading to a fall in the proportion of children presenting with shock (21% vs 52.5%) and airway compromise (9% vs 30.5%). We agree with Hatherill et al.'s [3] conclusion that in developing countries with limited resources the cost-benefit of a paediatric retrieval team (PRT) needs to be balanced against very compelling and competing primary healthcare priorities. Other measures to reduce adverse events during inter-hospital transfers, such as training of transport staff (paramedics, junior doctors and nurses), adequacy of suitably equipped transport vehicles and close liaison with the tertiary PICU (before and during transport) might offer a viable alternative to a PRT in a resource-limited setting.

References

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