Paediatric intensive care: challenges and promise

Stephen Jacobe, Anthony Slater and Warwick Butt

Children occupy a very special role in our society, invested with our hopes and dreams for the future. The vulnerability and innate innocence of children demand our care and protection, perhaps even more so for children who are critically unwell. It is natural for health care workers, and bedside nurses in particular, to adopt a near maternal role for the child. However, the loving bond between parent and child must be recognised, respected and nurtured wherever possible.[1] Parents are therefore involved as much as possible in their child's care, and most paediatric intensive care units no longer have prescribed visiting hours for parents, and some units have incorporated sleeping "pods" within the patient's room for overnight stays. Depending on the developmental maturity of the child, the ICU may be a terrifying place and reassurance, by even the gentlest of strangers, may be difficult. Elucidating reliable patient perceptions of pain and discomfort is also difficult and, in both instances, the assistance of the child's parent can be invaluable.

There has been considerable improvement in the survival of patients admitted to the paediatric ICU over time. For instance, the crude mortality rate of children during their first admission to ICU at The Royal Children's Hospital Melbourne decreased from 15.2% in 1983 to 4.8% in 2005–2006.[2] The crude mortality rate of children admitted to ICUs across Australasia in 2010 was 3%.[3] Unfortunately, a proportion of survivors may suffer long-term consequences as a result of their illness[4] or even the treatment received in ICU, and the decrease in mortality is partially offset by an increase in morbidity.[2] Despite this, paediatric intensive care remains a cost-effective type of intensive care.[5]

Nearly 15% of admissions have pre-existing moderate to severe disability, and these patients have a worse outcome, with a mortality rate of 29%. Most children lack the capacity to decide what treatments represent their best interests, and it is almost invariably the parent who is asked to act as their surrogate decision-maker whenever important medical decisions need to be made.[6] The lack of prior capacity as well as the presence of the parents as surrogate decisionmakers means that "advance directives" are of less relevance than they are in adult practice. Occasionally there may be differences of opinion between the parents and the child's clinicians; however, such differences are almost invariably resolved over time without recourse to the courts. The majority of deaths occurring in Australian paediatric ICUs follow a decision to withdraw life-sustaining treatment.[7] These decisions are almost invariably made with consensus among the patient's caregivers and family, and the gravity of such a decision for a child's parent cannot be overstated. In this situation, parents need reassurance that their child will not be abandoned,[8] that any decision to refocus treatment efforts towards symptom control rather than striving for a cure represents the best approach for their child, and that they have the support of those around them, including the health care team.

Table 1 summarises the 9375 ICU separations submitted to the Australian and New Zealand Paediatric Intensive Care (ANZPIC) Registry for 2011. It is likely that this represents all

Table 1: Summary of intensive care unit separations for 2011 for children admitted to intensive care and reported to the ANZPIC Registry

Details of separations	No. admitted	No. of deaths	Survival %
Number of admissions			
Children admitted to a PICU or NICU/PICU	7707	201	97.4%
Children >16 years admitted to PICU	232	13	94.4%
Children <16 years admitted to a general ICU	1668	54	96.8%
Most frequent reasons for admission			
Medical reasons			
Bronchiolitis	872	1	99.9%
Seizures	472	3	99.4%
Surgical reasons			
Spinal instrumentation	222	0	100.0%
Ventricular septal defect repair	219	0	100.0%
Causes of death in ICU*			
Out-of-hospital cardiac arrest	68	30	55.9%
Septic shock	166	30	81.9%
Traumatic brain injury	255	21	91.8%
ICU therapies			
Invasive ventilation	4396	231	94.7%
Non invasive ventilation	1479	41	97.2%
Oxygen via high flow nasal cannulae	1036	19	98.2%
High frequency oscillation	156	33	78.8%
Continuous renal replacement therapy	81	27	66.7%
Peritoneal dialysis	202	16	92.1%
Nitric oxide	218	46	78.9%
Inotrope infusion	1958	174	91.1%
Extracorporeal life support	115	31	73.0%

ANZPIC = Australian and New Zealand Paediatric Intensive Care. PICU = paediatric intensive care unit. NICU = neonatal intensive care unit. * Most frequent reason for admission in non-survivors.

children admitted to the nine specialist units and 92% of all children admitted to ICU in Australia and New Zealand. ICU mortality was 2.6% for all admissions and 5.3% where invasive ventilation was required. Advanced support techniques including continuous renal replacement therapy, high frequency oscillation, and extracorporeal life support were used in 0.9% to 1.7% of admissions with an increased mortality of 21% to 33%.

Paediatric intensive care began in the early 1960s with the use of prolonged intubation after surgery and has, like adult intensive care in Australia, become well organised. As critical care developed in Australia, paediatrics was included in clinical and scientific meetings (such as the Australian and New Zealand Intensive Care Society [ANZICS] meetings), research groups (the ANZICS paediatric study group and clinical trials group), training certification (by the Joint Faculty of Intensive Care Medicine and the College of Intensive Care Medicine of Australia and New Zealand) and in *Critical Care and Resuscitation*. We hope over the next few years to contribute more to the Journal as it further evolves and develops.

Competing interests

None declared.

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