Editorial

Awareness and paediatric anaesthesia

ANDREW J. DAVIDSON MBBS, FRCA
Department of Paediatric Anaesthesia and Pain Management, Royal Children’s Hospital, Melbourne, Australia

Awareness is a topical and controversial issue in adult anaesthesia. Scant attention has been paid to this topic in children. Accepting extrapolations from adult data may not be sufficient due to the differing practise of anaesthesia in paediatrics, the altered pharmacology of anaesthetics and the developmental psychology of children.

Current revival of interest in awareness in adults has been stimulated by the availability of new technologies to assess various aspects of the depth of anaesthesia. The auditory evoked response and the electroencephalogram have been analysed to produce several measures of anaesthetic depth. This analysis has occurred in the adult population and, due to maturational characteristics of the brain, all these devices will need to be calibrated for children. The Bispectral Index (BIS) has been investigated the most extensively. The BIS, at least in the older children, has similar characteristics to those seen in adults (1–3). In infants, the meaning of the BIS number is less clear (1). At least three large trials are currently in progress assessing the ability of BIS to reduce awareness in adults. Before applying these technologies to reduce awareness in children, not only do they need to be calibrated in children but also a greater understanding of awareness in paediatric anaesthesia is required.

No recent surveys of awareness have been performed in children. In 1973, McKie and Thorpe reported an alarming incidence of 5% amongst 202 children aged 7–14 years who were undergoing a variety of surgical procedures (4). In 1988, two smaller studies from Liverpool of 120 children aged 5–17 years and 144 children aged 5–14 years reported no cases of awareness (5,6). These two studies used premedicated daycase patients where the postoperative interview was performed just prior to discharge. The different findings may be explained by the more thorough and extended follow-up in the older study. The current incidence of awareness in adults is low: between 0.1% and 0.2% (7,8). The Liverpool studies, due to their small sample sizes and inferior follow-up, do little to reassure us that the incidence does not remain high in children.

Given the lack of recent data assessing the risk of awareness in children, is there any reason to suppose the risk in children is any different to adults? In adults, causes for awareness include faulty equipment, giving inadequate anaesthesia (either due to the demands of the surgical procedure or poor technique) and increased patient anaesthesia requirement (either due to substance abuse or normal interpatient variability). It is reasonable to assume risk from anaesthesia equipment failure would be the similar. Surgical procedures with a higher risk in the adult population include Caesarean sections, trauma and bronchoscopies. Although bronchoscopies are regularly performed on children, trauma is less common and Caesarean sections are certainly rare! Do paediatric anaesthetists use techniques inherently more prone to awareness? Do anaesthetists run children lighter? There is no evidence to confirm or refute this, although studies comparing BIS numbers in adults and children have found similar or lower BIS numbers during routine paediatric anaesthesia (2,3). One area of possible concern is the more variable pharmacology of anaesthetics in children. The MAC for volatile agents varies with age and the pharmacokinetics of intravenous agents are incompletely determined in children, although we do know propofol requirements are greater (9). It is therefore possible that children could be more frequently underanaesthetized.
From the child’s perspective, the relevance of awareness may also be different. The definitions of consciousness and processes of memory formation are complex and contentious topics even in adults. Even less is known about memory formation in neonates and infants. Pain has certainly been shown to alter behaviour in neonates but is it an issue if a painfree neonate hears the surgeon’s conversation? Infants and toddlers are acutely distressed by parental separation. It is hard to imagine the experience of awareness in this age group being anything but terrifying. Preschoolers who often link fantastic causes to experiences, school age children with concerns for body integrity and adolescents with preoccupations of body image, may all be particularly vulnerable to the adverse effects of an episode of awareness. Of greatest concern is that children are less likely to have the coping strategies of adults.

Awareness in adults is a concern because of the fundamental breach of our personal contract with the patient to keep them asleep, litigation, the distress it causes patients and possible long-term psychological damage. There is no reason why our reassurance to children that they will not wake up should be any less binding than that we give to adults. At present, litigation is not a major issue. However, we have no idea of the psychological impact of awareness in children. Assessing the psychological consequences of awareness remains a challenge in children. Behavioural change is common after hospitalization or surgery. The extent depends enormously on the definition of behavioural change and length of follow-up (10). It is also unclear which aspects of hospitalization are most disturbing. On such a background, it would be difficult to measure the effects of a presumably rare event such as awareness.

In conclusion, there is no reason to think awareness is any less likely or any less distressing in children. The varied pharmacology of anaesthetics in children may make it more likely. For many years, anaesthetists underestimated the issue of awareness in adults. As public interest rises and new technologies appear, there is a pressing need to readdress this issue in children.

References