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. The majority of these recollections were neutral (60%) or positive (25%). Only 15% of recollections were negative. No child reported recollections of the intensive care unit, and treated with neuromuscular blocking agents remembered any period of therapeutic paralysis.

Conclusions—Children’s recollections of PICU are mainly neutral or positive. Mechanically ventilated children sedated with midazolam and morphine remember little of endotracheal intubation.

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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 for their written informed consent. Children with learning difficulties severe enough to preclude interview were noted and excluded. Following their discharge children were seen in general ward areas and a semistructured interview with a maximum of 16 questions was applied (Appendix 1). Standard prompts were used with question 1, “Do you remember being on the intensive care unit?” to assist children in identifying which part of the hospital was the PICU. A single investigator (SP) carried out all interviews and parents of all younger children were present. Older children were given the option of having parents present. Interviews were tape recorded and lasted for a maximum of 15 minutes. Children were then asked to “draw a picture of what it was like to be on the intensive care unit.”

GROUP A
Once it was apparent that their child was likely to survive PICU admission, parents were asked...
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 themes; particularly 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 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...
Recollection of children following intensive care

447

and subsequent recall.13

mented on the potential link between sedation

admission.10

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recall of critical care experience is not signifi-

or subsequent psychologi-

cal morbidity,14 and may reduce the incidence

of post-traumatic stress disorder following

critical illness.12

Midazolam is recognised as an effective

dative sedative agent18 and is widely used in critically

ill children worldwide.19 20 The benzodi-

azepines are excellent agents for inducing

antegrade amnesia without impairing the abil-

ity to retrieve previously learned information.21

Midazolam has been shown to reduce the rec-

collection of critically ill adult patients,12 al-

though this may not be true at low doses.22 It is

well known that the handling of midazolam

varies between age groups,23 and that wide

interindividual variations occur in the pharma-

cokinetics of midazolam in critically ill

children.24 Our study suggests that midazolam

has a significant amnesic effect when adminis-

tered 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 corre-

sponding to any significant differences between the

groups.15

We have interviewed children over a broad

age range, following the advice of a child

psychologist, and do not feel that the age of the

children influenced their responses. Similarly

we interviewed children in group B after a vari-
able interval following discharge which may

have influenced their recall, although we were

reassured by the lack of difference in the nature

of responses between groups A and B, and by the

findings of adult investigators who found recall

of critical care experience is not signifi-
cantly affected by the time elapsed since

admission.10

We have shown that children interviewed

following discharge from PICU have essentially

neutral recollections, with any negative recol-

lections focusing on uncomfortable aspects of

medical care or environmental factors. Almost

one third of the children in this study remem-

bered being in pain, a similar result to that

found in a recent adult study.14 Effective man-

agement 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 therapeu-

tic paralysis. Only one ventilated child

could clearly remember the presence of the

endotracheal tube, and she highlighted the

anxiety that resulted from inability to commu-
nicate. The traditional goals of sedation have

been to facilitate mechanical ventilation, re-

duce anxiety and distress in the child, and allow

for tolerance of diagnostic and therapeutic

procedures.15 Additional benefits may include

reduced patient recall, which may be an impor-
tant factor in reducing subsequent psychologi-

cal morbidity,14 and may reduce the incidence

of post-traumatic stress disorder following

critical illness.17

Discussion

Initial reports of recollection following inten-
sive care were based on the frequently disturb-
ing personal accounts of adults highlighting the

inability to communicate, pain, fear, and

hallucinations.24 Subsequent studies have

shown that up to 50% of adult patients may

remember extensive details of treatment re-
ceived, including mechanical ventilation and

therapeutic paralysis.5-10 In a more recent

study, 36% of adult patients recalled therapeu-

tic paralysis and highlighted temporal disorien-
tation, sleep disturbance, and difficulty in

breathing as major negative experiences.11 It

has been shown that the degree of recall in

adult patients is correlated with the severity of

their illness,12 and other authors have com-

mented on the potential link between sedation

and subsequent recall.13

We have interviewed children over a broad

age range, following the advice of a child

psychologist, and do not feel that the age of the

children influenced their responses. Similarly

we interviewed children in group B after a vari-
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of critical care experience is not signifi-
cantly affected by the time elapsed since

admission.10

We have shown that children interviewed

following discharge from PICU have essentially

neutral recollections, with any negative recol-

there was no correlation between severity of ill-

ness, or depth of sedation, and subsequent recall.

Of those children interviewed in hospital

88% were positive about their move to a

general ward area. Overall, 79% of children felt

neutral regarding any future readmission to

PICU and 13% felt negative.

Only nine children were willing to draw pic-
tures; the majority were either feeling too

unwell or were too embarrassed. The majority
drew themselves lying in bed or standing in the

hospital such as in fig 2.

Appendix 1: Recall questions

1. Do you remember being on the intensive care unit? (If “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 are grateful for the assistance of Dr Neal Chilvers in the data

analysis of this paper.

www.archdischild.com
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.

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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