Recollection of children following intensive care

S Playfor, D Thomas, I Choonara

Abstract
Background and aims—The recollections of critically ill children following discharge from the paediatric intensive care unit (PICU) have not previously been described. We have interviewed such children to establish the nature of their recollections.

Methods—Children aged 4 years and above were interviewed following discharge from the PICU at the Queens Medical Centre, Nottingham, either in hospital or at home, using a semistructured interview. Their recollections were recorded and interpreted by content analysis.

Results—A total of 38 interviews were carried out; 44 specific recollections were recorded and interpreted by content analysis. Children's recollections of PICU are mainly neutral or positive. Mechanically ventilated children sedated with midazolam and morphine remember little of endotracheal intubation.

Keywords: recall; paediatric intensive care; midazolam

There have been no studies describing the recollections of critically ill children following intensive care admission. Studies have shown that adult patients frequently have unpleasant recollections of the intensive care unit, and often remember periods of mechanical ventilation and therapeutic paralysis.

We have assessed the recall of children aged 4 years and above following discharge from a paediatric intensive care unit (PICU) by means of a single semistructured interview.

Methods
This study took place on the PICU at the Queens Medical Centre, Nottingham, UK and was approved by the local ethics committee. Two groups of children were studied. Group A included children aged 4 years and above admitted to the PICU over a period of 12 consecutive weeks from the onset of the study. Group B included similar children who had been mechanically ventilated in the seven months prior to the onset of the study.

Results
A total of 38 interviews were carried out: 24 from group A and 14 from group B. There were 45 admissions of children aged 4 years and above to the PICU during the study period. Of those children not interviewed: 11 had pre-existing severe learning difficulties, four suffered ongoing neurological deficits as a result of their illness which precluded...
interview, three children refused to be interviewed, two were lost to follow up, and one child died. There were no statistically or clinically significant differences between the responses of group A and group B.

The median age of all interviewed patients was 12 years (range 4–16 years); 47% were male. Table 1 shows their clinical diagnoses. The median duration of PICU admission was three days (range 1–11 days). Twenty five children (66%) were mechanically ventilated and seven (18%) were treated with neuromuscular blocking agents. Interviews for group A took place after a median interval of two days following discharge from PICU (range 1–12 days). Interviews from group B took place after a median interval of 16 weeks following discharge from PICU (range 4–28 weeks).

Twenty five children (66%) were able to remember the PICU and 17 (45%) knew why they had been there. All those who were not mechanically ventilated could remember the unit although notably only one of the six children (17%) admitted with a head injury remembered the PICU.

In response to question 3, “What do you remember about the intensive care unit?” children expressed 44 specific recollections (Fig 1); 26 of these were classified as neutral and related mainly to observations of the medical equipment surrounding them, the environment, and how they were feeling. Eleven positive recollections were expressed, the most common of which related to the nursing staff, followed by environmental factors such as the television. Seven negative recollections were expressed. Four related to the environment: three complained about noise levels, and one complained about never knowing what time of day it was. The other three negative recollections related to medical care: two regarding nasogastric tubes, and one regarding an endotracheal tube. Only one child said that the PICU was overall a bad place. She could recall no specific bad things and could only add, “I don’t like it. I don’t like having to go there.”

Twenty one children (55%) could remember the PICU nursing staff, regarding whom there were 32 specific recollections; 16 related to the provision of nursing care and 13 related to personal interaction such as “being kind” and “talking to me”. Only one child could remember the medical staff; “The doctor said ‘you look glum, give us a smile’”.

When asked to highlight good things, 26 factors were identified; the most common of these related to the care received by the child: being made better (six statements) and being looked after (four statements). The next most common statements related to the nursing staff and environmental factors such as the comfortable, relaxed, or friendly atmosphere on PICU and especially the television and videos. When asked to highlight bad things, 14 factors were identified. The most common of these related to aspects of medical care: nasogastric tubes, needles, and bad tasting medicine. The next most common group was environmental factors such as noise or an uncomfortable bed. Four personal factors were identified: being unable to speak because of the endotracheal tube, lack of sleep, not knowing the time of day, and being hungry. One 7 year old boy was concerned that the PICU “could be quite dangerous with all those sharp things around”.

On direct questioning 11 children (29%) remembered being in pain. Eight children (21%) said that they had been scared and six (16%) complained of being unable to sleep because of noise or discomfort: “I couldn’t sleep because I had to stay on my back. I’d be awake from about one o’clock in the morning.” Eight children (21%) complained of being thirsty. Two children experienced unusual dreams following PICU discharge: one dreamt about “doctors putting lines into me” but said that they were not upsetting, and the other reported “some really weird dreams that I can’t explain. They were a bit frightening”.

Of the 25 children who had been mechanically ventilated, 12 (48%) were able to remember PICU. Four children (16%) had some recollection of mechanical ventilation: one child reported, “it felt like normal breathing”, one child remembered the tube being down her throat and being unable to speak because of it, and two children remembered coughing as the endotracheal tube was removed. Seven children had been treated with continuous infusions of neuromuscular blocking agents and none had any recollection of therapeutic paralysis. Because of the low levels of recall in children treated with infusions of midazolam...
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Midazolam is recognised as an effective sedative agent and is widely used in critically ill children worldwide. The benzodiazepines are excellent agents for inducing antegrade amnesia without impairing the ability to retrieve previously learned information. Midazolam has been shown to reduce the recollection of critically ill adult patients, although this may not be true at low doses. It is well known that the handling of midazolam varies between age groups, and that wide interindividual variations occur in the pharmacokinetics of midazolam in critically ill children. Our study suggests that midazolam has a significant amnesic effect when administered by continuous infusion to critically ill children, which adds to its profile as a useful sedative agent in this group. Further studies involving larger numbers of children would be required to determine if the depth or quality of sedation obtained with midazolam was correlated with recall. The effects on subsequent patient recall should be considered when assessing the efficacy of sedation regimes in intensive care.

We are grateful for the assistance of Dr Neal Chilvers in the data analysis of this paper.

Appendix 1: Recall questions
1. Do you remember being on the intensive care unit? (If “No”; The place where you were before you were brought here. The place where you were very poorly. If still “No” ask Questions 2, 11, 15, 16).
2. Do you know why you were admitted to the unit?
3. What do you remember about the intensive care unit?
4. Overall was it good or bad?
5. What were the good things?
6. What were the bad things?
7. Were you ever in pain?
8. Were you ever scared?

We have shown that children interviewed following discharge from PICU have essentially neutral recollections, with any negative recollections focusing on uncomfortable aspects of medical care or environmental factors. Almost one third of the children in this study remembered being in pain, a similar result to that found in a recent adult study. Effective management of pain is increasingly recognised as an important element of critical care; with modern anaesthetic and analgesic techniques the quality of this aspect of care should be improved.

The children in this study remembered little of mechanical ventilation and nothing of therapeutic paralysis. Only one ventilated child could clearly remember the presence of the endotracheal tube, and she highlighted the anxiety that resulted from inability to communicate. The traditional goals of sedation have been to facilitate mechanical ventilation, reduce anxiety and distress in the child, and allow for tolerance of diagnostic and therapeutic procedures. Additional benefits may include reduced patient recall, which may be an important factor in reducing subsequent psychological morbidity, and may reduce the incidence of post-traumatic stress disorder following critical illness.

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8. Were you ever scared?
9 Could you sleep when you were tired?
10 Could you get a drink when you were thirsty?
11 Have you had any bad dreams? (If “Yes”; What were they about?)
[12] Do you remember being on the breathing machine? (If “Yes”; What was it like?)
13 What were the noises you could hear?
14 Do you remember the nurses? (If “Yes”; What were they doing?)
[15] How do you feel about being back on the ward?
16 If you got poorly again and had to go back to the intensive care unit how would you feel about it?

Key: [ ] indicates optional questions.


12 Bion JF. Sedation and analgesia in the intensive care unit. Hospital Update 1988;14:1272–86.
15 Shelley MP. Sedation in the ITU. Care of the Critically Ill 1998;14:85–8.
23 Park GR, Navapurkar V. Sedation in the critically ill patient—the place of midazolam. Care of the Critically Ill 1994;10:5–9.
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