

# Rats, cats and scorpions: children's hallucinations in paediatric intensive care

According to two new studies, a significant number of children are experiencing disturbing hallucinations following their treatment on paediatric intensive care units. Furthermore the content of these hallucinations is remarkably similar to that described by adult intensive care survivors in a growing number of anecdotal reports published recently.

Schieveld et al (2007) reported a series of 61 paediatric intensive care inpatients aged 0–17 years, who were referred to a neuropsychiatry service at the University Hospital Maastricht in the Netherlands. Of the children referred, 40 were diagnosed as suffering from delirium using adapted adult criteria. In the majority of these cases the type of delirium was hyperactive or emerging and a subsequent article on an expanded sample of 46 children has revealed that, although the range of symptoms of delirium was similar to that reported by comparison groups of 49 adult and 70 geriatric intensive care patients, the children reported significantly higher frequency and intensity of visual hallucinations (Leentjens et al, 2008).

Older children reported higher rates of delirium, but the authors caution that this may have been in part because the assessment of delirium was more problematic with younger children, who form the majority of admissions to paediatric intensive care internationally. It will clearly be a challenge to find a form of words in any future paediatric delirium assessment tool that will be applicable across the paediatric age range. In this context, the authors make an interesting observation which they feel could prove to be important diagnostically: a number of parents summed up the change in their son or daughter with the dramatic comment that the child no longer seemed like theirs.

If it is assumed that ward staff in this study correctly identified all cases of delirium and referred all of them on to the neuropsychiatry service, the estimated incidence of delirium for the population

of children from which the original sample was drawn would be 5%. However, as the authors point out, this rate is considerably lower than rates reported in prospectively screened adult intensive care patients and concede that this may well be an underestimate, particularly in terms of the number of children suffering from hypoactive delirium. Also although they report 100% remission rates for the 38 out of 40 children treated with antipsychotic medication (haloperidol ( $n=27$ ); risperidone ( $n=10$ ); both ( $n=1$ )), they acknowledge that little is known about the natural history of these symptoms and that conclusions about the benefits of medication in this situation should ideally be based on the results of a randomized double-blind placebo-controlled trial.

In another study by Colville et al (2008), based at Great Ormond Street Hospital for Children in the UK, a consecutive series of 102 children aged 7–17 years were interviewed prospectively about their recall for events during their intensive care admission, 3 months after discharge. It was found that 34 children (33%) reported some form of delusional memory, usually at the end of their intensive care admission (with 25 specifically mentioning a hallucinatory experience). The content of hallucinations was predominantly threatening and usually visual, although tactile hallucinations were also reported. Children reported seeing rats, cats and menacing cartoon characters and feeling as though they had scorpions and spiders crawling over them. A couple of children also remembered having a strong sensation that their parents had been replaced by impostors.

Associations between these experiences and a number of medical and demographic factors were examined and the strongest found was the association with length of time on sedation or analgesia. This finding is consistent with the adult literature and with a number of reports of children suffering withdrawal symptoms, including hallucinations, in association with the

types of medication most commonly used on paediatric intensive care units, e.g. benzodiazepines and opiates (Ista et al, 2007). The further finding that the presence of such delusional memories was independently associated with the child's score on a post-traumatic stress screening questionnaire is cause for concern and is consistent with work on adult intensive care survivors, which has shown that patients who have delusional experiences, particularly if they have no factual recall of their admission, are at increased risk of developing post-traumatic stress reactions (Jones et al, 2001).

## Clinical implications

Hallucinations are frightening for patients to endure and upsetting for parents to witness. The frequency with which these phenomena were reported, particularly in the consecutive sample reported by Colville et al (2008), suggests that there is a need both to educate staff and to inform families about the possibility that patients may be hallucinating.

If these symptoms are identified during admission they can be treated pharmacologically with haloperidol, risperidone or clonidine which have all been demonstrated to reduce or eradicate anxiety and agitation. It may also be that environmental manipulations such as reducing noise and simplifying the immediate physical surroundings around the bed would further reduce the incidence or severity of symptoms. Finally, it is possible that if older children are simply asked more routinely whether they have had these disturbing experiences and reassured that they are transient and not uncommon, they will be less preoccupied and disturbed by them after leaving the hospital.

## Research implications

Formal assessment of withdrawal and delirium (both of which can include the presence of hallucinations) in adult intensive care patients is patchy, but occurs even less often in paediatric intensive care

patients (Ista et al, 2007). This is an important issue which is hampering potentially relevant research studies such as those currently being undertaken with adults in this field. A recent randomized controlled study of adult intensive care patients has shown that the use of dexmedetomidine as the principal sedating agent was associated with lower rates of delirium and coma than lorazepam (Pandharipande et al, 2008). In addition, interrupted sedation has also been shown to be associated with reduced rates of delirium and longer term psychological benefits in adult intensive care patients (Kress et al, 2003).

## Conclusions

There is an urgent need for the development and standardization of measures of withdrawal and delirium for children in intensive care settings, particularly given the association between the latter and morbidity and mortality in adults (Ely et al, 2004). Once agreement has been reached on how to measure these distressing symptoms in paediatric patients, it will be possible to establish which children are at the greatest risk of experiencing them. It will also then be possible to investigate the extent to which they can be prevented or reduced in clinical trials designed to evaluate the impact of substituting alternative sedation regimens, varying rates of wean-

ing sedation and analgesia and prescribing antipsychotic medication. **BJHM**

### Gillian Colville

Consultant Clinical Psychologist  
Paediatric Psychology Service  
St George's Hospital  
London SW17 0QT

Colville G, Kerry S, Pierce C (2008) Children's factual and delusional memories of paediatric intensive care. *Am J Respir Crit Care Med* **177**: 976–82

Ely EW, Shintani A, Truman B et al (2004) Delirium as a predictor of mortality in mechanically ventilated patients in the intensive care unit. *JAMA* **291**: 1753–62

Ista E, van Dijk M, Gamel C, Tibboel D, de Hoog M (2007) Withdrawal symptoms in children after long-term sedatives and/or analgesics: a literature review. 'Assessment remains troublesome'.

*Intensive Care Med* **33**: 1396–406

Jones C, Griffiths RD, Humphris G, Skirrow PM

(2001) Memory, delusions, and the development of acute posttraumatic stress disorder-related symptoms after intensive care. *Crit Care Med* **29**: 573–80

Kress JP, Gehlbach B, Lacy M, Pliskin N, Pohlman AS, Hall JB (2003) The long-term psychological effects of daily sedative interruption on critically ill patients. *Am J Respir Crit Care Med* **168**: 1457–61

Leentjens AFG, Schieveld JNM, Leonard M, Lousberg R, Verhey FRJ, Meagher DJ (2008) A comparison of the phenomenology of pediatric, adult, and geriatric delirium. *J Psychosom Res* **64**: 219–23

Pandharipande PP, Pun BT, Herr DL et al (2008) Effect of sedation with dexmedetomidine vs lorazepam on acute brain dysfunction in mechanically ventilated patients: the MENDS randomized controlled trial. *JAMA* **299**: 2644–53

Schieveld JN, Leroy PL, van Os J, Nicolai J, Vos GD, Leentjens AF (2007) Pediatric delirium in critical illness: phenomenology, clinical correlates and treatment response in 40 cases in the pediatric intensive care unit. *Intensive Care Med* **33**: 1033–40

## KEY POINTS

- Symptoms of delirium reported by critically ill children are similar to those reported by adults on intensive care units.
- A significant proportion of children report disturbing hallucinations and/or delusions in association with admission to paediatric intensive care.
- Children's visual hallucinations are more frequent and intense than those reported by adult intensive care patients.
- Length of time on sedation or analgesia is significantly associated with reports of hallucinations and/or delusions.
- The presence of delusional memories is a significant independent predictor of a child's post-traumatic stress score after discharge.